



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Neihart, MT	<b>Accident Number:</b>	WPR14FA362
<b>Date &amp; Time:</b>	09/02/2014, 1230 MDT	<b>Registration:</b>	N34880
<b>Aircraft:</b>	CESSNA 177B	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Controlled flight into terr/obj (CFIT)	<b>Injuries:</b>	1 Fatal, 1 Serious, 2 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

While flying in mountainous terrain to show one of the passengers the area, the pilot entered a canyon that started to narrow as the canyon's walls rose so the pilot initiated a climb. The airplane then experienced a downdraft followed by a second downdraft, and the pilot found a low spot in the trees and attempted a climbing turn; however, the airplane would not climb and started brushing the trees. The airplane descended into the ground, and a postimpact fire ensued. The pilot reported no anomalies with the airframe or engine that would have precluded normal operation, and postaccident examination revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation.

Weather charts revealed gusty wind conditions with vertical air mixing and an increased potential for turbulence in the accident area. Weather model soundings and simulations revealed that the layer from the surface through 10,000 feet mean sea level was unstable, indicating that the airplane likely encountered wind magnitudes as high as 30 knots, gusty winds, and updrafts and downdrafts in the mountainous terrain. Further, the airplane likely experienced turbulence and encountered downdrafts with a tailwind component at a velocity between 100 and 200 ft per minute.

Calculation of the airplane's weight and balance revealed that throughout the flight, the airplane was operating about 114 pounds over maximum gross weight and outside (forward) of the center of gravity envelope. It is likely that the airplane was unable to climb over the terrain as a result of the airplane's weight and balance configuration combined with the weather conditions in the area.

## Probable Cause and Findings

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

The pilot's failure to maintain clearance from terrain while maneuvering at low altitude in turbulent conditions over mountainous terrain. Contributing to the accident was the pilot's improper decision to traverse the mountainous area with the airplane over its maximum gross weight and with a forward center of gravity.

## Findings

<b>Aircraft</b>	Climb capability - Capability exceeded (Cause) Altitude - Not attained/maintained (Cause) Maximum weight - Capability exceeded (Factor) CG/weight distribution - Capability exceeded (Factor)
<b>Personnel issues</b>	Decision making/judgment - Pilot (Factor)
<b>Environmental issues</b>	Turbulence - Effect on operation (Cause) Mountainous/hilly terrain - Effect on operation (Cause)

## Factual Information

### History of Flight

Prior to flight	Aircraft loading event
Maneuvering-low-alt flying	Turbulence encounter
Maneuvering	Controlled flight into terr/obj (CFIT) (Defining event)

On September 2, 2014, about 1230 mountain daylight time, a Cessna 177B, N34880, impacted terrain about 5 miles southeast of Neihart, Montana. The private pilot and one passenger sustained minor injuries, one passenger was seriously injured, and one passenger was fatally injured. The airplane was destroyed during the accident sequence and subsequent post impact fire. The airplane was registered to, and operated by, the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight and no flight plan had been filed. The flight originated from Great Falls International Airport (GTF), Great Falls, Montana at about 1200.

The pilot reported that prior to the flight he checked the weather, mentally calculated the airplane's weight and balance, and conducted a preflight inspection of the airplane. The takeoff and departure were uneventful. About 30 miles to the southeast of the airport the pilot descended so the passengers could take photographs of the canyon and an old train route. The pilot conducted a climbing about 360 degree turn to 7,500 feet. He flew along the western ridge of the canyon showing the passengers various landmarks. He continued south along the canyon when the canyon started to narrow and the terrain started to rise. The pilot initiated a climb when the airplane experienced a downdraft. The airplane then experienced a second downdraft and the pilot felt the airplane was a little too low. Unable to turn around between the narrow canyon walls he found a low spot in the trees and attempted to turn around. Despite the airplane's nose being up, the airplane would not climb. It started brushing trees and then it descended into the trees. The last tree impact abruptly turned the airplane before it impacted the ground. Almost immediately after impact the pilot observed fire which quickly engulfed the airplane.

The pilot reported that there were no anomalies with the airframe or engine at the time of the accident.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	55, Male
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 With Waivers/Limitations	<b>Last Medical Exam:</b>	02/06/2013
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	10/25/2013
<b>Flight Time:</b>	118 hours (Total, all aircraft), 35 hours (Total, this make and model)		

The pilot, age 55, held a private pilot certificate for airplane single-engine land issued October 25, 2013, and a third-class medical certificate issued February 6, 2013 with the limitation that he must have available glasses for near vision. The pilot had 118 total hours, 35 of which were in the accident aircraft make and model.

## Aircraft and Owner/Operator Information

<b>Aircraft Manufacturer:</b>	CESSNA	<b>Registration:</b>	N34880
<b>Model/Series:</b>	177B	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1974	<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	17702061
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	07/10/2014, Annual	<b>Certified Max Gross Wt.:</b>	2500 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	3600 Hours	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	O-360-A1F6D
<b>Registered Owner:</b>	WILSEY CHRISTOPHER	<b>Rated Power:</b>	180 hp
<b>Operator:</b>	WILSEY CHRISTOPHER	<b>Air Carrier Operating Certificate:</b>	None

The four-seat, high-wing, fixed gear airplane, serial number 17702061, was manufactured in 1974. It was powered by a Lycoming IO-360 series, 180 horsepower engine, and was equipped with a McCauley controllable pitch propeller. Review of the airplane's logbooks indicated that the airplane's most recent maintenance inspection was an annual inspection that occurred on July 10, 2014. A review of the weight and balance data for the airplane revealed that the maximum gross weight is 2,500 pounds. The calculated weight of the airplane at the time of the accident was about 2,614 pounds, which placed the center of gravity outside (forward) of the envelope throughout the accident flight.

## Meteorological Information and Flight Plan

Observation Facility, Elevation:	GTF, 3680 ft msl	Observation Time:	1253 MDT
Distance from Accident Site:	45 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	322°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	19° C / 3° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	13 knots/ 19 knots, 250°	Visibility (RVR):	
Altimeter Setting:	29.82 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Great Falls, MT (GTF)	Type of Flight Plan Filed:	None
Destination:	White Sulphur S, MT (756)	Type of Clearance:	VFR
Departure Time:	1200 MDT	Type of Airspace:	Class G

The nearest weather reporting station was GTF, approximately 45 miles northwest of the accident site. At 1253 the weather was reported as wind from 250 at 13 knots gusting to 19 knots, visibility 10 statute miles, clear skies, temperature 19 degrees C, dewpoint 3 degrees C, and an altimeter setting of 29.82 inches of mercury.

A non-official surface observation site was located about 2 miles southwest of the accident site at an elevation of 8,232 feet. That station reported gusty surface winds around the accident time with a 22 mph wind gust reported immediately following the accident time.

National Weather Service charts were used to analyze the area around the accident site. The surface analysis chart revealed a fairly active surface environment with a developing stationary front located east of the accident site, and a developing cold front west of the accident site. The accident site was located in an area indicative of gusty wind conditions. An upper air chart revealed a trough located directly over the accident site that would likely enhance vertical air mixing and an increased potential for turbulence. A North American Mesoscale model sounding was created for the accident site and the layer from the surface through 10,000 feet MSL was "absolutely unstable" which indicates wind magnitudes as high as 30 knots and gusty winds would be expected; updraft and downdrafts would be expected in mountainous terrain.

A Weather Research and Forecasting Model simulation was run to simulate the weather conditions surrounding the accident site at the accident time. As the flight progressed the airplane would have experienced turbulence and encountered downdrafts with a tailwind component at a velocity between 100-200 feet per minute. The accident flight would not have encountered an updraft until rising terrain south and east of the accident sight.

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	1 Fatal, 1 Serious, 1 Minor	<b>Aircraft Fire:</b>	On-Ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal, 1 Serious, 2 Minor		

The airplane came to rest near the top of a ridge in a heavily wooded mountain pass. The wreckage path was about 82 yards long running downhill; there were many downed trees, and tree fragments throughout the debris path. The first identified point of impact was a topped tree that was about 30 feet tall. About 30 yards from the topped tree was the right side stabilator and a portion of a red beacon lens. Shortly thereafter were fragments of stabilator end caps, branches, and part of a wheel pant. Also in this immediate area was an about three foot section of the outboard right wing and the right wing tip with the strobe and green navigation light still attached. Beyond the outboard right wing was the left side stabilator. There was an increase in fully downed 3- to 4-inch in diameter trees that sustained a smooth diagonal slice. Immediately following those trees was the main wreckage, which came to rest upside down and was heavily burned. The main wreckage consisted of the vertical stabilizer and rudder, left wing, inboard right wing, the cabin area, and engine compartment.

## Tests And Research

An on-scene examination revealed no anomalies with the airframe or engine that would have precluded normal operations.

The cabin area sustained heavy thermal damage throughout; the propeller, throttle, and mixture controls were full forward and sustained heat damage. The instrument panel, avionics, and fuel selector were unidentifiable. Control continuity was established throughout the primary flight controls. The fuel system was mostly consumed by fire; however, the left wing fuel tank contained several gallons of fuel consistent with 100LL aviation gasoline.

The engine remained intact and sustained extensive thermal damage; it was unable to be rotated by hand. There was no evidence of catastrophic engine failure. The propeller blades were still secured to the propeller hub and both were bent aft.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Samantha A Link	<b>Adopted Date:</b>	01/14/2016
<b>Additional Participating Persons:</b>	Paul R Hurlbert; Federal Aviation Administration; Helena, MT Jan Smith; Textron Aviation - Cessna Aircraft Company; Wichita, KS		
<b>Publish Date:</b>	11/08/2016		
<b>Note:</b>	The NTSB traveled to the scene of this accident.		
<b>Investigation Docket:</b>	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=90006">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=90006</a>		

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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.