

# National Transportation Safety Board

Office of Aviation Safety

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CEN22FA029

## **AIRCRAFT EXAMINATION NOTES**

October 27, 2022

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## **A. ACCIDENT**

Location: Harrison, Michigan  
Date: November 5, 2021  
Time: 0930EDT  
1330 UTC  
Airplane: Van's RV-6, N16TG

## **B. AIRCRAFT EXAMINATION NOTES**

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## **C. SUMMARY**

On November 5, 2021, about 0930 eastern daylight time, an amateur-built Van's RV-6 airplane, N16TG, was destroyed when it was involved in an accident near Harrison, Michigan. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

Automatic Dependent Surveillance-Broadcast (ADS-B) data indicated that the airplane departed runway (RWY) 27L at Oakland International Airport (PTK), Pontiac, MI at about 0846. After departure the airplane made a climbing right turn and flew northwest for about 12 nm, then turned north for about 5 nm, then back to a northwest heading. The airplane reached a cruise altitude of about 3,000 feet and remained on the northwest heading until track data was lost about 0930. The last ADS-B position was about 8.4 miles and 260 degrees from the accident site. The data showed that the airplane was in straight and level flight before the end of the data. The accident site was located about 1 mile south of the approach end of runway 36 at the Clare County Airport (80D), Harrison, Michigan.

## **D. DETAILS OF THE EXAMINATION**

### **1.0 Accident Site**

The airplane impacted the back yard of a residence. The terrain was level and impact signatures indicated that the airplane struck the ground about 45 degrees nose low. The initial impact point was located directly beneath the airplane.



Figure 1 Overall view of accident site (NTSB Photo)

## **2.0 Airframe Examination**

The airplane remained predominately intact with all major airframe components still connected. The engine was still partially attached to the fuselage. The 3-blade wood core propeller was still attached to the engine. Two blades were broken off near the blade root. None of the blades were splintered and were predominately intact.

### **2.1 Fuselage**

The fuselage sustained significant crushing of the forward end which encroached into the cockpit area. The crush angle was consistent with a 45-degree nose low impact. The aft fuselage from about the mid-cockpit area aft was intact. No preimpact anomalies were detected with respect to the fuselage structure.

## **2.2 Empennage**

The empennage remained attached to the aft fuselage with the elevator and rudder control surfaces still attached. No preimpact anomalies were detected with respect to the empennage.

## **2.3 Wings**

The wings remained attached to the fuselage and exhibited leading edge crushing which indicated about a 45-degree nose low impact. Both left and right fuel tanks were breached, and the deformation was consistent with hydraulic deformation. There was an odor of fuel at the accident site. The fuel tank deformation and fuel smell were consistent with fuel being contained in the fuel tanks at impact. No preimpact anomalies with respect to the wing structure were evident.

## **2.4 Landing Gear**

The fixed landing gear remained attached to the fuselage and was bent back underneath the fuselage. No preimpact anomalies were detected.

## **3.0 Engine Examination**

The front of the airplane was suspended using a tow truck to gain access to the engine and allow rotation. The engine crankshaft could be rotated using the propeller. The top set of spark plugs was removed. The spark plugs were automotive type spark plugs and exhibited normal coloration. The engine was rotated, and suction and compression could be felt through the open spark plug holes on all cylinders.



Figure 2 Engine during examination (NTSB Photo)

The engine was equipped with dual electronic ignition systems. One ignition system was a Light Speed Engineering Plasma ignition which utilized a crankshaft trigger system, an electronic box and a set of ignition coils firing automotive style spark plugs. The electronic box for this ignition system was mounted on the aft side of the firewall and was crushed by impact forces. The circuit board within the box was visible and the board was broken due to impact. Due to the damage, this ignition system could not be tested.

The second ignition system was a E-Mag model P114L4, Serial number 3385. This was an electronic ignition system that replaced an original magneto. The system utilized ship electrical power for starting and low (idle) power running. According to the manufacturer, after about 800 rpm, the internal alternator within the E-mag would produce enough output to run the engine and switching from ship electrical power to the internal alternator was automatic. The E-mag from the accident airplane was damaged during the accident and the mounting ears of the coil pack were broken. One ignition lead tower and connector were broken for cylinders 3-4. The ignition lead towers for cylinders 1-2 were intact. The cable from the coil to the main part of the unit was intact and the wires were damaged but unbroken. The main harness

connector was broken. The unit was tested by installing test wires into the main harness connector for ground and 12V connections. The tach and P-lead connections were left disconnected. The ignition leads for the 1 and 2 cylinders were stripped back exposing the inner radio suppression core and the core of each lead placed in close proximity to each other to simulate the spark plug gaps. Power was applied and the LED on the back of the unit flashed a series of different colors and then went dark. According to the manufacturer this indicated that the unit performed its internal self-check and the observed flashing and then remaining dark was normal since the p-lead was not connected. The input gear was rotated, and a series of sparks was generated at the ignition leads. The manufacturer was questioned about the spark produced and it was explained that at low rpm, the system creates a series of 5 sparks in very rapid succession to aid in low rpm ignition and that at higher rpms it reverted to a single spark. This description was consistent with the observed spark during hand rotation. To test the operation of the internal alternator, an electric drill was used to spin the input shaft of the E-mag with power applied to the 12v and ground terminals. Spark was established and with the drill still operating at full rpm (drill rated for 950 rpm), the 12V power was disconnected and the unit continued to produce sparks from the cylinder 1-2 ignition leads. This indicated that the internal alternator was functioning.



Figure 3. E-Mag ignition system removed from the accident airplane. (NTSB Photo)

The engine carburetor had one mounting ear broken off during impact. The carburetor controls were still attached with no defects noted. The carburetor bowl was removed and examination of the carburetor and internal components didn't reveal any defects.

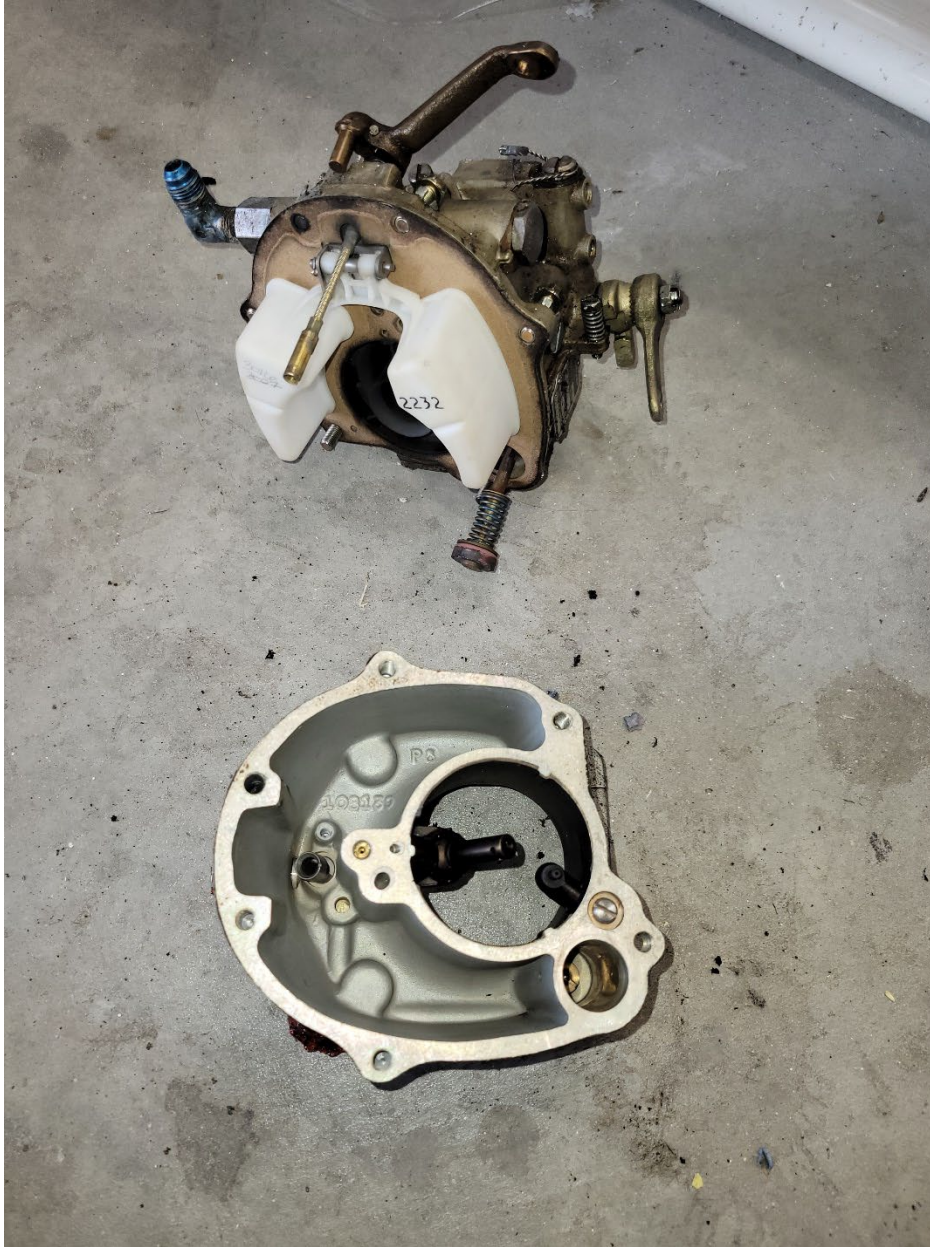


Figure 4. Disassembled carburetor (NTSB Photo)

Examination of the engine, ignition system, and carburetor did not reveal any preimpact anomalies.

#### **4.0 Propeller Examination**

The airplane was equipped with a 3-blade fixed-pitch Catto propeller, with wood-core blades that were covered in a composite material. The hub was still attached to the engine and one blade was still attached to the hub. The remaining two blades had broken at the root next to the hub. Except for breaks at the blade root, all three blades were predominately intact. The minimal damage to the wood

core propeller indicated that the engine was not producing power when the airplane impacted the ground.

Submitted by:

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