National Transportation Safety Board
Office of Aviation Safety
Washington, DC 20594

WPR22FA254

# AIRFRAME AND ENGINE EXAMINATION

December 13, 2022

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## A. ACCIDENT

Location: Topeka, Kansas
Date: July 16, 2022
Time: 1153 central daylight time
Airplane: experimental amateur-bult, RV-7, N283S

## B. AIRFRAME AND ENGINE EXAMINATION

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## C. SUMMARY

On July 16, 2022, about 1153 central daylight time, an experimental amateur-bult, RV-7, N283S, was substantially damaged when it was involved in an accident near Topeka, Kansas. 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 EXAMINATION

### 1.0 Airframe Examination

Manufacturer: Stucky Steven D
Model: RV-7
Serial Number: 70341

Flight control continuity was established, separations in the flight control cables were consistent with impact damage or cuts by recovery personal.

Examination of the recovered airframe revealed that the recovery organization had removed both wings, both horziontinatal stabilizers, vertical stabilizer, right elevator and rudder for transport. The forward section of the cockpit was impact damaged and crushed aft. Crushing and bending was observed throughout the fuselage. The instrument panel was impact damaged with multiple instruments displaced.

**Figure 1: View of accident airplane during examination.**

Throttle and mixture control continuity was established form the cockpit controls to the carburetor. Both the throttle control cable and the mixture control cables were bent and separated at the control levers, consistent with impact damage.

The propeller governor cable was bent, and separated at the control levers, consistent with impact damage. The propeller control arm was separated from the propeller governor and not observed within the recovered wreckage.

The left wing was separated from the fuselage near the wing root. The leading edge fragmented from the wing root to about mid span. Crushing and bending was observed throughout the wing. The left wing tip was separated from the wing and was tethered by various wires. The left flap and aileron remained attached via their mounts. The left aileron was moved by hand, the attached torque tube was observed to move in the corresponding direction. The main fuel tank fuel cap location was in the fragmented section of the wing and separated from the filler neck.

The right wing was separated from the fuselage near the wing root. Crushing was observed on the leading edge from the wing root to about mid span. The right flap and aileron remained attached via their mounts. The right aileron was moved by hand, the attached torque tube was observed to move in the corresponding direction.

Both horziontinatal stabilizers, vertical stabilizer, right elevator and rudder for transport. The left elevator remained attached to horziontinatal stabilizer via it

mounts. The rudder was separated vertical stabilizer. The trailing edge of the rudder surfaces separated, from the bottom to about mid span. The elevator torque tube was fracture separated near the center of the fuselage, consistent with impact damage. Crushing and bending was observed throughout the empennage.

## 2.0 Engine Examination

Engine Manufacturer: Lycoming
Engine Model Number: YO-360-A1A
Engine Serial Number: L-41228-36E

Examination of the recovered engine revealed that the engine remained attached to the engine mount. Several fractures were observed throughout the engine mount. All four cylinders remained attached. The engine starter, carburetor and oil filter were separated. All fuel and oil lines that were removed were tight. No evidence of any mechanical damage was observed to the engine crankcase.

**Figure 2: View of engine during examination.**

The rocker box covers were removed. The intake and exhaust rocker arms were intact, and oil coated on all cylinders. 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 of each cylinder and piston face. All of the intake and exhaust valves were unremarkable. The crankshaft was rotated by hand using a hand tool. Rotational

continuity was established throughout the engine and valve train. Thumb compression and suction was obtained on all four cylinders.

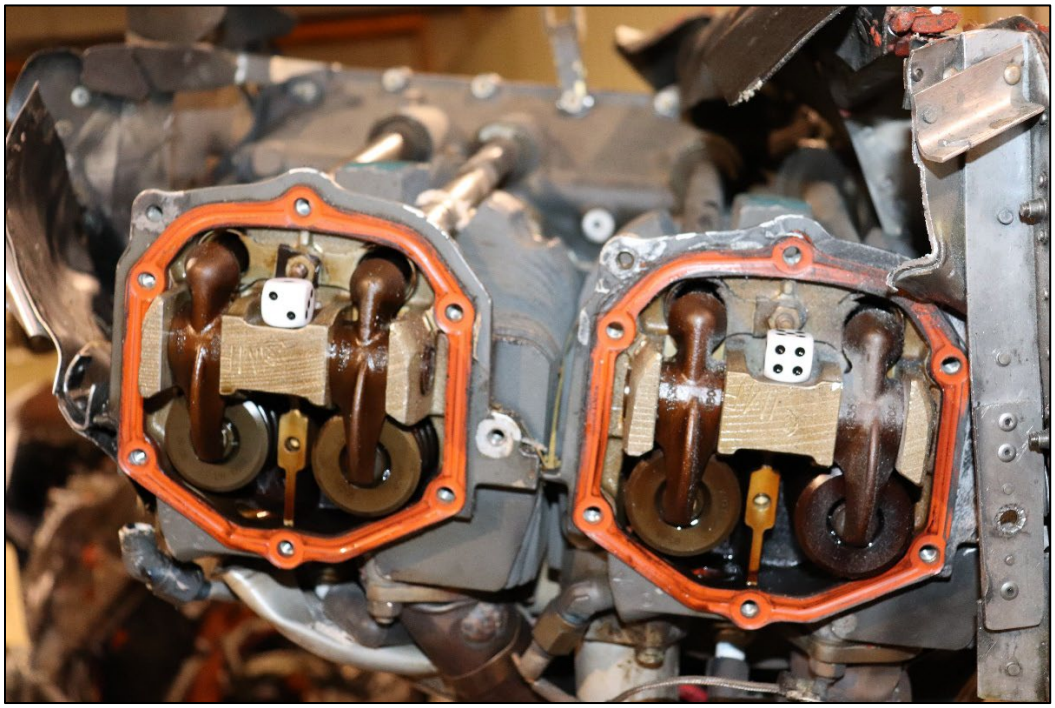

**Figure 3: View of left side of the engine.**

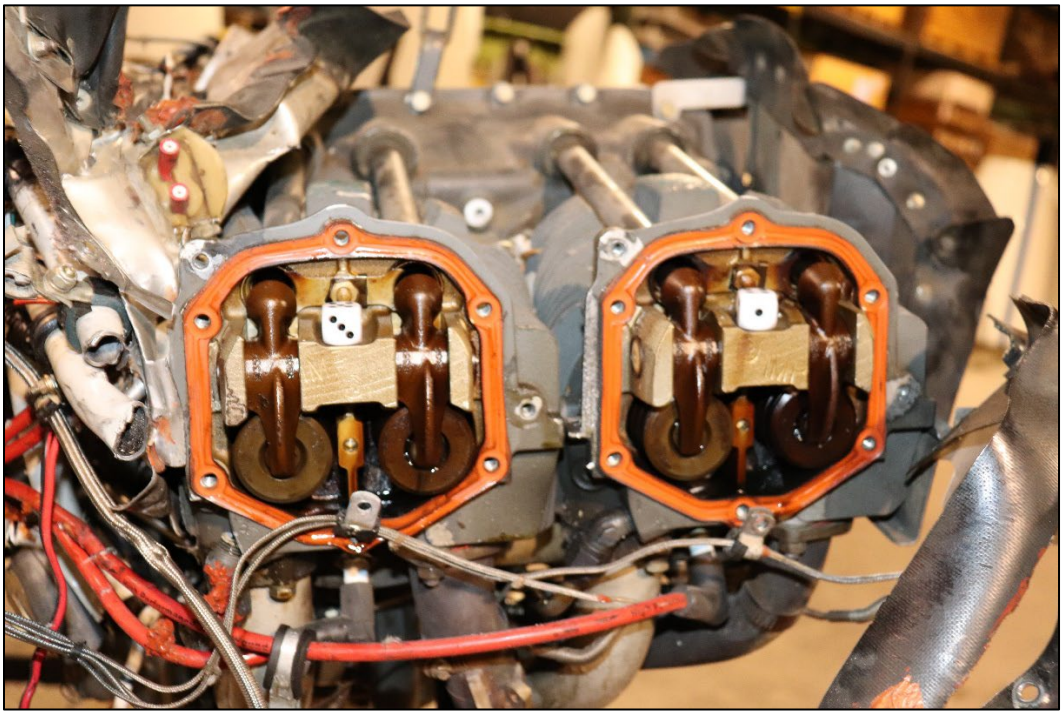

**Figure 4: View of right side of the engine.**

The upper spark plugs were removed from the engine, and they were automotive style. All sparkplugs exhibited carbon deposits within the electrode area and were light gray in color. All of spark plugs exhibited signatures consistent with worn-normal when compared to the Champion Check-A-Plug comparison chart.

The carburetor was impact separated from the plenum, the fracture surfaces exhibited signatures consistent with overload. The throttle cable remained attached to the throttle arm, was intact and undamaged. The throttle cable was removed from the throttle arm and the arm moved freely from stop to stop. The mixture cable was fracture separated near the mixture arm, consistent with impact damage. The mixture arm was bent and moved freely from stop to stop. The carburetor was dissembled, found free of debris and unremarkable.

The engine driven fuel pump remined attached to the engine at the mounting pad. The fuel lines remained attached to their respective fittings. The fuel pump body was cracked, consistent with impact damage. The fuel pump was removed, activated by hand and pressure was felt at the fuel outlet. Blue in color liquid, consistent with 100LL was observed.

The airplane was equipped with two electronic magnetos. Both magnetos remained attached to the engine and a visual examination of the magnetos reveled impact damage. Magneto to engine timing could not be determined. The magnetos sustained varying degrees of damage that rendered the units inoperative and therefore, could not be functionally tested.

The engine oil sump had impact damage on the bottom side, the oil suction screen was removed and free of debris.

The exhaust system remained secure to the cylinders. No evidence of any exhaust leaks around the cylinder attach points were observed. Crushing and bending was observed throughout.

## 3.0 Propeller Examination

Propeller Manufacturer: Hartzell
Propeller Serial Number: CH 446298

The airplane was equipped with a two blade Hartzell propeller. The propeller and propeller hub remained attached to the engine at the crankshaft. Both blades remained attached to the propeller hub. Propeller blade A exhibited bending aft, with polishing along the leading edge, along with unidirectional striations on the cambered side of the blade. Propeller blade B exhibited polishing along the leading edge, along with unidirectional striations on the cambered side of the blade.


**Figure 5: View of accident airplane propeller.**

Submitted by:

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