



National Transportation Safety Board Aviation Accident Final Report

Location:	Selma, CA	Accident Number:	WPR16LA094
Date & Time:	04/18/2016, 1805 PDT	Registration:	N9909B
Aircraft:	CESSNA 182A	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	2 Minor
Flight Conducted Under:	Part 91: General Aviation - Instructional		

Analysis

Following an uneventful flight, the flight instructor and student pilot began a descent toward an airport where they intended to refuel the airplane. The flight instructor reported that, during the descent, the engine lost power. After notifying air traffic control, they received vectors to the nearest airport. Despite multiple attempts, the flight instructor was unable to restart the engine. He realized that the airplane would not be able to reach the airport, so he initiated a forced landing to an open sand- and dirt-covered field. During the landing roll, the airplane nosed over. The flight instructor reported that he did not use carburetor heat during the descent.

During examination of the airplane, the fuel strainer valve was stuck in the open position and the valve and the mixture metering sleeve were contaminated with sandlike debris, which likely entered the system during the accident sequence. The debris was removed. The fuel strainer valve then closed, indicating the impact sequence caused it to open. The carburetor was reassembled and reinstalled on the engine, and the engine started and ran continuously at various power settings until it was shut off using the mixture control.

Recovery personnel noted that each wing fuel tank contained less than 2 quarts of fuel; the wings were not breached. Fuel burn calculations revealed that the airplane would have used 43.5 gallons of fuel after the airplane was topped off with fuel about 1 hour before the flight and should have had about 21.5 gallons of fuel remaining (the two tanks had a total capacity of 65 gallons), 18.5 gallons of which would have been usable. It could not be determined why only about 2 quarts of fuel remained in each wing tank.

Weather conditions in the area at the time of the accident were conducive to the formation of carburetor icing at glide and cruise power. It is likely that the flight instructor's failure to use carburetor heat during the descent resulted in the accumulation of carburetor icing and subsequent total loss of engine power.

Probable Cause and Findings

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

The total loss of engine power due to carburetor icing, which resulted from the flight instructor's failure to use carburetor heat during the descent.

Findings

Aircraft	Intake anti-ice, deice - Not used/operated (Cause)
Personnel issues	Lack of action - Instructor/check pilot (Cause)
Environmental issues	Conducive to carburetor icing - Effect on equipment (Cause) Terrain - Contributed to outcome

Factual Information

On April 18, 2016, about 1805 Pacific daylight time, a Cessna 182A, N9909B, was substantially damaged during a forced landing following a loss of engine power near Selma, California. The airplane was registered to HBC Aero LLC, Rancho, Murieta, California, and operated by the student pilot. The student pilot and the Certified Flight Instructor (CFI) sustained minor injuries. Visual meteorological conditions prevailed and no flight plan was filed for the instructional flight. The cross-country flight originated from Mc Clellan-Palomar Airport, Carlsbad, California, about 1600, with an intended destination of Madera, California.

In a written statement to and a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the flight instructor (FI) reported that following an uneventful flight from Rancho Murieta to Hesperia, California, they flew to Apple Valley, California, to refuel. The FI stated that they topped the airplane off with 56.08 gallons of fuel, and flew to Carlsbad, which was about a 1-hour flight, where they dropped two people off prior to departing to return to Rancho Murieta.

During the flight, the FI and student pilot decided instead of their original intended fuel stop at Fresno, California, they would refuel in Madera. The FI further stated that during a descent from 6,500 feet to 4,500 feet mean sea level (msl), the engine lost power. The FI and student pilot received vectors from air traffic control to the nearest airport. Despite multiple attempts, the FI was unable to restart the engine, and realized they would not be able to make it to the Selma Airport, Selma, California. Subsequently, the FI initiated a forced landing to an open field, and during the landing roll, the airplane nosed over. The FI reported that during the descent, carburetor heat was not used.

Examination of the airplane by a Federal Aviation Administration (FAA) inspector revealed that the airplane came to rest in a field, which contained a mix of sand and dirt. The right wing and fuselage were structurally damaged. The airplane was recovered to a secure location for further examination.

Examination of the recovered airframe and engine was conducted on June 15, 2016, at the facilities of Plain Parts, Pleasant Grove, California, by representatives of Cessna Aircraft and Continental Motors Inc. under the supervision of the NTSB IIC.

Both wings and the empennage were separated from the airplane to facilitate recovery of the wreckage. Personnel from the recovery company reported that there was less than 2 quarts of fuel in either fuel tank. Both the left and right fuel caps remained attached and secure. The airframe was intact and undamaged. The nose wheel landing gear was separated. Impact damage to the airframe air filter and air box was observed. When an alternate fuel source was plumbed to the right wing fuel inlet port, fuel was observed leaking out of the airframe fuel strainer. The fuel strainer valve was found stuck in the open position along with an abundance of sand like debris. The debris was cleaned away, and the fuel strainer valve closed normally.

All accessories remained attached, the ignition harness was intact, and the right side engine mounts were fractured. The left side exhaust was damaged. The crankshaft was rotated by

hand, and thumb compression was obtained on all cylinders. In addition, when the crankshaft was rotated, spark was observed on all ignition leads. Due to propeller damage, a test club propeller was installed on the engine in order to facilitate an engine run.

An external power supply was connected to the airplane's electrical system, and the engine was started. Initially, the engine ran for about 80 seconds before losing power. Multiple attempts were made to start the engine again, however, the engine would only start when primed, and would not continue running once the initial primer fuel was exhausted. The carburetor was then removed from the engine and disassembled. A small amount of sand like debris was cleared from the Mixture Metering Sleeve using light air pressure. No other anomalies were noted with the carburetor. The carburetor was reassembled and reinstalled on the engine. The engine started, and ran continuously at various power settings until the mixture control was moved to the idle cutoff position. The sources of the debris located within the carburetor mixture metering sleeve was undetermined.

Review of the Cessna 182 Pilots Operating Handbook (POH), 182 Cruise and Range Performance Chart, depending on rpm, manifold pressure, and mixture settings, fuel burn rates vary between 9.7 and 14.5 gallons per hour. The airplane was equipped with two wing fuel tanks, which have a capacity of 32.5 gallons of fuel per tank. The POH states that the left and right fuel tank have a usable fuel of 27.5 gallons per tank in all flight conditions along with an additional 3.5 gallons of fuel useable in level flight only. Each fuel tank has an unusable fuel level of 1.5 gallons.

The NTSB IIC calculated an estimated fuel burn using a fuel consumption rate of 14.5 gallons per hour, and the result was 3 hours of flight time. It was determined that the flight would have used about 43.5 gallons of fuel since the airplane was topped off with fuel.

At 1953, weather conditions recorded at the Fresno-Yosemite International Airport, located about 14 miles north of the accident site, were temperature 81 degrees Fahrenheit, dew point 43 degrees Fahrenheit. According to the Federal Aviation Administration Special Airworthiness Information Bulletin CE-09-35, entitled Carburetor Icing Prevention, the temperature and dew point were conducive to the formation of icing at glide or cruise power.

History of Flight

Enroute-cruise	Loss of engine power (total) (Defining event) Off-field or emergency landing
Landing-landing roll	Off-field or emergency landing Nose over/nose down

Flight Instructor Information

Certificate:	Airline Transport; Commercial	Age:	53, Male
Airplane Rating(s):	Multi-engine Land; 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 Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	No
Medical Certification:	Class 2 Without Waivers/Limitations	Last FAA Medical Exam:	04/15/2014
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	3500 hours (Total, all aircraft), 35 hours (Total, this make and model), 70 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Student Pilot Information

Certificate:	Student	Age:	39, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Without Waivers/Limitations	Last FAA Medical Exam:	03/31/2016
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	2 hours (Total, all aircraft), 2 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	Registration:	N9909B
Model/Series:	182A A	Aircraft Category:	Airplane
Year of Manufacture:	1957	Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	34309
Landing Gear Type:	Tricycle	Seats:	
Date/Type of Last Inspection:	09/02/2015, Annual	Certified Max Gross Wt.:	2348 lbs
Time Since Last Inspection:	58 Hours	Engines:	1 Reciprocating
Airframe Total Time:	3536.2 Hours at time of accident	Engine Manufacturer:	CONT MOTOR
ELT:	C91 installed, not activated	Engine Model/Series:	O-470 SERIES
Registered Owner:	HBA AERO LLC	Rated Power:	230 hp
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KFAT, 327 ft msl	Distance from Accident Site:	14 Nautical Miles
Observation Time:	0253 UTC	Direction from Accident Site:	342°
Lowest Cloud Condition:	Scattered / 20000 ft agl	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	350°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.97 inches Hg	Temperature/Dew Point:	27° C / 6° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Carlsbad, CA	Type of Flight Plan Filed:	None
Destination:	Madera, CA	Type of Clearance:	None
Departure Time:	1615 PDT	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	2 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Minor	Latitude, Longitude:	36.561667, -119.632500 (est)

Administrative Information

Investigator In Charge (IIC):	Joshua Cawthra	Report Date:	07/26/2017
Additional Participating Persons:	Kevin Marpert; Federal Aviation Administration; Fresno, CA Mike Council; Continental Motors Inc.; Mobile, AL Jonathon Hirsch; Cessna Aircraft; Wichita, KS		
Publish Date:	07/26/2017		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=93042		

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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](#).