

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA19FA163

WRECKAGE EXAMINATION SUMMARY

May 4, 2019

A. ACCIDENT

Location: Kent Island, Maryland
Date: May 4, 2019
Time: 1210 EDT
Airplane: Guimbal Cabri G2, N572MD

B. WRECKAGE EXAMINATION SUMMARY

IIC	Heidi Kemner NTSB Ashburn, VA
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C. DETAILS OF THE INVESTIGATION

On May 4, 2019, about 1210, Guimbal Cabri G2, N572MD, was destroyed after it impacted the Chesapeake Bay near Kent Island, Maryland. The private pilot and passenger were fatally injured. The helicopter was registered to a corporation and operated by Monumental Helicopters as a 14 Code of Federal Regulations Part 91 personal flight. Instrument meteorological conditions prevailed for the flight, which did not operate on a flight plan. The local flight originated from Tipton Airport (FME), Fort Meade, Maryland, around 1130.

D. AIRFRAME EXAMINATION

1.0 Fuselage

The helicopter impacted the Chesapeake Bay, about 1 mile from the shoreline. It was located in about 62.8 feet of water. All major components of the helicopter were recovered and an oil sheen was noted on the water by first responders.



Figure 1. View of helicopter after recovery.

The helicopter was recovered on May 6, 2019, and was transported to a salvage facility to facilitate examination. The engine remained attached to the fuselage on two of the three attach points. All 3 main rotor blades were impact damaged, but remained attached to the rotor head and 2 blades were removed by recovery personnel. The fuselage was impact damaged and the forward section was fragmented. The skids were impact separated from the helicopter and recovered.

Cockpit documentation

Rotor Brake - OFF
Mixture Control - Full Rich

Circuit Breakers
BARC Main - popped
Plasma - popped
Strobe Trim - popped
All other circuit breakers remained in place.

Fuel Shutoff - ON position (fuel flowing)

Magneto Switch - ON

Plasma Switch - ON

Hobbs - 0645.5

Instrument Panel

Airspeed - about 80 knots

Altimeter - 4,380 ft

Vertical Speed Indicator - Up 3000 ft/min (maxed)

Master Switch - ON

Strobe - ON

Pump - ON

Alternator - ON

Clutch - ON (engaged)

Nav Light - ON

Landing Light - ON (slightly bent to the left)

Carb Heat - HOT (normal position is "AUTO")

ELT - Armed



Figure 2. View of instrument panel.

Fuselage

The cockpit was impact fragmented. Flight control continuity was confirmed from the flight controls to the main rotor and tail rotor through multiple overstress fractures. Continuity was confirmed from the throttle to the engine through all push pull tubes. The fuel tank was separated from the fuselage but remained attached through a fuel line. The fuel line was separated to facilitate recovery.

The windscreen, doors, and forward section of the fuselage were fragmented. The instrument console remained attached to the main wreckage through cables and wires. The main rotor remained attached to the transmission, which remained attached to the fuselage.

The ELT bracket was impact separated from the helicopter and located; however, the ELT was not in the bracket nor located.

Left Seat – Passenger

The left seat was impact separated and remained attached to the seatbelt. The seatbelt was unbolted to facilitate recovery. Three of the 4 seat attachment brackets remained connected to the seat. The fourth attachment bracket was separated and not located. All 3 of the 4 brackets connected to the seat were splayed out. The seat back was impact separated but remained attached to the lower section of the seat by fabric. The strut remained attached to the seat but the was impact separated from the aft wall of the cabin. The left seatbelt remained attached to the aft wall of the cabin. The top attach point remained in place. The inertial reel operated when the belt was pulled by hand. The belt buckle operated when moved by hand. The left seat left side energy attenuation rail was impact separated and not located. The left seat right side rail remained attached to the aft cabin wall. The bottom section of the rail was impact separated from the top section and located in the water. Impact damage was noted to the left seat right side rail.



Figure 3. Left Seat



Figure 4. Aft view of left seat.

Right Seat - Pilot

The right seat was impact separated, but remained attached to the fuselage by the seatbelt. The seatbelt was unbolted to facilitate recovery. One side of the seatbelt remained attached to the seat. All 4 of the seat brackets remained attached to the back of the seat. The top two and bottom right side were splayed out. The seat back was partially separated from the seat pan where the strut attached to the seat. The seat strut was also impact separated, but the cylinder remained attached to the seat. The section of the seat belt that remained attached from the seat the buckle was cut

by first responders. The top right side shoulder harness was cut. The harness was partially extended from the inertial wheel. The inertial reel operated when tested by pulling on the harness. The right energy absorption rail was bent at the top and bottom of the rail. A portion of the seat strut remained attached to the fuselage. Web stretch was noted on the top right side of the shoulder harness. The top tether point was impact separated and not located. The belt buckle operated when moved by hand.



Figure 5. Right seat.

Aft view of



Figure 6. Aft view of right seat.

The gascolator was removed and fuel was noted in the bowl. The fuel was free of debris.

The rotor head was turned by hand and the transmission fly wheel rotated. When the rotor head was rotated in reverse, the flywheel did not move, which confirmed the operation of the sprag clutch. The main transmission chip detector was removed and ferrous material was noted.



Figure 7. View of rotor head.

Main Rotor Blades

All main rotor blades remained attached to the rotor head but were removed to facilitate recovery. The yellow rotor blade exhibited impact damage and was fragmented. The lead/lag damper was not extended.

The green rotor blade was impact damaged and the outboard portion of the blade was partially separated. The lead/lag damper was extended about 0.5 cm.

The red rotor blade was impact damaged and sections of the trailing edge were splayed open. The red lead/lag damper was extended about 4 cm.



Figure 8. View of main rotor blades.

Tail Section

The fenestron remained attached to the tailboom. Chordwise scratching was noted on the fenestron housing. All fenestron vanes were bent the opposite direction of travel. Furthermore, the tail rotor rotated freely when the tail rotor drive shaft was rotated by hand. Several of the fenestron blade shrouds were stripped and the metal interior remained attached to the tail rotor. The tail rotor drive shaft was bent and was separated from the transmission. Continuity was confirmed from the anti-torque pedals to tail rotor. The tail rotor pitch change links remained attached to the assembly. The chip detector was examined from the tail rotor gear box and was free of debris.

The horizontal stabilizers remained attached to the tail boom. The leading edge of the right horizontal stabilizer was impact damaged.

The top section of the vertical fin on the fenestron was undamaged and remained attached to the tailboom. The lower section of the vertical fin was partially impact separated.



Figure 9. Fenestron

E. ENGINE EXAMINATION

The engine remained attached to the helicopter through two of the three engine mounts. It was removed from the airframe for further examination.

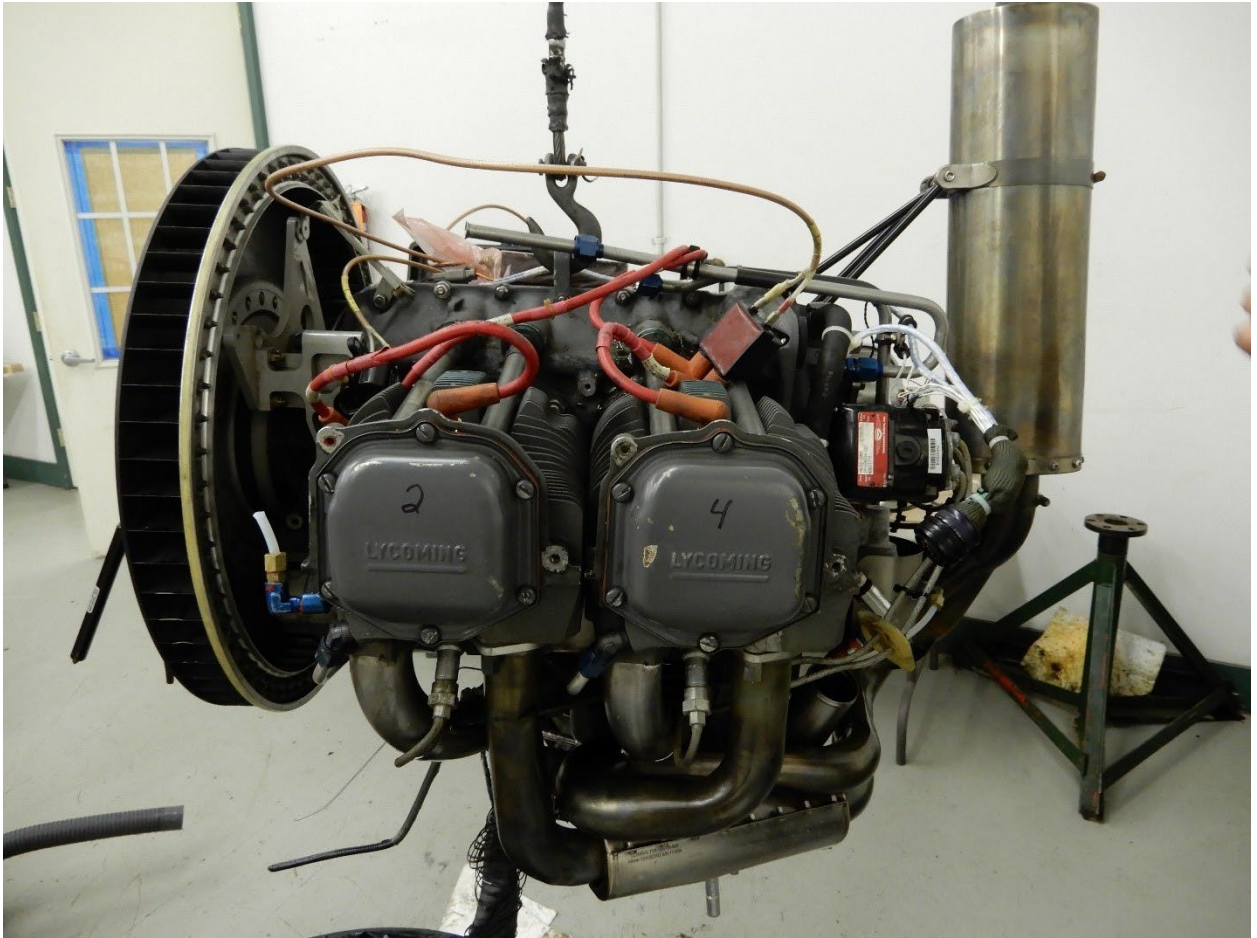


Figure 10. View of engine.

Multiple gallons of water were drained from the engine. Crankshaft continuity was confirmed by rotating the scroll assembly by hand. The scroll assembly exhibited impact damage about 1/3 around the circumference. Thumb compression and suction was noted on the Nos. 2, 3, and 4 cylinders. There was no damaged noted to the engine crankcase or the oil sump.

The No. 1 cylinder was removed and examined. Water was placed in the cylinder to determine where the air was leaking out and water drained a majority through the exhaust and a minor amount through the intake valve seats. The No. 1 piston rings were not aligned.

The carburetor was removed from the engine. Fuel was noted in the bowl and had the presence of water. The floats exhibited hydraulic deformation. The accelerator pump operated when the throttle arm was moved by hand. The carburetor fuel inlet screen was removed and no debris was noted. The carburetor gasket was removed and no tears were noted. There was fuel staining noted on the throttle body arm and side of the carburetor in the vicinity of the throttle body arm.

The carburetor heat door was located in the closed position. The assembly was impact damaged and pushed up onto the carburetor. The automatic carburetor door was tested using a 12V battery. When the wires were connected to the battery, the door operated and moved to an open position. The wires were then moved to the opposite poles of the battery and the carburetor door moved to the closed position.



Figure 11. View of disassembled carburetor.

The oil suction screen was removed and no debris was noted.



Figure 12. View of oil suction screen.

The engine driven fuel pump was removed from the engine and it operated when moved by hand.



Figure 13. View of mechanical fuel pump.

The spark plugs were removed. The top spark plugs were automotive conversions. The bottom spark plugs were aviation spark plugs. All top spark plugs were corroded. The bottom spark plugs were wet, exhibited normal wear, and were light grey in color. The Nos. 3 and 4 spark plugs exhibited wet lead deposits.



Figure 14. View of spark plugs.

The conventional magneto was removed from the engine and produced spark on all towers.



Figure 15. View of magneto.

The oil filter was removed and disassembled. No debris was noted in the filter.

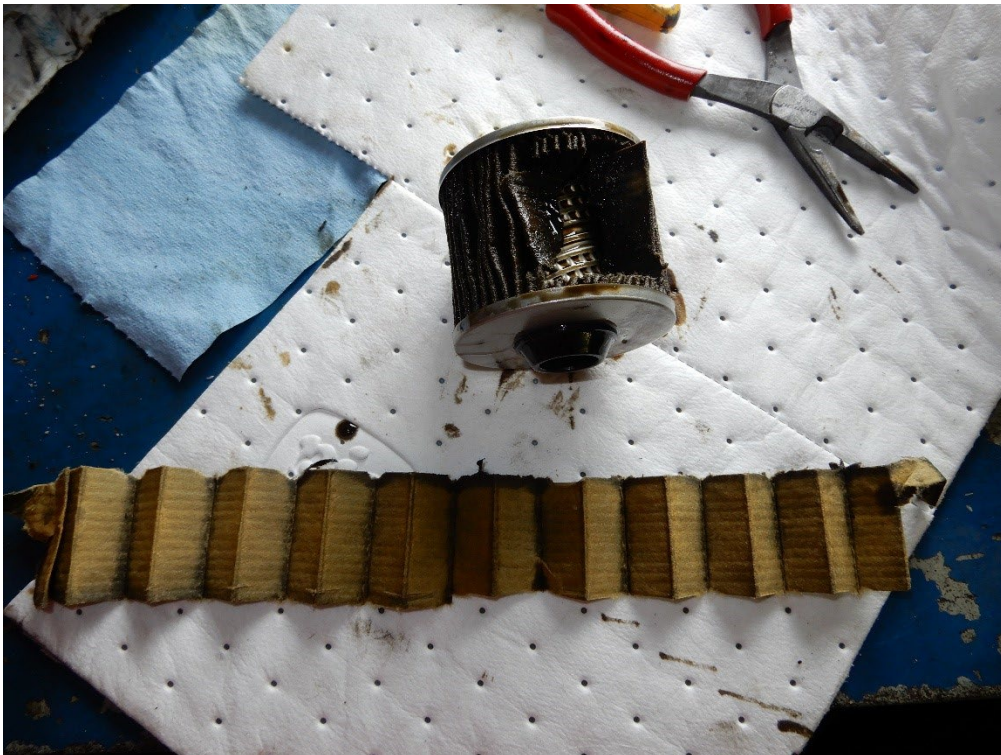


Figure 16. View of disassembled oil filter.

The electronic magneto was recovered and impact damaged was noted to the case. Furthermore, a note on the case of the electronic magneto stated that it was only to be used on experimental type aircraft certificated by the FAA.



Figure 17. View of electronic magneto.

The alternator and started remained securely attached to the engine.
The engine induction filter was impact separated and not located.

Submitted by:

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Air Safety Investigator