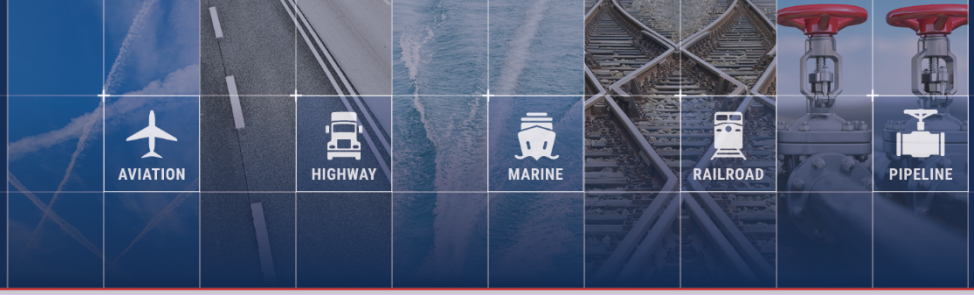

Aviation Investigation Final Report

Location:	Cedar City, Utah	**Accident Number:**	WPR16FA002
Date & Time:	October 5, 2015, 13:00 Local	**Registration:**	N6449M
Aircraft:	Cessna 152	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation		

Analysis

A company chief pilot was performing a company check flight of a newly hired flight instructor. Data recovered from an on-board flight tracking system indicated that the airplane was maneuvering about 3,000 ft above ground level in the accident area; the final 35 seconds of data showed a near vertical descent toward the accident location. A witness saw the airplane descending vertically in a slight nose-down attitude "like a fluttering leaf." The airplane impacted the ground in a slightly nose-down and wings-level attitude, and ground impact marks around the airplane did not indicate any forward momentum. Examination of the airframe and engine found no abnormalities that would have precluded normal operation. The flight tracking data, the witness description, and the damage to the airplane are consistent with the airplane entering an aerodynamic stall and descending to ground impact. It could not be determined whether the stall was inadvertent or intentional (stall demonstration). Weight and balance calculations indicated that the airplane was about 40 pounds over maximum gross weight at takeoff and about 10 pounds over gross weight at the time of the accident; however, it is unlikely that this weight exceedance contributed to the loss of control.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the pilots to maintain control of the airplane while maneuvering, which resulted in an aerodynamic stall from which they did not recover.

Findings

Aircraft	Angle of attack - Not attained/maintained
Personnel issues	Aircraft control - Flight crew
Personnel issues	Weight/balance calculations - Flight crew

Factual Information

History of Flight

Maneuvering	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On October 5, 2015, at 1300 mountain daylight time, a Cessna 152, N6449M, impacted a dry lake bed about 6 nautical miles southwest of Cedar City Municipal Airport (KCDC), Cedar City, Utah. The two flight instructors were fatally injured, and the airplane was destroyed by impact forces. Upper Limit Aviation was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. The local company check flight departed KCDC about 1215. Visual meteorological conditions prevailed, and no flight plan had been filed.

The operator reported that the purpose of the flight was for the chief pilot of the flight school to demonstrate the airplane to a newly hired flight instructor. Witnesses saw the airplane performing various maneuvers over the dry lake bed, which was used as a training area. One witness reported that, just before the accident, the airplane was descending in a near vertical fashion in a slight nose-low attitude and looked "like a fluttering leaf."

The airplane was equipped with an on-board flight tracking system that uploaded recorded data points via satellite to the operator every 2 minutes. The unit retained the recorded data in non-volatile memory at 5 second intervals. The unit was downloaded, and a review of the last 14 minute segment of flight data showed the airplane departing from KCDC at 1246 using runway 26. The data showed the airplane making a right turn to the north at 1248:04. The airplane continued the right turn and made a touch-and-go landing on runway 20.

At 1251:04, the airplane was climbing away from the runway. The flight track continued southwest toward the accident location. At 1256:04, the flight track passed over the accident site elevation (5,457 ft) at an altitude of 7,656 ft mean sea level (msl) and continued southwest in a gradual climb. The flight track showed a gradual left turn followed by a widening right climbing turn back toward the north. At 1259:49, the airplane's altitude was 8,661 ft msl, and the data then showed a descent to 8,179 ft msl during a 15 second period. By 1300:04, the airplane had climbed to an altitude of 8,353 ft msl. At 1300:19, the airplane was at an altitude of 8,559 ft msl (about 3,100 ft above ground level), and the remaining 35 seconds of data showed a near vertical descent toward the accident location. The last recorded data point at 1300:54 showed that the airplane was over the accident site, had a ground speed of 40 knots, and was at 5,580 ft msl.

Flight instructor Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	50
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	April 1, 2015
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	5666 hours (Total, all aircraft), 68 hours (Total, this make and model), 2866 hours (Pilot In Command, all aircraft), 148 hours (Last 90 days, all aircraft), 45 hours (Last 30 days, all aircraft)		

Pilot Information

Certificate:	Commercial	**Age:**	24
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	September 25, 2015
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	1290 hours (Total, all aircraft), 1164 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N6449M
Model/Series:	152 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1980	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	15284733
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	July 17, 2015 Annual	**Certified Max Gross Wt.:**	1676 lbs
Time Since Last Inspection:	37 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	9715.3 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-235 SERIES
Registered Owner:	TUMBLEWEED LEASING CO INC	**Rated Power:**	125 Horsepower
Operator:	Upper Limit Aviation	**Operating Certificate(s) Held:**	Pilot school (141)

The two-seat, high-wing, fixed-gear airplane, serial number 15284733, was manufactured in 1980. It was powered by a 125-horsepower Lycoming O-235-L2C engine and equipped with a Sensenich 70CKS6-0-52 fixed-pitch propeller. Review of copies of maintenance logbook records showed that an annual inspection was completed on July 17, 2015, at an hour meter reading of 99.4 hours, airframe total time of 9,678.2 hours, and engine time since major overhaul of 99.4 hours. Examination of the maintenance and flight department records revealed no unresolved maintenance discrepancies against the airplane before departure.

Fueling records at KCDC established that the airplane was last fueled on October 5, 2015, with 14 gallons of 100-octane aviation fuel. The operator calculated, based on previous flight records, that the airplane departed with a total of 23 gallons of fuel on board.

The current weight and balance documentation for the airplane was found in the airplane flight manual. The maximum gross weight for the airplane was 1,670 pounds. The gross weight at departure was estimated at 1,709 pounds. Based on estimated fuel burn and flight time, at the time of the accident, the airplane had a gross weight of 1,681 pounds.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KCDC,5618 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	18:53 Local	**Direction from Accident Site:**	54°
Lowest Cloud Condition:	Scattered / 7000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.01 inches Hg	**Temperature/Dew Point:**	18°C / 5°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Cedar City, UT (CDC)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Cedar City, UT (CDC)	**Type of Clearance:**	None
Departure Time:	12:15 Local	**Type of Airspace:**	

Airport Information

Airport:	CEDAR CITY RGNL CDC	**Runway Surface Type:**	
Airport Elevation:	5622 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	37.648334,-113.198608(est)

Investigators examined the wreckage at the accident scene. The damage to the airplane was consistent with impact in a right-wing-low, nose-down attitude. There were no ground impact marks around the airplane to indicate any forward momentum. Both fuel tanks exhibited hydraulic deformation in a downward direction and were breached.

The outboard right wing leading edge exhibited tapering compression damage. The left wing was canted

forward, and the right wing was canted aft. All primary flight control surfaces and major system components were identified and located at the wreckage site before the wreckage was recovered. The aileron and flap cables were cut by recovery personnel at the wing roots.

Medical and Pathological Information

The Utah Department of Health, Office of the Medical Examiner, conducted postmortem examinations of both pilots. The cause of death for both pilots was reported as blunt force injuries.

The Federal Aviation Administration's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing of specimens of both pilots, which were negative for carbon monoxide, cyanide, volatiles, and tested drugs.

Tests and Research

After the wreckage was recovered, the engine was separated from the main wreckage and placed on a table to facilitate examination and disassembly. The propeller hub remained attached to the engine. Both propeller blades remained straight and exhibited no damage indicative of rotation at the time of impact.

Engine compression and valve train continuity were established. The magnetos produced spark at all leads. The top spark plugs appeared new. The fuel strainer bowl was full of fuel, which tested negative for water, and the strainer screen was clean.

The carburetor was impact displaced and was embedded in the left lower firewall. It was fractured radially at the throttle plate. The float bowl was removed and about 10 drops of fuel were observed and tested using Kolor Kut water disclosing paste with negative results. Hydraulic deformation was observed on one of the floats. All fuel lines were empty of any liquid.

The fuel selector was removed, examined, and determined to be in the "ON" position.

Administrative Information

Investigator In Charge (IIC):	Jones, Patrick
Additional Participating Persons:	Jeff L Smith; Federal Aviation Administration; Salt Lake City, UT Peter J Basile; Textron Aviation; Wichita, KS John Butler; Lycoming Engines; Dallas, TX
Original Publish Date:	October 17, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=92114