Aviation Investigation Final Report

Location:	Mendon, Utah	**Accident Number:**	WPR22FA227
Date & Time:	June 24, 2022, 09:03 Local	**Registration:**	N934JH
Aircraft:	Cessna 152	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The accident flight was intended to teach the flight instructor candidate how to enter, recognize, and recover from an aggravated stall wherein the airplane follows a corkscrew path. Before the accident maneuver, automatic dependent surveillance - broadcast (ADS-B) data revealed that several training maneuvers were performed with extraordinary directional changes greater than 180° or rapid descents in altitude. The rapid changes in altitude and recovery were consistent with stall or spin recovery maneuvers. Although there were no witnesses to the accident, surveillance video footage captured the airplane descending rapidly in a developed spin. Postaccident examination of the airframe and engine revealed that the airplane impacted terrain in a 45° nose-down attitude, with no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation.

The operator's training guidance stated that the minimum altitude to perform spin training was 9,500 ft mean sea level (msl). According to ADS-B data, the accident maneuver was entered about 9,100 ft msl, and the elevation at the wreckage site was 4,590 ft.

According to the operator's flight experience logs, the flight instructor accumulated 2 hours of flight experience learning how to spin the accident airplane. The fight instructors personal flight logs were not provided, and his total flight experience was not determined. According to the operator's flight experience logs, the flight instructor candidate had no actual flight experience in the accident airplane make and model.

The pilot under instruction's toxicology testing detected codeine and morphine in urine at low levels. These results could be explained by codeine use alone, although other potential explanations exist. Regardless, the pilot under instruction had no detectable codeine or

morphine in his blood, which makes it unlikely that codeine or morphine effects contributed to the accident.

Probable Cause and Findings

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

The flight instructor’s failure to recover from a developed spin, which resulted in impact with terrain.Contributing to the accident was the flight instructor’s decision to enter the maneuver below the operator’s altitude limitation.

Findings

Personnel issues	Aircraft control - Instructor/check pilot
Personnel issues	Decision making/judgment - Instructor/check pilot
Aircraft	(general) - Not attained/maintained
Personnel issues	Total experience w/ equipment - Instructor/check pilot

Factual Information

History of Flight

Maneuvering	Simulated/training event
Maneuvering	Aerodynamic stall/spin (Defining event)

On June 24, 2022, about 0903 Mountain daylight time, a Cessna 152, N934JH, sustained substantial damage when it was involved in an accident in Mendon, Utah. The flight instructor and pilot receiving instruction sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

According to the flight school's Chief Flight Instructor, the purpose of the accident flight was for the flight instructor to conduct spin training with the pilot receiving instruction, who was a flight instructor candidate. The accident airplane departed Logan-Cache Airport, in Logan, Utah, and traveled to Utah State University's designated aviation practice area, about 10 nm southwest of the airport. According to ADS-B data, several training maneuvers were performed, with the duration of flight lasting nearly thirty minutes.

Three maneuvers were performed with directional changes greater than 180° or rapid descents in altitude, consistent with spin training. ADS-B data indicated that the accident maneuver was entered about 9,100 ft msl (~4,510 ft agl). The elevation at the wreckage site was 4,590 ft. A review of surveillance footage showed the airplane in a fully developed left spin. When the airplane entered the surveillance video's field of view, the airplane subsequently completed three rotations to the left, in a nose-down attitude, within a time span of about seven seconds, before disappearing from the camera view and impacting terrain.

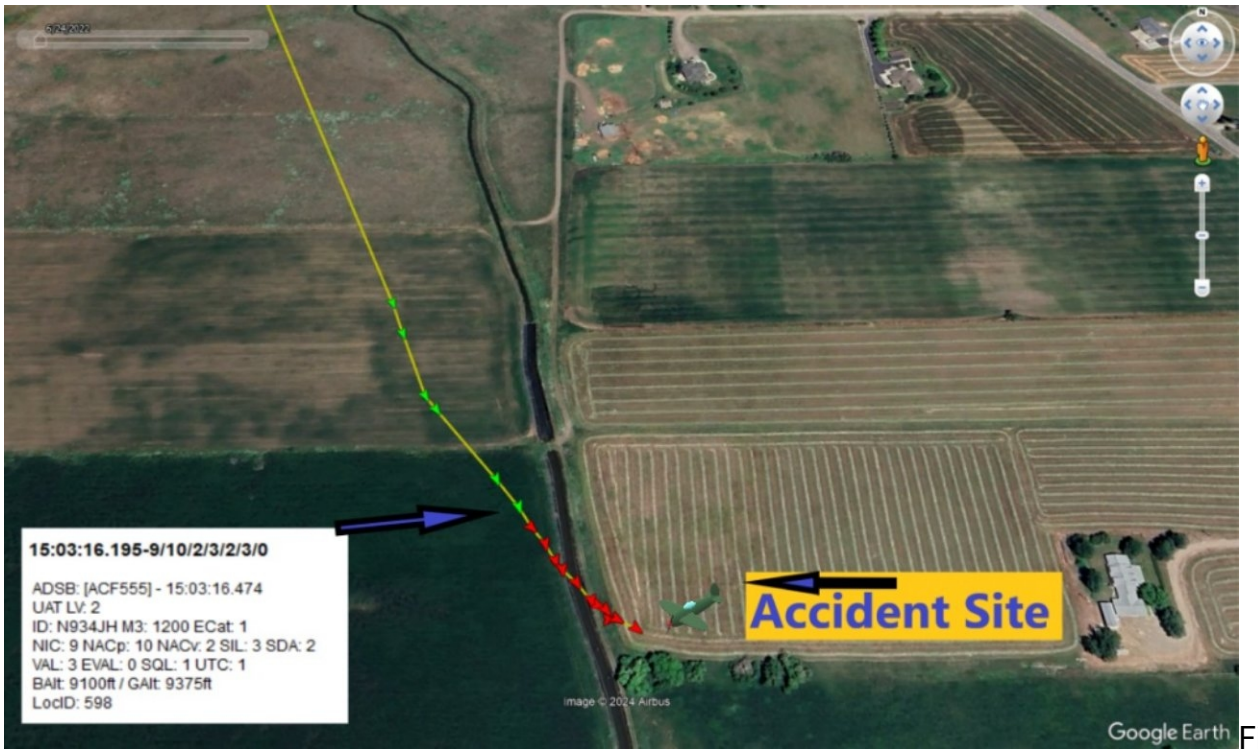

Figure 1: N934JH spin maneuver initiated

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	24,Male
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:**	July 13, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 18, 2020
Flight Time:	(Estimated) 348.9 hours (Total, all aircraft), 2.4 hours (Total, this make and model), 348.9 hours (Pilot In Command, all aircraft), 2.3 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Commercial	**Age:**	25,Male
Airplane Rating(s):	Single-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):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	February 14, 2022
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 25, 2022
Flight Time:	(Estimated) 252.8 hours (Total, all aircraft), 0.4 hours (Total, this make and model), 213.6 hours (Pilot In Command, all aircraft), 1.4 hours (Last 24 hours, all aircraft)		

A review of the operator's pilot logs for the flight instructor and flight instructor candidate receiving instruction revealed that most of their actual flight experience was acquired in a low-wing, four-seat, technically advanced airplane. The accident airplane was a high-wing, two-seat, analogue-gauge airplane.

A review of the flight instructor's pilot log provided by the operator indicated that he had acquired 348.9 hours of flight experience, with 2.4 hours of flight experience in the accident airplane. The pilot's log revealed that he had acquired 1.1 hours of flight experience nine days before the accident flight, 0.9 hours three days before the accident flight, and 0.4 hours in the accident airplane, which was acquired on the ground before terminating the planned flight due to inclement weather.

A review of the flight instructor candidate's pilot log provided by the operator revealed that he had acquired 252.8 hours of flight experience, with 0.4 hours in the accident airplane, which was acquired on the ground before terminating the planned flight due to inclement weather.

The personal flight logs for the flight instructor and the pilot receiving instruction were not provided. According to a fuel invoice provided by the operator, the accident airplane was refueled with just over 6 gallons of 100LL aviation gasoline on June 23, 2022.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N934JH
Model/Series:	152	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	15283001
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	December 22, 2021 Annual	**Certified Max Gross Wt.:**	1670 lbs
Time Since Last Inspection:	75.6 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4800.6 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C126 installed, activated, aided in locating accident	**Engine Model/Series:**	O-235-L2C
Registered Owner:	UTAH STATE UNIVERSITY	**Rated Power:**	110 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	Pilot school (141)

The operator's spin recovery training parameters are illustrated below:

The Spin recovery needs to be briefed from the Airplane Flight Manual (AFM).
Here are the parameters that will be briefed-

- Minimum altitude to do the flight is 9,500-10,000 MSL.
  - o 6,000 AGL is listed in the AFM for a 6-turn spin.
  - o We will only do a 3-turn spin
  - o After every spin you will climb back to the minimum altitude
  - o 1,500 AGL is listed in the AFM as the lowest recovery altitude, we should never get this close during spins.
- CFI will only do a power-off stall into a Spin as per the AC circular and CFI PTS.
- CFI will do stall to the incipient phase and then the recovery.
- Student will do stall to the incipient phase and then the recovery.
- CFI will demonstrate the first 3-rotation spin and recovery
- Student will perform the requisite 3-rotation spins to both directions and a total of 3 separate spins and recoveries.
- If safety is ever in question, you will stop the training flight.

The airplane manufacturer's pilot operating handbook and approved AFM, provided the recovery method for spins within its normal procedures (see Figure 2).

1. VERIFY THAT AILERONS ARE NEUTRAL AND THROTTLE IS IN IDLE POSITION.
2. APPLY AND **HOLD** FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION.
3. JUST **AFTER** THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL **BRISKLY** FORWARD FAR ENOUGH TO BREAK THE STALL. Full down elevator may be required at aft center of gravity loadings to assure optimum recoveries.
4. **HOLD** THESE CONTROL INPUTS UNTIL ROTATION STOPS. Premature relaxation of the control inputs may extend the recovery.
5. AS ROTATION STOPS, NEUTRALIZE RUDDER, AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.

Figure 2. POH/AFM spin recovery training

According to the AFM, for planning purposes at least 1,000 ft of altitude loss should be allowed for a 1-turn spin and recovery. Additionally, the AFM identified that spins are to be completed before reaching at minimum 1,500 ft agl.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KLGU,4448 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	08:51 Local	**Direction from Accident Site:**	39°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	60°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.07 inches Hg	**Temperature/Dew Point:**	20°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Logan, UT (LGU)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Logan, UT (LGU)	**Type of Clearance:**	VFR
Departure Time:	09:00 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	41.68048,-111.96809

The wreckage was in a tall grass field located in an agricultural area. The aircraft impacted terrain about a 45° nose-down attitude. The cockpit was compressed upward and aft, decreasing cockpit volume. The wings remained connected to their respective wing attachment fittings. Both lift struts remained attached to the fuselage and the wings. The left- and right-wing root skins exhibited compression damage. Neither wing's leading edge exhibited signs of impact compression damage, although the left-wing tip sustained impact damage. The aluminum fuel tanks remained intact. The right wing was bent upward approximately 10° outboard of the lift strut. The upper-wing skins exhibited wrinkles consistent with compression. The lower wing skins in the same area exhibited wrinkles consistent with tension. The empennage remained intact. The left horizontal stabilizer was bent downward approximately 10° about midspan.

The manufacturer of the accident airplane issued a mandatory rudder stop modification identified as *Single Engine Bulletin (SEB) 01-1*. The service bulletin was mandated by Federal Aviation Administration Airworthiness Directive (AD) 2009-10-09 and was complied with on the accident airplane and postaccident inspection revealed no anomalies. The purpose as stated in the bulletin was as follows:

To provide an enhanced rudder stop, bumper, doubler and attachment hardware designed to assist in preventing the possibility of the rudder overriding the stop bolt during full left and/or right operation of the rudder.

According to weight and balance calculations conducted by the flight instructor and validated by the investigator-in-charge, the airplane was operated within center-of-gravity limitations and within weight and balances tolerances.

An examination of the airframe revealed no indications of flight control cable or control surface obstructions that would have prevented or restricted the normal operation of the flight controls. There was no evidence of preimpact mechanical malfunctions observed during examination of the engine.

Medical and Pathological Information

An autopsy of the flight instructor was performed by the Utah Department of Health Office of the Medical Examiner, Taylorsville, Utah. According to the autopsy report, the cause of death was blunt force injuries and the manner of death was an accident.

Toxicology testing performed on the flight instructor candidate by the FAA Forensic Sciences Laboratory found 206 µg/ml codeine and 71 µg/ml morphine in the urine. The pilot under instruction had no detectable codeine or morphine in his blood at the time of the crash.

Administrative Information

Investigator In Charge (IIC):	Hicks, Michael
Additional Participating Persons:	Keith A. Crockett; FAA; Salt Lake City, UT
Original Publish Date:	June 26, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=105346