Aviation Investigation Final Report

Location:	Brookings, Oregon	**Accident Number:**	WPR19FA116
Date & Time:	April 18, 2019, 16:15 Local	**Registration:**	N791PF
Aircraft:	Vans RV8	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

A witness saw the airplane complete a touch-and-go landing and depart toward the north. Another witness saw the airplane flying north after takeoff, then shortly thereafter saw it flying south as if the pilot was returning to the airport for landing; the airplane then made an "abrupt or severe" 180° left turn back toward the north before it rolled onto its right side for several seconds, then "went straight down" and subsequently impacted terrain.

Postaccident examination of the engine revealed no anomalies that would have precluded normal operation. Examination of the airframe revealed that flight control continuity was confirmed throughout the airplane from the pilot controls to the control surfaces, with the exception of the elevator torque tube, which was fractured and observed to have separated near the elevator pitch servo. Metallurgical examination indicated that the fracture was consistent with bending overstress. It could not be determined if the fracture occurred prior to or during the impact sequence. It is most likely that the pilot experienced a loss of control during an aggressive maneuver at too low an altitude to recover from.

Probable Cause and Findings

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

The pilot's failure to maintain aircraft control during an aggressive maneuver that resulted in a nose down collision with terrain.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Aircraft control - Pilot
Aircraft	Pitch control - Not attained/maintained

Factual Information

History of Flight

Maneuvering-low-alt flying	Loss of control in flight (Defining event)

On April 18, 2019, about 1615 Pacific daylight time, an experimental, amateur-built RV8A, N791PF, was substantially damaged when it was involved in an accident near Brookings, Oregon. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (CFR) Part 91 personal flight.

A witness, who was driving parallel to runway 30/12 at Brookings Airport (BOK), Brookings, Oregon, reported that he watched the airplane complete a touch-and-go landing; the sound of the engine was normal and smooth. The airplane climbed and continued north out of his sight.

Another witness, who was located about 1 nautical mile northwest of BOK, reported that he saw the airplane inflight heading north. Shortly thereafter, he saw the airplane flying south toward the airport and stated that it "appeared to be coming in for a landing." The airplane then entered an "abrupt or severe" 180° left turn back to the north, rolled onto its right side for several seconds, then nosed over and descended straight down into terrain.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	71,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	BasicMed With waivers/limitations	**Last FAA Medical Exam:**	June 4, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 863 hours (Total, all aircraft), 289 hours (Total, this make and model), 690 hours (Pilot In Command, all aircraft)		

The pilot held a commercial pilot certificate with airplane single-engine land, multiengine land, and instrument airplane ratings, and a flight instructor certificate for airplane single-engine. He also held control tower operator and repairman - experimental aircraft builder certifications. A review of the

pilot's logbook revealed that, as of August 2, 2017, the pilot had a total time of 863 hours, 156 hours of flight instruction given in single-engine airplanes, and 289 hours as pilot-in-command in the accident airplane make and model. The pilot completed his most recent flight review on June 19, 2017.

The pilot received his most recent third-class medical certificate on April 3, 2013, with a limitation for corrective lenses. The medical certificate expired for all classes on April 30, 2015. The pilot's most recent BasicMed course was dated April 30, 2017, with a BasicMed date of June 4, 2017.

Aircraft and Owner/Operator Information

Aircraft Make:	Vans	**Registration:**	N791PF
Model/Series:	RV8 A	**Aircraft Category:**	Airplane
Year of Manufacture:	2007	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental light sport (Special)	**Serial Number:**	81328
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	1980 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Superior
ELT:		**Engine Model/Series:**	XP-360
Registered Owner:		**Rated Power:**	
Operator:		**Operating Certificate(s) Held:**	None

The tandem two-seat, low-wing, fixed tricycle-gear airplane was issued an FAA Special Airworthiness Certificate on May 15, 2007. It was powered by a 180-horsepower Superior XP-360, four-cylinder, four-stroke, horizontally opposed, air-cooled, direct-drive engine, equipped with a constant-speed Hartzell HC-C2YK-1BF propeller.

Both seats were equipped with flight controls; the front seat for pitch, roll and yaw, while the aft seat was only equipped for pitch control. Only the front seat position was equipped with engine controls.

Review of the maintenance records revealed that the airplane's most recent condition inspection was completed on June 20, 2017. The airplane total time on that date was recorded as 342.6 hours.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	BOK,462 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	15:56 Local	**Direction from Accident Site:**	5°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	19°C / 12°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Bandon, OR (S05)	**Type of Flight Plan Filed:**	None
Destination:	Brookings, OR (BOK)	**Type of Clearance:**	None
Departure Time:	13:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Brookings Airport BOK	**Runway Surface Type:**	Asphalt
Airport Elevation:	462 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	12	**IFR Approach:**	Unknown
Runway Length/Width:	2900 ft / 60 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	42.083889,-124.30166

The airplane impacted terrain in a near vertical, nose-down attitude about 3,400 ft northwest of the departure end of runway 30 at BOK. It came to rest in a brush-covered ravine on a downslope of about 20° on a heading of 170°.

Substantial damage was observed throughout the entirety of the airplane, with the exception of the empennage, which displayed minimal damage. Both wings sustained heavy impact damage, with aft

crushing observed along the wingspan. Both left- and right-wing fuel tanks were breached due to impact forces. Both wing fuel caps were observed to be tight and in place. The wings remained attached to their respective wing root attach points.

The cabin and cockpit areas were destroyed due to impact forces. The fuselage aft of the rear cabin bulkhead was twisted and heavily deformed. The empennage remained intact with minor damage. Except for the elevator torque tube, which was broken near the elevator pitch trim servo, flight control continuity was established and confirmed throughout the entirety of the airplane.

Both main landing gear, which were folded aft and underneath the airplane, remained attached to their respective underwing attach points. The nose landing gear was separated due to impact forces.

Both the engine and propeller remained attached to the forward end of the fuselage; the engine mounts sustained impact damage. Both propeller blades were bent aft about 30° and displayed chordwise scratches; each blade remained attached to its respective hub and the propeller remained attached to the engine crankshaft. When turned by hand, the propeller rotated through 360° without obstruction, and continuity was confirmed through the driveshaft to the accessory section.

The left wing remained attached to the fuselage wing root at all attach points. The wing was bent and twisted, with both leading-edge impact damage and aft crushing. The left flap and left aileron were impact damaged but remained attached to all trailing edge attach points.

The right wing remained attached to the fuselage wing root at all attach points. The wing was bent and twisted, with leading edge crushing to the inboard two-thirds. The right flap and right aileron remained attached to the trailing edge; the flap had minor damage and the aileron was undamaged.

The left elevator remained attached to the left horizontal stabilizer. About half of the outboard section was wrinkled and bent upward about 10°. The elevator trim tab remained attached to the elevator at all attach points and was bent upward about 10°. The left horizontal stabilizer remained attached to the fuselage. The outboard half was bent upward about 10°.

The right horizontal stabilizer remained attached to the fuselage at all attach points. Minor damage to the underside of the stabilizer was observed. The right elevator remained attached to the right horizontal stabilizer at all attach points with no damage noted.

The vertical stabilizer remained attached to the fuselage and was undamaged. The rudder remained attached to the vertical stabilizer with minor damage.

The forward section of the elevator torque tube and the fractured connecting rod were sent to the NTSB Materials Laboratory for examination.

The connecting rod fractured at the nut where it was threaded into the forward portion of the elevator torque tube. The fracture surfaces of the connecting rod were examined using a stereo microscope. The threaded shank portion of the connecting rod exhibited plastic deformation. The plastic deformation consisted of bending of the threaded shank and resulted in elongation of the thread pitch on one side of the threaded shank and compression of the thread pitch on the other side. Some thread was torn out at

the final fracture point. The fracture exhibited signatures consistent with bending overstress. It could not be determined if the fracture occurred prior to or during the impact sequence. For additional information, refer to the engineer's Materials Laboratory Factual Report, which is appended to the docket for this accident.

Medical and Pathological Information

The Oregon State Medical Examiner, Clackamas, Oregon, performed an autopsy on the pilot. The cause of death was attributed to massive blunt force trauma.

Toxicology testing performed by the FAA Forensic Sciences Laboratory was negative for all tested-for substances.

Administrative Information

Investigator In Charge (IIC):	Little, Thomas		
Additional Participating Persons:	Joseph Mollahan; Federal Aviation Administration; Hillsboro, OR William A. Ross; Superior Air Parts; Coppell, TX		
Original Publish Date:	May 27, 2021	**Investigation Class:**	3
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99286		