



# Aviation Investigation Final Report

<b>Location:</b>	Phoenix, Arizona	<b>Accident Number:</b>	WPR18FA229
<b>Date &amp; Time:</b>	August 20, 2018, 06:45 Local	<b>Registration:</b>	N787WM
<b>Aircraft:</b>	James E Causey Acroduster II	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Aerodynamic stall/spin	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The two private pilots on board the experimental amateur-built airplane had purchased the airplane 2 days before the accident. On the day of the sale, the previous owner provided the rear-seat accident pilot with a 2.5-hour familiarization flight. He stated that he had no issues with the pilot's performance, but he did suggest that the accident pilot obtain some instruction from a flight instructor to become more familiar with the airplane, to which the accident pilot replied that he didn't have time and that he felt comfortable with the airplane.

On the morning of the accident, the pilots performed 4 takeoffs and landings in the airport traffic pattern, each of which was uneventful. During the 5<sup>th</sup> circuit in the traffic pattern, onboard video revealed that the airplane's nose pitched up slightly just before the airplane entered the left turn onto the base leg. As the airplane continued to turn left, it appeared to exhibit aerodynamic buffeting. The airplane rolled right, then immediately rolled left as the nose pitched down and the airplane began to rapidly descend. The airplane rolled from a 90° left bank to a 90° right bank and continued to descend in a nose-low attitude while rolling left and right before impacting terrain. Postaccident examination of the airplane and engine revealed no anomalies that would have precluded normal operation.

It could not be determined which of the two pilots was manipulating the flight controls at the time of the accident, and no personal logbooks for either pilot were available for review; therefore, the pilots' flight experience and recency of experience could not be determined. The onboard video of the flight was consistent with an exceedance of the airplane's critical angle of attack while maneuvering in the airport traffic pattern, which resulted in an aerodynamic stall/spin at an altitude too low for recovery.

### Probable Cause and Findings

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

An exceedance of the airplane's critical angle of attack while maneuvering for landing, which resulted in an aerodynamic stall/spin at an altitude too low for recovery.

#### Findings

Aircraft	Angle of attack - Not attained/maintained
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Aircraft control - Pilot

# Factual Information

## History of Flight

<b>Approach-VFR pattern downwind</b>	Aerodynamic stall/spin (Defining event)
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)

On August 20, 2018, about 0645 mountain standard time, an experimental amateur built Acroduster II airplane, N787WM, was substantially damaged when it was involved in an accident in Phoenix, Arizona. The two private pilots sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The accident pilots purchased the airplane 2 days before the accident. According to the airplane's previous owner, on the day of the sale, he provided the rear seat pilot with a 2.5-hour familiarization flight. While the previous owner reported no concerns with the way the accident pilot flew the airplane, he did recommend to the accident pilot that he consider delaying his departure a day or so and fly the airplane with a flight instructor in order to become more familiar with it. The accident pilot declined the offer, stating that he didn't have time and that he felt comfortable with the airplane. That afternoon, the front and rear seat accident pilots departed to their home airport, Phoenix Deer Valley Airport (DVT), Phoenix, Arizona, about 275 nautical miles east, and arrived uneventfully.

On the morning of the accident, the pilots performed 4 uneventful takeoffs and landings in the DVT airport traffic pattern. Onboard video from the flight showed that, while turning from left downwind to left base for the fifth landing, the airplane's nose pitched up slightly just before the airplane entered the left turn onto the base leg. As the airplane continued to turn left, it appeared to exhibit aerodynamic buffeting. The airplane rolled right, then immediately rolled left as the nose pitched down and the airplane began to rapidly descend. The airplane then rolled from a 90° left bank to a 90° right bank and continued to descend in a nose-low attitude, while continuing to roll left and right, before impacting terrain.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	54,Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea	<b>Seat Occupied:</b>	Rear
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	April 30, 2018
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 912 hours (Total, all aircraft), 4 hours (Total, this make and model)		

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	49,Female
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea	<b>Seat Occupied:</b>	Front
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	December 20, 2016
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 115 hours (Total, all aircraft), 0.5 hours (Total, this make and model), 0 hours (Pilot In Command, all aircraft), 0 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Which of the pilots was manipulating the flight controls when the accident occurred could not be determined. No pilot logbooks were recovered for either pilot.

## AIRCRAFT INFORMATION

Records revealed that the propeller and engine were removed from the airplane on June 1, 2016, as a result of a propeller strike; at that time, the tachometer reading was 440 hours. At the time of the accident, the airplane had accumulated a total tachometer time of 471 hours.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	James E Causey	<b>Registration:</b>	N787WM
<b>Model/Series:</b>	Acroduster II	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1993	<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	SA750-083176JC
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	August 28, 2017 Condition	<b>Certified Max Gross Wt.:</b>	1800 lbs
<b>Time Since Last Inspection:</b>	23 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	470.8 Hrs at time of accident	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	C91 installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	AEIO-360 SER
<b>Registered Owner:</b>		<b>Rated Power:</b>	200 Horsepower
<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>	DVT, 1428 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	06:53 Local	<b>Direction from Accident Site:</b>	107°
<b>Lowest Cloud Condition:</b>	Clear	<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>	29.89 inches Hg	<b>Temperature/Dew Point:</b>	31°C / 16°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Phoenix, AZ (DVT )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Phoenix, AZ (DVT )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	06:25 Local	<b>Type of Airspace:</b>	Class D

The 0653 weather observation at DVT included calm wind, 10 miles visibility, clear sky, temperature 31&deg;C, dew point 16&deg;C, and an altimeter setting of 29.90 inches of mercury.

## Airport Information

<b>Airport:</b>	Deer Valley Airport DVT	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	1478 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	25L	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	8196 ft / 100 ft	<b>VFR Approach/Landing:</b>	Touch and go;Traffic pattern

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	33.683612,-112.065551

The accident site was located about 1/2 mile southeast of the approach end of runway 25L. The airplane came to rest upright on a magnetic heading of about 060°. The wreckage field was contained within 50 ft of the main wreckage and consisted mostly of small wing segments. The propeller assembly separated from the main wreckage.

The right-wing panels were highly fragmented. The left upper wing panel remained partially attached with impact damage to the aileron and spar. The left lower wing panel was highly fragmented from midspan to the wingtip. The empennage remained intact with damage to both elevator tips.

The engine and forward fuselage structure were crushed aft with most of the damage to the right lower side. The engine sustained impact damage to the induction and exhaust assemblies and the accessory section. The landing gear struts were twisted aft about 90°. The forward cockpit floor area was crushed upward. According to the first responders and the medical examiner, both pilots' 5-point seatbelt assemblies were secured and buckled. The fuel selector handle was found in the 'Fuel 1' (pointed left) position. According to the FAA inspector, the magneto switch was turned from the BOTH position to the OFF position by first responders.

The propeller assembly remained attached to the crankshaft propeller flange. The propeller blades exhibited twisting and chordwise scoring near the tips. One of the blade tips had separated from the blade. The spinner was crushed on one side.

Postaccident examination of the airplane and engine revealed no mechanical anomalies that would have precluded normal operation.

## Medical and Pathological Information

## Front-Seat Pilot

According to the autopsy performed by the Maricopa County Office of the Medical Examiner, Phoenix, Arizona, the cause of death for the front-seat pilot was multiple blunt force injuries.

Toxicological testing performed by the FAA's Forensic Sciences Laboratory found celecoxib (a non-steroidal anti-inflammatory used to treat arthritis) and famotidine (a prescription or over-the-counter medication used to treat heartburn) in cavity blood. These two medications are generally not considered to be impairing. No ethanol was detected in cavity blood.

## Rear-Seat Pilot

According to the autopsy performed by the Maricopa County Office of the Medical Examiner, the cause of death for the rear-seat pilot was multiple blunt force injuries. A contributing cause of death was atherosclerotic cardiovascular disease as documented by the presence of a metallic stent in the left anterior descending coronary artery with 75-90% occlusion distal of the stent, 100% occlusion of the right coronary artery, 50% narrowing of the left circumflex artery, and extensive scarring of the posterior wall and septum of the left ventricle. There was evidence of medical intervention including intubation. The pilot also had a well-defined meningioma and an enlarged thyroid.

Toxicological testing performed by the FAA's Forensic Sciences Laboratory identified no ethanol in the blood and salicylate and etomidate in the urine. Salicylate (commonly from aspirin) is contained in over-the-counter medications and is used to treat mild pain or to reduce the chance of blood clots. Etomidate is a general anesthetic. Glucose was detected in urine at 577 milligrams per deciliter (mg/dL) (postmortem normal is below 100 mg/dL glucose in urine) and the pilot's hemoglobin A1C was 8.8% (above 6.5% indicates diabetes).

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Little, Thomas
<b>Additional Participating Persons:</b>	Charles Baxter; Federal Aviation Administration; Scottsdale, AZ Mark Platt; Lycoming Engines; Williamsport, PA
<b>Original Publish Date:</b>	June 3, 2020
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=98105">https://data.nts.gov/Docket?ProjectID=98105</a>

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).