

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA21FA135

WRECKAGE EXAMINATION SUMMARY

February 24-25, 2021

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A. ACCIDENT

Location: Mayfield, Kentucky
Date: February 22, 2021
Time: 1756 CST
Airplane: Henry D Babenco / Vans RV-7A, N383DB

B. WRECKAGE EXAMINATION SUMMARY

Investigator-In-Charge	Pete Wentz NTSB Ashburn, VA
Party Coordinator	Brad Gottschalk FAA/FSDO Memphis, TN
Party Coordinator	David Robinson FAA/FSDO Nashville, TN
Party Coordinator	Troy Helgeson Lycoming Engines Williamsport, PA

C. SUMMARY

On February 22, 2021, about 1756 central standard time, a Vans RV-7A, N383DB, was substantially damaged when it was involved in an accident near Mayfield, Kentucky. The private pilot was fatally injured. The airplane was operated under the provisions of Title 14 Code of Federal Regulations Part 91 as a personal flight.

The airplane was witnessed by bystanders at the Mayfield Graves County Airport (M25) Mayfield, Kentucky, conducting touch and go landings on runway 1. Another witness traveling east bound on I-69 saw the airplane climbing, they stated "as the airplane went higher, the tail dropped, and the plane went into a back flip" then they observed the plane come out of the flip and "headed nose first towards the ground."



Figure 1 - Map of Accident Location

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

The airplane came to rest north of the airport about 1011 ft in an open field. All major components of the airplane were located in the vicinity of the main wreckage.



Figure 2- View of airplane at accident location



Figure 3- Airplane's data plate

1.1 Fuselage

The forward cabin was impact crushed. The instrument panel and throttle quadrants were damaged but intact. The nose section, consisting of the powerplant, engine mount, and other accessories, separated from the fuselage.

The fuselage was compressed and torn - recognizable portions included a rear structural frame, sections of airplane skin, and tail cone pieces with registration markings.



Figure 4- Forward cabin and fuselage

Flight control cable continuity was established. The aileron cables were observed.

The elevator control cables were intact.

Both the right and left sides of the rudder had cables attached.

Flap position was undetermined. The left flap push/pull rod was fractured due to impact forces.

1.2 Empennage

The empennage was attached to the fuselage. The vertical stabilizer and rudder remained attached. The leading edge of the vertical stabilizer and the topmost portion of the rudder were impacted damaged.

The left horizontal stabilizer and left elevator remained attached. The outboard portion of the left horizontal stabilizer was impact damaged.

The right horizontal stabilizer and right elevator remained attached. The right horizontal stabilizer was impact damaged at leading edge and connection to the fuselage.

The elevator trim tab remained attached to the inboard portion of the attached left elevator. The elevator trim tab push/pull rod remained attached to the actuator and to the trim tab.



Figure 5 - Empennage

1.3 Wings

The left wing remained attached to the airplane and exhibited accordion-like crushing by impact forces. The left aileron remained attached and intact. The left flap remained attached and intact. The left-wing tip remained attached to the left wing.

The right wing remained attached to the airplane, was torn by impact forces, and exhibited accordion-like crushing. The right aileron remained attached and intact. The right flap remained attached and intact. The right wingtip was separated from the wing.



Figure 6 - Right Wing.



Figure 7 - Left wing.



Figure 8- Right flap push/pull rod, broken.



Figure 9 - Lower right side of rudder, cable attachment point

1.4 Landing Gear

The main landing gear remained attached to the fuselage. The nose landing gear separated from the aircraft on impact.



Figure 10- Main landing gear

1.5 Cockpit

The digital instrument panel (GRT Horizon I and EIS 4000) sustained significant impact damage.

The magnetos switch was in the "Both" position.



Figure 11 - Magneto switch position

The control quadrant was impact crushed. Engine control levers indicated: Throttle, near full forward; propeller, full; mixture, full rich.



Figure 12 - Throttle quadrant controls

1.6 Survivability

Both seats were detached from their rails, and the seat bases were detached from their backs. The left and right shoulder harnesses were found attached to the roof section. Both shoulder harnesses had nylon attachment bushings installed. The shoulder harness webbing and attachment latches appeared undamaged.

1.7 Fuel/Fuel System

Both the left and right wing fuel tanks were breached due to impact. The smell of 100LL aviation fuel was noted at the accident site, but no fuel was observed in either tank.

The left and right fuel tank caps were both in place and intact.



Figure 13 - Left wing fuel tank cap (in place)



Figure 14 - Left fuel tank filler hole (cap removed for exam).

2.0 Engine Examination

Lycoming Y10-360-M1B, serial number L-34116-51E



Figure 15 - Engine data plate (Courtesy of Lycoming)

The engine was manufactured as new by Lycoming on February 21, 2008.

The engine and propeller accumulated 33.5 hours of operation as of an airframe maintenance entry for an oil change on August 13, 2017, completed by the owner/pilot. No additional maintenance was logged after that date.

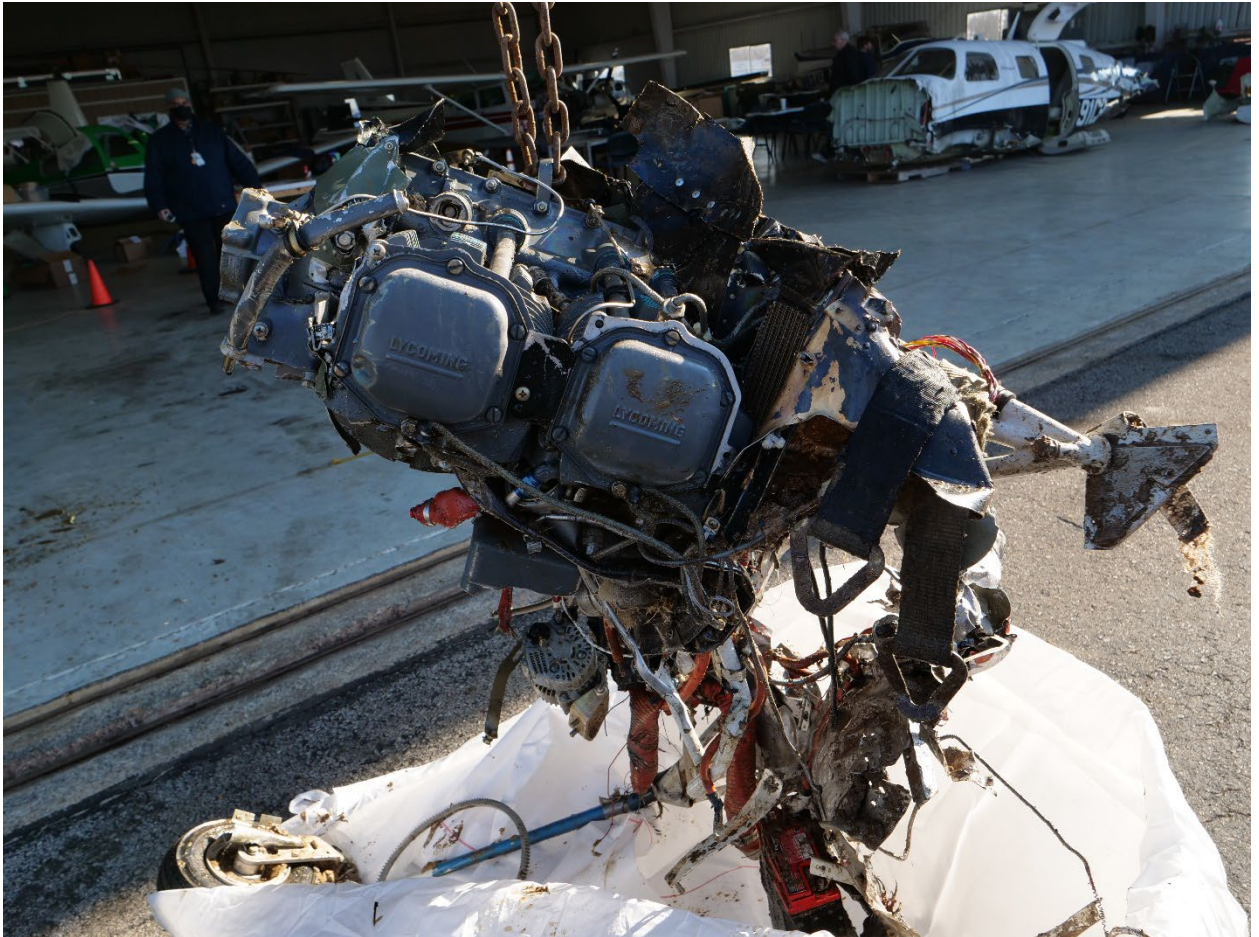


Figure 16 - View of engine after airplane was recovered.

2.1 Magnetos

The right magneto - manufactured by Slick, model 4370 and serial no. 08011640, had a broken flange and was freely rotated by hand, producing a spark at each lead.

The left magneto - manufactured as model 4373 and serial no. 08011874 - was impact damaged (cracked case) and the area around the capacitor was found crushed. The magneto was not rotatable.



Figure 17 - Right magneto, moved from engine.



Figure 18 - Left magneto, removed from engine.

2.2 Fuel System

The fuel system was manufactured by Precision as model EX-5VA1 with setting 30150002. The fuel flow divider was disassembled, and a tear was observed in the diaphragm near the spring.



Figure 19 - Fuel flow divider diaphragm, note tear on left side of spring.

The fuel injectors were removed during exam. Nos. 1, 3 and 4 were clear of debris. No. 2 was fractured from impact damage.

The fuel servo remained attached to the oil sump, with its brass plug tight and safety wired. Fuel was observed coming the servo.

The mixture arm was found separated from the servo. The throttle arm and rod end remained attached to the fuel servo. The throttle cable was separated at the rod portion of the cable.



Figure 20- Fuel servo, removed from engine (Courtesy of Lycoming)



Figure 21- Fuel servo inlet screen (Courtesy of Lycoming)

The engine driven fuel pump was removed and showed signs of impact damage. The pump lever was fractured from the main pump body.



Figure 22 - Engine-driven fuel pump, removed from engine (Courtesy of Lycoming)

2.3 Lubrication System

The oil sump was fractured from the engine and no oil was present as a result of impact damage.



Figure 23- Oil sump, fractured.

The oil suction screen was removed and observed to be clean. The oil cooler was found partially crushed with its lines still attached. The oil filter was crushed.



Figure 24- Oil suction screen (Courtesy of Lycoming).

2.4 Cylinders

The propeller was rotated by hand through 360° of motion and crankshaft and valvetrain continuity was confirmed. Thumb compression was noted on all cylinders. The cylinders were examined by a lighted borescope, and no anomalies were noted.

The top spark plugs - manufactured by Autolite, type UREM38E and SI 1042 Approved - were removed from cylinders Nos. 1, 3 and 4 and noted as having an undamaged electrode / normal per the Champion Aviation Check-A-Plug Card AV-27. The spark plug from cylinder no. 2 was fractured at the cylinder.



Figure 25- View of top spark plugs removed from engine.

2.5 Alternator

The alternator remained attached to the engine.



Figure 26 - Alternator, removed from engine (Courtesy of FAA)

3.0 Propeller Examination

The propeller was a two blade, controllable pitch, Hartzell model HC-C2YR-1BFP s/n CH43370B. The propeller was found fractured from the engine. It was recovered from about 4 ft under the engine. The propeller and crankshaft flange had broken off just aft of flange due to impact forces.

One propeller blade was bent aft and exhibited leading edge damage. The second blade was bent back and then forward about halfway (S-bending).



Figure 27- Propeller



Figure 28-Leading edge damage to propeller blade



Figure 29-Propeller flange.