



# Aviation Investigation Final Report

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<b>Location:</b>	Galice, Oregon	<b>Accident Number:</b>	WPR22LA193
<b>Date &amp; Time:</b>	May 31, 2022, 09:40 Local	<b>Registration:</b>	N298DM
<b>Aircraft:</b>	Vans RV-8	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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## Analysis

The pilot was maneuvering the airplane over a river about 3,000 feet above mean sea level (msl) with the engine operating at 2,200 rpm. After a few minutes, the pilot heard a “pop” emanating from the engine compartment followed by a loss of engine power. With no suitable terrain to land in the area, the pilot opted to ditch in the river adjacent to the shoreline. The airplane touched down in a calm current near some exposed rocks. A team of swift-water rescue divers arrived at a boat ramp across the river with the intention of performing a training exercise that morning. The team carried the pilot and passenger to shore without injury.

A postaccident examination revealed that the crankshaft gear was missing its retaining bolt and lock-plate. The alignment dowel was sheared off and the crankshaft gear’s mounting flange was damaged. Mounting flange material was found in the sump, but the missing bolt and lock-plate were not found, likely because it was never installed at the last overhaul (98.9 hours before the accident).

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The in-flight failure of the crankshaft gear’s alignment dowel as a result of the retaining bolt not being installed, which lead to a total loss of engine power.

## Findings

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**Personnel issues**

Forgotten action/omission - Maintenance personnel

**Aircraft**

Recip eng rear section - Incorrect service/maintenance

## Factual Information

### History of Flight

<b>Enroute-cruise</b>	Loss of engine power (total) (Defining event)
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On May 31, 2022, at 0940 Pacific daylight time, a Vans RV-8, N298DM, sustained substantial damage when it was involved in an accident near Galice, Oregon. The pilot and passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot completed a 20-minute flight and landed in Grants Pass, Oregon, with the intention of picking up his spouse. The airplane started normally and they departed from runway 31 about 0930. The pilot continued to the west until reaching the Rouge River, where he maneuvered over the river about 3,000 feet above mean sea level (msl) with the engine operating at 2,200 rpm. After a few minutes, the pilot heard a “pop” emanating from the engine compartment followed by a loss of engine power. The pilot added full throttle, verified the mixture was full rich, cycled the magnetos, and switched the fuel selector position to the other tank. Despite the pilot’s troubleshooting attempts, the engine did not restart.

The pilot looked for a location to perform an emergency landing and noted that the airplane was too high to align with the gravel bars in the immediate vicinity. With no suitable terrain ahead, he opted to ditch in the river adjacent to the shoreline. The airplane touched down in a calm current near some exposed rocks. The airplane settled on rocks and the pilot and passenger sat on the canopy for about 15 minutes. A team of swift-water rescue divers arrived at a boat ramp across the river with the intention of performing a training exercise that morning. The team carried the pilot and passenger to shore without injury.

During the accident sequence, the left wing was substantially damaged. The pilot estimated that there was about 30 gallons of fuel onboard the airplane at the time of the accident.

The engine was overhauled prior to being installed on the airplane. The airplane and overhauled engine had amassed 98.9 flight hours before the accident.

A Federal Aviation Administration certified Airframe and Powerplant Mechanic examined the wreckage. He stated that upon rotation of the propeller, the rocker arms on the intake and exhaust valves did not move. Removal of the accessory gear housing revealed that the

crankshaft gear was missing its retaining bolt and lock-plate (see Figure 1 below). After removing the gear, he noted the alignment dowel was sheared off and the crankshaft gear's mounting flange was damaged. He removed the oil sump and found debris consistent with the mounting flange material but was unable to locate the missing bolt.

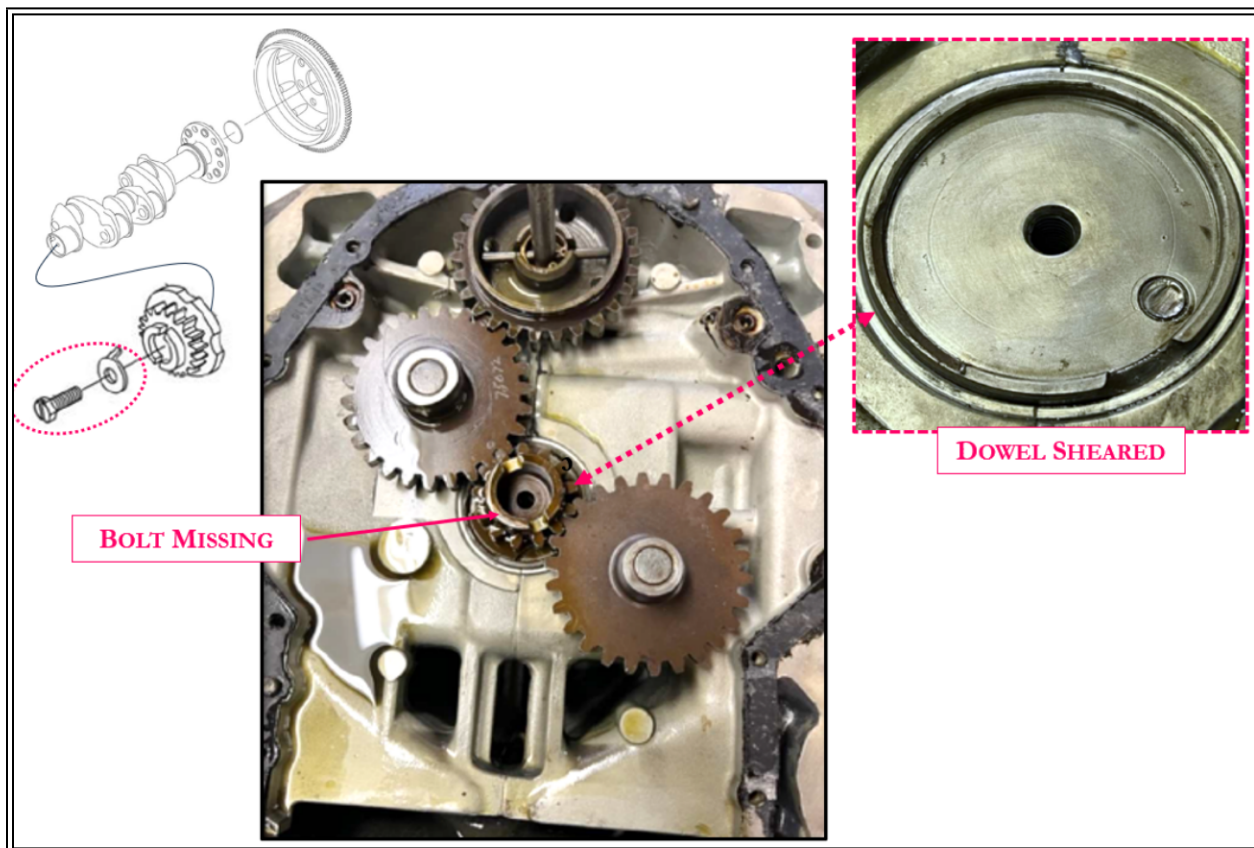


Figure 1: Accessory Housing Removed (pictures provided by mechanic)

## Pilot Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	51, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Front
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	5-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	Airplane multi-engine; Airplane single-engine; Instrument airplane	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	February 21, 2022
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	May 11, 2022
<b>Flight Time:</b>	3257 hours (Total, all aircraft), 47 hours (Total, this make and model), 2916 hours (Pilot In Command, all aircraft), 218 hours (Last 90 days, all aircraft), 56 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Vans	<b>Registration:</b>	N298DM
<b>Model/Series:</b>	RV-8	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2002	<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	80-298
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	June 1, 2021 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>	45 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	97 Hrs	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed	<b>Engine Model/Series:</b>	O-320-E2D
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	160
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KSXT,3841 ft msl	<b>Distance from Accident Site:</b>	9 Nautical Miles
<b>Observation Time:</b>	09:46 Local	<b>Direction from Accident Site:</b>	76°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	/	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	29.94 inches Hg	<b>Temperature/Dew Point:</b>	19.4°C / 10°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Grants Pass, OR (3S8)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Grants Pass, OR (3S8)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	09:30 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	GRANTS PASS 3S8	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	1130 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	42.563495,-123.5747(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Keliher, Zoe
<b>Additional Participating Persons:</b>	Jason Lawver; Federal Aviation Administration; Hillsboro, OR
<b>Original Publish Date:</b>	April 10, 2024
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=105169">https://data.ntsb.gov/Docket?ProjectID=105169</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).