Aviation Investigation Final Report

Location:	Niceville, Florida	**Accident Number:**	ERA19FA048
Date & Time:	November 17, 2018, 12:37 Local	**Registration:**	N232VA
Aircraft:	Vans RV-12	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The owner of the airplane, who was a flight instructor, completed a 100-hour inspection on the light sport airplane before another flight instructor departed in the airplane on an instructional flight. That instructor reported that, during takeoff, the engine was not producing full power and experienced a momentary loss of power. He returned to the airport and landed uneventfully. The owner examined the airplane and concluded that the loss of power was likely due to vapor lock. They left the engine cowl open to cool the engine, and about 2 hours later, the owner/flight instructor departed with a student on the accident flight. The student stated that, after takeoff, the engine sputtered and the flight instructor took control. He had no recollection of the accident other than that the altimeter indicated 240 ft.

Recorded data revealed that the airplane experienced a significant reduction in engine rpm for unknown reasons about 35 seconds after the takeoff. The throttle was reduced, and the airplane reached a maximum altitude of about 250 ft at an airspeed of 44 knots. Vertical acceleration began to oscillate, the airplane was banking to the left and reached a 68° left wing down bank angle. It then began to descend rapidly; the throttle was advanced and engine speed increased; however, shortly thereafter, the airplane impacted the ground. Examination of the airframe and engine did not reveal any preimpact anomalies. The airplane's flight track and recorded data were consistent with it entering a stall during a left turn back toward the airport.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
A partial loss of engine power during initial climb for undetermined reasons, and pilot's failure to maintain airspeed during a turn back to the runway, which resulted in an exceedance of the airplane's critical angle of attack, and subsequent aerodynamic stall.

Findings

Aircraft	(general) - Malfunction
Not determined	(general) - Unknown/Not determined
Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Angle of attack - Not attained/maintained

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On November 17, 2018, about 1237 central standard time, a Vans RV-12, N232VA, was substantially damaged when it impacted trees and terrain during takeoff from Ruckel Airport (FL17), Niceville, Florida. The flight instructor was fatally injured and the student pilot sustained serious injuries. The airplane was privately owned and was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight.

Another flight instructor reported that, after returning from a flight earlier on the day of the accident, he was told by the owner of the airplane (the accident instructor) that the airplane's 100-hour inspection had been completed. The other flight instructor subsequently departed in the accident airplane with another student pilot; however, about 400 ft above ground level (agl) during the initial climb, they noticed that the engine rpm was lower than normal, and at 500 ft agl, the engine momentarily lost power. The flight instructor made a 180° turn and returned to the runway for a precautionary landing. He and the accident instructor then performed a visual inspection of the airplane and could not find any anomalies. The accident instructor stated that the problem was likely "vapor lock," which the airplane had experienced in the past, and told the other instructor to let the engine cool down and that he would fly the airplane later in the day with his own student. Two hours later, the accident instructor and student pilot departed on the accident flight.

The student pilot stated that when he arrived at the airport, he noticed that the airplane's engine cowling was open and he asked his instructor if everything was okay. He was told that there was a problem earlier but that it was fixed. The student pilot and instructor completed the preflight checklist and discussed what to expect during the flight that day. They also discussed what they would do if they had a problem during takeoff and that the minimum altitude required to return to the runway was 700 ft agl. During takeoff, the engine sputtered and the flight instructor took control of the airplane. The student looked down at the altimeter and saw 240 ft; he had no further recollection of the accident.

Two witnesses, who lived across the street from the runway, stated that they watched the airplane take off. When it was just over the treetops, the airplane made a sharp left turn like it was trying to turn around and land at the airport. They stated that the airplane's wings leveled just before it hit the treetops. They added that the engine was "very loud."

PERSONNEL INFORMATION

The instructor held an airline transport pilot certificate with a rating for airplane multiengine land and commercial privileges for airplane single-engine land and sea. He also held a flight instructor certificate with ratings for airplane single-engine, airplane multiengine, and instrument airplane. His most recent Federal Aviation Administration (FAA) first class medical certificate was issued on August 23, 2018. He reported 2,348 total hours of flight experience at that time. His logbook was not recovered.

The student pilot held a student pilot certificate. His most recent FAA third class medical certificate was issued on July 17, 2018. He reported 14 total hours of flight experience at the time of the accident.

AIRCRAFT INFORMATION

The two-seat, low-wing, tricycle gear airplane was manufactured in 2013. It was powered by a Rotax 912ULS, 100-horsepower engine, equipped with a two-bladed Sensenich propeller. The airplane's logbook did not contain an entry for the 100-hour inspection completed on the morning of the accident. The previous 100-hour inspection was completed on September 14, 2018. At that time, the airframe and engine had accrued 389 total hours of operation.

According to a pilot operating handbook, the airplane's published stall speed with flaps retracted was 45 knots.

METEOROLOGICAL INFORMATION

The 1255 recorded weather at Destin-Fort Walton Beach Airport (VPS), Eglin Air Force Base, Florida, located 5 miles southwest, included wind from 010° at 8 knots; 10 statute miles visibility; few clouds at 25,000 ft agl; temperature 15°C; dew point 1°C; altimeter 30.18 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located about 150 ft from the left side of the departure end of runway 36. Broken tree branches were noted descending at an approximate 15° angle and extended about 50 ft on a magnetic heading of 270° to the main wreckage. The main wreckage came to rest inverted. The fuel tanks were void of fuel as a result of being inverted. All major components of the airplane were accounted for at the scene. Control cable continuity was confirmed to all control surfaces. Tree impressions were found along the leading edges of both wings, and about 3 ft of the right-wing tip was found about 150 ft east of the main wreckage. One propeller blade was fractured from the hub.

The engine and propeller remained attached to the airframe. One propeller blade was fractured at the hub. The other blade's tip was fractured. The intake and carburetors were separated due to impact forces. The carburetor floats were removed and intact. The engine was rotated by hand and thumb compression was established on all cylinders. Valve train continuity was confirmed. Automotive fuel was present in the carburetor bowls and absent of contamination. The electronic ignition system could not be tested. Examination of the engine did not reveal any preimpact mechanical malfunctions or anomalies that would have precluded normal operation.

A Dynon SkyView avionics system was removed and forwarded to the National Transportation Safety Board Vehicle Recorders Laboratory for data download. The data revealed that the engine was advanced to takeoff power at 1236:10 and stabilized at about 4,950 rpm at wide open throttle (WOT). The engine then experienced a momentary reduction in power to 4,700 rpm, which subsequently stabilized at 4,850

rpm. At 1236:45, the airplane was about 55 ft above the ground when the engine experienced a sudden reduction in speed to less than 4,000 rpm without a corresponding change in manifold pressure; consistent with the throttle staying at WOT. At 1237:07, manifold pressure reduced consistent with the throttle being pulled back to idle and remained at idle for 3 seconds. During this time, the airplane reached a maximum altitude of about 250 ft at an airspeed of 44 knots. Vertical acceleration began to oscillate, the airplane was banking to the left and reached a 68° left wing down bank angle. It then began to descend rapidly, and the manifold pressure increased consistent with the throttle being advanced. The engine speed increased along with the increase in manifold pressure and reached 4,700 rpm. Shortly thereafter, at 1237:17, excursions consistent with impact were recorded (Figure 1 depicts a map overlay of the accident flight track).

Figure 1. Map overlay of the accident flight (The end of the track is consistent with the approximate location of the accident site).

MEDICAL AND PATHOLOGICAL INFORMAITON

An autopsy was performed on the flight instructor by the Office of the Medical Examiner, located in District 1, Florida. The report listed the cause of death as unspecified blunt force trauma.

Toxicology testing performed by the FAA Forensic Sciences Laboratory was negative for drugs and alcohol.

Flight instructor Information

Certificate:	Airline transport	**Age:**	38,Male
Airplane Rating(s):	Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	August 23, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	2348 hours (Total, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	51,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	July 17, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 14 hours (Total, all aircraft), 14 hours (Total, this make and model), 14 hours (Last 90 days, all aircraft), 3.9 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Vans	**Registration:**	N232VA
Model/Series:	RV-12 No Series	**Aircraft Category:**	Airplane
Year of Manufacture:	2013	**Amateur Built:**	
Airworthiness Certificate:	Special light-sport (Special)	**Serial Number:**	12006
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	September 14, 2018 100 hour	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	100 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	389 Hrs as of last inspection	**Engine Manufacturer:**	Rotax
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	912ULS
Registered Owner:		**Rated Power:**	100 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	Pilot school (141)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KVPS,87 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	18:55 Local	**Direction from Accident Site:**	236°
Lowest Cloud Condition:	Few / 25000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.18 inches Hg	**Temperature/Dew Point:**	15°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Niceville, FL (FL17)	**Type of Flight Plan Filed:**	None
Destination:	Niceville, FL (FL17)	**Type of Clearance:**	None
Departure Time:	12:37 Local	**Type of Airspace:**	

Airport Information

Airport:	Ruckel FL17	**Runway Surface Type:**	Grass/turf
Airport Elevation:	67 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	3300 ft / 75 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 Serious	**Latitude, Longitude:**	30.528055,-86.438888(est)

Administrative Information

Investigator In Charge (IIC):	Boggs, Daniel
Additional Participating Persons:	Kyle Cook; FAA/FSDO; Birmingham, AL Mitch Lock; Van's Aircraft; Aurora, OR
Original Publish Date:	May 19, 2020
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98649