Aviation Investigation Final Report

Location:	Hayden, Colorado	**Accident Number:**	CEN12FA161
Date & Time:	February 19, 2012, 15:25 Local	**Registration:**	N4772A
Aircraft:	Cessna 414A	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal, 4 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot performed an instrument approach to the runway with an approaching winter storm. A review of on-board global positioning system (GPS) data indicated that the airplane flew through the approach course several times during the approach and was consistently below the glideslope path. The airplane continued below the published decision height altitude and drifted to the right of the runway's extended centerline. The GPS recorded the pilot's attempt to perform a missed approach, a rapid decrease in ground speed, and then the airplane descend to the ground, consistent with an aerodynamic stall. Further, the airplane owner, who was also a passenger on the flight, stated that, after the pilot made the two "left turning circles" and had begun a third circle, he perceived that the airplane "just stalled." An examination of the airframe and engine did not detect any preimpact anomalies that would have precluded normal operation. The airplane's anti-ice and propeller anti-ice switches were found in the "off" position. A review of weather information revealed that the airplane was operating in an area with the potential for moderate icing and snow. Based on the GPS data and weather information, it is likely that the airframe collected ice during the descent and approach, which affected the airplane's performance and led to an aerodynamic stall during the climb.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadvertent stall during a missed approach. Contributing to the accident was the pilot's operation of the airplane in forecasted icing conditions without using all of its anti-ice systems.

Findings

Environmental issues	Conducive to structural icing - Effect on equipment
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Decision making/judgment - Pilot
Aircraft	Directional control - Not attained/maintained

Factual Information

History of Flight

Approach-IFR initial approach	Structural icing
Approach-IFR missed approach	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On February 19, 2012, at 1525 mountain standard time, a Cessna 414A airplane, N4772A, impacted terrain at the Yampa Valley Airport (KHDN), Hayden, Colorado. The commercial pilot and one passenger were fatally injured and four passengers were seriously injured. The airplane was substantially damaged. The airplane was registered to and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Instrument meteorological conditions developed for the flight, which operated on an instrument flight rules (IFR) flight plan. The flight departed the Dalhart Municipal Airport (KDHT), Dalhart, Texas, approximately 1415 central standard time.

A review of air traffic control communications revealed that the pilot was cleared for the instrument landing system (ILS) approach to runway 10 via the initial approach fix REVME.

Airfield personnel and airfield rescue and firefighting (ARFF) provided an enhanced universal communications (UNICOM) service for inbound traffic and were monitoring both the UNICOM and Denver Center radio frequencies, at the time of the accident. Airfield personnel heard the pilot report he was on final approach over the UNICOM frequency. Airport personnel then selected the airport lights to high, and the pilot acknowledged the light status. There was no report of a distress call being made by the pilot.

In an interview with the airplane's owner, who was also a passenger, he stated the airplane was maneuvering to land at KHDN. The pilot had made two left turning circles and had begun a third circle when the he perceived that the airplane "just stalled." He added that the airplane fell straight down and impacted terrain. In addition, he recalled that the engines were running at the time of the accident. In a subsequent statement made by the owner, he stated that immediately preceding the crash, he heard a very load “pop” or “bang” from the right side of the airplane, possibly the right engine, moments before the airplane “went down.” He recalled the pilot looking to the airplane’s right and that the pilot immediately reached towards the center console near the throttle controls. Moments later, the airplane crashed.

PERSONNEL INFORMATION

The pilot, age 75, held a commercial pilot certificate with ratings for airplane single engine land, airplane multi-engine land, airplane single engine sea, instrument airplane, and gliders. In addition, the pilot held a flight instructor certificate for airplane single engine, airplane multi-engine, instrument airplane, and gliders. The pilot was also an airframe and power-plant mechanic who would perform some maintenance tasks on the accident airplane. On March 31, 2011, the pilot was issued a second class medical certificate with the restriction to wear corrective lenses. A review of pilot training information revealed his previous flight review was on October 27, 2011, in the same make and model as the accident airplane.

AIRCRAFT INFORMATION

The airplane was a two engine, low wing, eight seat Cessna 414, serial number 414A005, and was manufactured in 1978. It was powered by two, 310-horsepower Continental Motors TSIO-520-NB engines that drove three-bladed, variable pitch, McCauley propellers. A review of maintenance records revealed that the previous annual inspection was completed on December 8, 2011, at a total airframe time of 8,245 hours, a left engine time since major overhaul of 2,028.9 hours, a right engine time since major overhaul of 901.6 hours, and a tachometer time of 2,794.7. At the accident site, the airplane's tachometer read 2,833.9 hours. The airplane's published stall speed is 70 knots.

METEOROLOGICAL INFORMATION

The National Weather Service Surface Analysis Chart issued at 1400 mountain standard time depicted two low pressure systems over eastern Colorado associated with a cold front moving across the Rockies and a developing warm front over eastern Colorado. Satellite imagery showed extensive cloud cover over the accident area with cloud tops near 27,000 feet. An upper air sounding taken near Grand Junction, Colorado, reported a freezing level at 5,703 feet mean sea level (msl), with conditions favorable for icing in clouds and in precipitation above the freezing level.

At 1515, an automated weather reporting facility located at KHDN reported wind from 310 at 8 knots, 5 miles visibility, few clouds at 800 feet, scattered clouds at 1,700 feet, broken ceiling at 2,900 feet, temperature -1 Celsius (C), dew point -3 C, and a barometric pressure of 29.62 inches of mercury. At 1535, wind from 290 at 10 knots gusting to 14 knots, visibility 1/4 mile, ceiling overcast at 400 feet, temperature -2 C, dew point -3 C, and a barometric pressure of 29.62 inches of mercury. This facility does not report precipitation, however conditions were favorable for the production of heavy snow.

A review of HDN's weather observation data revealed that between 1430 and 1445, a front passed over the airfield, which shifted the wind from the east to the west and deteriorated the ceiling and visibility. Weather in the area could produce snow that continued through to the time of the accident, when the lowest visibility and ceiling was reported.

An automated weather reporting facility at the Craig-Moffat Airport (KCAG), located about 14

miles west of KHDN, could report precipitation, with the exception of freezing rain. At 1506, the station began reporting light snow with a wind shift having occurred at 1450. At 1525, it reported light snow and freezing fog. Then at 1553, moderate snow and freezing fog was reported.

Several Airmen's Meterological Information (AIRMETs) were active for the time of the accident flight. These AIRMETs warned for IFR conditions, mountain obscuration, occasional moderate turbulence below 18,000 feet, and moderate icing between the freezing level and 18,000 feet.

AIDS TO NAVIGATION

The approach flown by the pilot was the ILS to runway 10. The inbound course was 104 degrees, with the initial approach fix (REVME) located along the localizer course at 15 nautical miles, and the final approach fix (INEDE) located along the localizer course at 8.1 nautical miles. The decision height was at 7,371 msl, with a weather requirement of an 800 foot ceiling and 2 ¾ miles visibility. The touchdown zone elevation for runway 10 was 6,591 feet msl.

COMMUNICATIONS

A review of radar audio revealed that the pilot had checked in with Denver Center and requested a visual approach if the ceiling was greater than 1,000 feet. Denver Center replied that a previous airplane flew the ILS approach into KHDN and had broken out of the clouds at minimum altitude (800 feet). The pilot then accepted an IFR clearance and was cleared to fly the ILS approach into KHDN.

AIRPORT INFORMATION

The Hayden/Yampa Valley airport (KHDN) is located approximately 2 miles southeast of Hayden, Colorado, with a field elevation of 6,606 feet and a single runway oriented along 100/280 degrees. Runway 10 had a precision approach path indicator located to the left of the runway, and had a medium intensity approach light system with runway alignment indicator lights. The airfield is non-towered so pilots utilized UNICOM to coordinate their movements on the airfield. As previously noted, ARFF provided advisories to pilots over UNICOM.

WRECKAGE AND IMPACT INFORMATION

The accident site was located about 95 yards south-southwest from the edge of runway 10. The wreckage path aligned generally along a 090 degree heading. The debris path contained the left aileron and right propeller. The main wreckage came to rest facing 320 degrees. The fuselage displayed buckling and crushing throughout its length. Damage to the left and right wings was nearly symmetric. The elevator counter weights separated in a downward direction. All major airplane components were accounted for at the accident site. Flight control continuity was established from the controls to their respective surfaces. The flaps and landing gear were found in the retracted position. The airplane's electric anti-ice and propeller

anti-ice were found in the “off” position. No preimpact anomalies were detected with the airframe that would preclude normal operation of the airplane.

The engines were removed and shipped to Continental Motors Inc., Mobile, Alabama, for test runs. Under the auspices of the NTSB, both engines were placed on test beds, started, and operated throughout their power ranges. No preimpact anomalies were detected with the engines that would preclude normal engine operation.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Douglas County Coroner’s Office, Castle Rock, Colorado, as authorized by the Routt County Coroner. The autopsy noted the following findings:

Right coronary artery narrowed more than 90 percent, with evidence of recanalization.
Severe cardiomegaly, with a weight of 570 grams.
Myocardial fibrosis of the left ventricle.

The Federal Aviation Administration Bioaeronautical Sciences Research Laboratory, Oklahoma City, performed forensic toxicology on specimens from the pilot. Testing was negative for carbon monoxide, cyanide, ethanol, and drugs.

ADDITIONAL INFORMATION

Garmin GPSmap 295

A global positioning system (GPS) was located in the cockpit area of the airplane and sent to the NTSB laboratories in Washington, D.C. A download of the device displayed the airplane’s flight path along the ILS approach. The airplane turned inside of the initial approach fix for the ILS 10 approach. During the approach, the airplane crossed through the approach course several times. The pilot crossed INEDE 260 feet below the published altitude for the final approach fix and was consistently below glide slope during the approach to the airport. Utilizing the GPS altitude, at 1523:25, the airplane was below glide slope, drifting right on the localizer approach course, and three miles from the airport, when the airplane reached the decision height of 7,331 feet msl. The airplane continued to drift to right of the localizer course while continuing to descend to an altitude of 6,591 feet msl, before it climbed to 6,824 feet, and then descended towards terrain. During this climb, the airplane’s groundspeed decreased to 78 knots.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	75,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Glider; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	March 31, 2011
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	October 27, 2011
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N4772A
Model/Series:	414A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	414A0095
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	CONT MOTOR
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-520-NcNB
Registered Owner:	On file	**Rated Power:**	310 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HDN	**Distance from Accident Site:**	
Observation Time:	15:35 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Thin Overcast / 400 ft AGL	**Visibility**	1 miles
Lowest Ceiling:	Overcast / 400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / 14 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.62 inches Hg	**Temperature/Dew Point:**	-2°C / -3°C
Precipitation and Obscuration:	Heavy - Blowing - Snow		
Departure Point:	Dalhart, TX (DHT)	**Type of Flight Plan Filed:**	IFR
Destination:	Hayden, CO (HDN)	**Type of Clearance:**	IFR
Departure Time:	14:15 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	Yampa Valley Airport HDN	**Runway Surface Type:**	Asphalt
Airport Elevation:	6606 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	10	**IFR Approach:**	Unknown
Runway Length/Width:	9998 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal, 4 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal, 4 Serious	**Latitude, Longitude:**	40.48389,-107.228614

Administrative Information

Investigator In Charge (IIC):	Aguilera, Jason
Additional Participating Persons:	Tom Wiesner; FAA FSDO; Denver, CO Steve Miller; Cessna Aircraft Company; Wichita, KS Nicole Charnon; Continental Motors; Mobile, AL
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Note:	
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