Aviation Investigation Final Report

Location:	Anchorage, Alaska	**Accident Number:**	ANC13FA084
Date & Time:	August 24, 2013, 15:36 Local	**Registration:**	N18699
Aircraft:	Cessna 150L	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The accident airplane was number two to land behind another airplane that was on final approach to the same runway. As the accident airplane neared the runway threshold, the air traffic control tower (ATCT) controller instructed the accident pilot to go around because the first airplane was still on the runway. The ATCT controller reported that despite two subsequent requests for the pilot to go around, the pilot did not acknowledge the requests, but the airplane stopped descending, and it continued to fly over the runway.

Multiple witnesses located at and around the airport reported seeing the accident airplane flying about 100 feet above the runway in a nose-high attitude. As the airplane continued over the departure end of the runway, witnesses reported hearing the engine lose power, which was followed by a steep left turn back toward the airport. During the turn, the airplane's nose pitched down abruptly, and the airplane collided with the ground in a steep, nose-down attitude near the departure end of the runway.

The airplane was equipped with two 19-gallon wing-mounted fuel tanks, of which 1.5 gallons of fuel in each tank is unusable. An on-scene wreckage examination revealed that about 1.8 gallons of fuel was removed from the right wing fuel tank, and about 1 quart of fuel was removed from the left wing fuel tank. Both fuel tanks were intact and not breached. The left wing fuel tank was equipped with a fuel vent line on the forward outboard area of the fuel tank. When comparing the final at-rest attitude of the airframe and wings, it is likely that the fuel within the left wing fuel tank was equivalent to the right wing fuel tank level; however, fuel would have drained from the left wing fuel tank through the vent line, thus resulting in a lower fuel level in the left wing fuel tank at the accident site. A subsequent postaccident examination of the airframe and engine revealed no evidence of a mechanical malfunction or failure that would have precluded normal operation.

Given the lack of mechanical deficiencies with the airplane, the amount of fuel discovered in the airplane's fuel tanks, and the witness statements, it is likely that the fuel tank inlets became unported when the airplane entered the nose-high attitude during the go-around, which resulted in fuel starvation.

The pilot's decision to return to the airport by initiating a turn at low altitude and low airspeed following the loss the of engine power resulted in an aerodynamic stall and a loss of control with insufficient altitude to recover.

Probable Cause and Findings

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

A loss of engine power due to fuel starvation as a result of a low fuel state and a nose-high attitude during a go-around, which unported the fuel tank feed line, and the pilot's decision to make a low-altitude turn back to the airport, which resulted in an aerodynamic stall and loss of control.

Findings

Aircraft	Fuel - Fluid level
Aircraft	Fuel - Fluid management
Personnel issues	Use of equip/system - Pilot
Personnel issues	Aircraft control - Pilot
Personnel issues	Decision making/judgment - Pilot
Aircraft	(general) - Not attained/maintained

Factual Information

History of Flight

Approach-VFR go-around	Loss of engine power (total)
Approach-VFR go-around	Loss of control in flight (Defining event)
Approach-VFR go-around	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On August 24, 2013, about 1536 Alaska daylight time, a Cessna 150L, N18699, was substantially damaged after a loss of engine power during a go-around at the Merrill Field Airport, Anchorage, Alaska. The airplane was registered to and operated by the pilot under the provisions of Title 14 Code of Federal Regulations Part 91. The commercial pilot and the sole passenger were fatally injured. Visual meteorological conditions prevailed and no flight plan was filed for the cross-country personal flight, which originated from the Wasilla Airport, Wasilla, Alaska, about 1515, with a destination of Merrill Field.

The National Transportation Safety Board (NTSB) investigator-in-charge (IIC) reviewed the recorded radio transmissions between the accident pilot and the Merrill Field Air Traffic Control Tower (ATCT), revealing that the accident pilot was initially cleared to land on runway 25, and behind a landing Cessna 172. After the Cessna 172 landed, and during its landing rollout, the ATCT controller on duty at the time of the accident instructed the pilot of the Cessna 172 to exit the runway, when able, for additional landing traffic. Shortly thereafter, the controller instructed the accident pilot to go around, but the accident pilot did not respond. Despite two subsequent requests for the pilot to go around, no response was received, but the airplane stopped descending, and continued to fly over runway 25.

Multiple witnesses located at and around Merrill Field reported seeing the accident airplane flying about 100 feet above runway 25, in a nose high attitude. As the airplane continued over the departure end of runway 25, witnesses reported hearing the engine quit, which was followed by a steep left turn back to the airport. During the turn, the airplane rolled to the left, then it descended vertically, nose first, and it subsequently collided with an area of grass-covered terrain west of runway 25.

PERSONNEL INFORMATION

The pilot, age 31, held a commercial pilot certificate with an airplane single-engine land and sea, airplane multi-engine land, and instrument airplane ratings. A second-class airman medical certificate was issued on September 12, 2012, with no limitations stated. The pilot reported on his most recent medical certificate application that he had accumulated 997 total flight hours, with 230 hours in the previous 6 months. Review of one of the pilot's logbooks had entries dated from February 1, 2007, to November 21, 2012, which was the most recent entry logged, revealed that he had accumulated 536.8 hours total flight time. The pilot's most recent logbook was not located during the investigation.

AIRCRAFT INFORMATION

The airplane, manufactured in 1973, was a two-seat, high-wing, fixed-gear airplane, serial number (S/N) 15074051, and was powered by a Continental Motors O-200-A engine, rated at 100 horsepower. The airplane was also equipped with a McCauley HCM6948 fixed pitch propeller. Additionally, the airplane was equipped with two long range fuel tanks, which hold 19 gallons per tank, of which, 1.5 gallons is unusable for each tank. The airplane's fuel selector valve is a lever-actuated valve that is operable in two positions, ON or OFF. Both the left and right wing fuel tank outlet fuel lines extend from the center of the wing tanks to the rear door posts and downward into the fuselage floor area, where they are connected to the fuel selector valve. In addition, the left wing is equipped with a fuel vent line that originates from the outboard leading edge of the left fuel tank.

The accident airplane airframe, engine, and propeller logbooks were not located during the investigation.

Refueling records obtained from a fuel vendor revealed that the airplane had been most recently refueled on August 23, 2013, with 12.00 gallons of 100 low lead aviation fuel at their Merrill Field location. Additional fuel receipts from Merrill Field were obtained, which showed that the airplane was refueled on August 17, 2013 with 16.77 gallons, on August 13, 2013 with 29.90 gallons, and on August 9, 2013 with 12.00 gallons.

METEOROLOGICAL INFORMATION

The closest official weather observation station is located at the Merrill Field Airport. At 1553, an Aviation Routine Weather Report (METAR) was reporting, in part: Wind, light and variable at 3 knots; visibility, 10 miles; clouds and sky condition, clear; temperature, 70 degrees Fahrenheit (F); dew point, 48 degrees F; altimeter, 29.94 inHg.

Review of the FAA Special Airworthiness Information Bulletin CE-09-35 revealed that the reported weather conditions were conducive for serious carburetor icing at glide power.

AIRPORT INFORMATION

Merrill Field Airport is a towered airport operating under Class-D airspace. The airport is equipped with 3 runways. Runway 7/25 is 4,000 feet in length and 100-feet wide. The reported field elevation of the airport is 137 feet mean sea level.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site by the NTSB IIC revealed that the airplane came to rest in a nose low position about 398 feet west of the departure end of runway 25, oriented on a heading of about 344 degrees magnetic. Wreckage debris remained within about 50 feet of the main wreckage. About five feet directly in front of the main wreckage was a ground scar about 2 feet in width, 6 inches long and about 5 inches deep. Extending from the ground scar in an easterly direction was a swath of paint chips, white in color. At the end of the swath of paint chips, was a portion of the right wing green navigation lens.

The right wing was intact and remained attached to the fuselage, and it came to rest in a leading edge, wing tip low position with the inboard portion of the wing elevated. The right aileron and flap remained attached to the wing via their respective mounts. The flap actuator was observed in a position consistent with the flaps being full up. The leading edge of the wing from the wing tip inboard to the flap aileron junction was crushed aft to the forward wing spar. The leading edge was crushed aft and decreased in

damage towards the wing root from the flap aileron junction. Trace amounts of fuel was observed within the fuel tank at the accident site. The fuel tank was removed from the wing structure and approximately 1.8 gallons of fuel was removed from the tank. Water finding paste was used to test the fuel for water with negative results for water.

The left wing remained attached to the fuselage, and it came to rest in a leading edge, wing tip low position with the inboard portion of the wing elevated. The left aileron and flap remained attached via their respective mounts. The leading edge and wing structure was bent/wrinkled about 14 to 15 inches inboard from the wing tip. The left wing was bent downward slightly just inboard from the flap aileron junction. The fuel cap was secured in place. Fuel was observed leaking from the area of the fuel vent at the accident site. The left wing fuel tank was removed from the wing and appeared to be intact and not breeched. Approximately 1 quart of fuel was removed from the wing tank. The left wing fuel tank is equipped with a vent line drain on the forward outboard area of the tank. Water finding paste was used to test the fuel for water with negative results.

The forward portion of the fuselage was crushed aft. The engine was displaced aft and upward into the instrument panel and windshield. A circular impression on the cabin roof structure just aft of the upper area of the windshield was observed, which was consistent with impact from the engine crankcase. Evidence of a small postaccident fire was observed near the front part of the engine and cowling area. No soot was observed in the surrounding area of the fuselage or wings.

The fuselage fuel strainer was removed. Fuel was observed within the bowl with a slight amount of dirt debris. The screen was free of debris. Water finding paste was used to test the fuel for water, with positive results for a slight amount of water in the bowl.

The fuel system was mostly intact. The fuel lines from both the left and right fuel tank outlet ports were intact down their respective aft door post to the fuel selector valve. The fuel selector valve was observed in the "ON" position. The fuel vent line from the right fuel tank to the left fuel tank was separated and exhibited impact damage consistent with impact from the engine crankcase. The vent line from the left fuel tank to the vent was intact, undamaged, and free of debris. Both the left and right fuel caps were vented and the seals were intact and pliable.

The empennage was intact and appeared to be undamaged with the exception of the right horizontal stabilizer and elevator, which were bent upward slightly about mid span. The rudder remained attached to the vertical stabilizer via its respective mounts. The left and right elevator remained attached to the left and right horizontal stabilizer via their respective mounts. The trim tab remained attached to the right elevator via its respective mount. The trim tab actuator was measured at 1.6 inches, and found to be in a position consistent with 3 degrees tab up.

Flight control continuity was established from the cockpit control column to all primary flight control surfaces. Rudder flight control continuity was established from the pedals aft to the rudder.

Cockpit documentation revealed that the instrument panel was displaced aft and fractured into multiple sections with multiple instruments displaced. The primer was found in the full in, but unlocked position. The throttle was found fully extended outward and bent downward.

The engine was removed from the airframe and subsequently examined at a local engine repair facility. The examination of the engine, a Continental Motors O-200-A, revealed that the vacuum pump was

separated from its mounting pad, two of the four engine mounts were damaged, and the carburetor was separated from the induction intake spider. The oil sump was compressed upwards and breeched. All four cylinders remained attached to the engine. Evidence of fire damage was observed on the carburetor and the cylinder 1 and 3 (right) side of the engine.

The induction system was impact damaged. The exhaust (left and right) were impact damaged and free of any debris within the exhaust flow path.

The ignition harness was impact damaged. The top sparkplugs were removed and examined. The number one and two spark plugs exhibited light gray deposits within the electrode area. Number three and four exhibited a brownish color deposit within the electrode area. The number one spark plug exhibited worn out normal signatures and number two, three, and four exhibited normal wear signatures.

The left and right magnetos were intact and exhibited slight thermal damage. The magnetos were placed on a test bench and produced spark on all posts with impulse coupling engagement.

The carburetor was displaced from its mount and exhibited extensive fire damage. The carburetor bowl was separated. The venturi was intact and in place. Both the mixture and throttle arms were impact damaged and moved slightly by hand. The metal floats were intact, however, one was separated. A significant amount of a foreign substance, consistent with fire extinguishing material, was observed throughout the carburetor bowl, intake filter mount, and brackets. The carburetor heat lever moved partially by hand and remained connected to the air box. The fuel screen was removed and was observed free of debris.

The accessories, accessory housing, top spark plugs, camshaft gear, and rocker box covers were removed. The accessory gears were oil coated and intact. The engine partially rotated by hand with a degree of stiffness.

The accessory case was intact and fire damaged. The oil pump rotated freely by hand. The oil pickup screen was secured and impact damaged.

All four cylinders were removed from the crankcase. All four pistons remained attached to their respective connecting rod via the piston wrist pin. All four pistons and piston rings were unremarkable. All four cylinders were unremarkable. All intake and exhaust valve rocker arms were unremarkable. Internal examination of the crankcase revealed that one of the thrust bearings was displaced and found free within the engine. The crankcase bolts were loosened and the crankshaft rotated freely.

The crankshaft was intact; however, the oil slinger ring was separated throughout its circumference. All four connecting rods remained attached to the crankshaft and moved freely.

The cylinder 1 and 3 side crankcase half was intact. The front, middle, and aft bearings appeared to be slightly shifted aft. The forward thrust bearing saddle exhibited impact damage with forward to aft oriented striations. The cylinder 2 and 4 side crankcase half was intact. The forward, middle, and aft bearings were intact and shifted slightly aft. Damage was observed to the forward and thrust bearing saddles.

Damage to the front bearings, thrust bearings, crankshaft oil slinger ring, and the middle and aft bearing shift was found consistent with impact damage.

The propeller remained attached to the engine crankshaft propeller flange. Chordwise striations were observed on the inner half of each blade. Both propeller blades were slightly bent aft.

No evidence of any preexisting mechanical malfunction that would have precluded normal operation of the airframe or engine was found.

Detailed airframe and engine examination reports are included in the public docket for this accident.

MEDICAL AND PATHOLOGICAL INFORMATION

A post mortem examination was conducted under the authority of the Alaska State Medical Examiner, Anchorage, on August 26, 2013. The cause of death for the pilot was attributed to multiple blunt force injuries.

The Federal Aviation Administration (FAA) Civil Aeromedical Institute performed toxicology examinations for the pilot on September 25, 2013, which was negative for carbon monoxide, alcohol and drugs.

FIRE

A small amount of fire damage was observed on the forward part of the engine. No soot pattern was observed around the area on the fuselage. The fire was reported to have been extinguished by first responders.

TESTS AND RESEARCH

A portable handheld Garmin GPSMap 296 and Apple iPhone 4 were located within the wreckage. The GPS and phone were subsequently sent to the NTSB Vehicle Recorder Division, Washington, DC., for further examination.

The data extracted from the GPS included 28 sessions from July 30, 2013, through the accident flight on August 24, 2013. The accident flight was the last session recorded, which started at 15:11:16 and ending at 15:26:14 and contained 160 total data points.

The accident flight recording began 14:08:36 at the Merrill Field Airport. By 14:19:43, the flight was airborne and flew northeast towards Pioneer Peak. After orbiting near Pioneer Peak until about 14:42:48, the flight proceeded northwest towards the Wasilla Airport. The flight approached Wasilla Airport at about 15:02:16. After landing, the aircraft taxied onto the ramp. By 15:15:08, the flight departed Wasilla Airport toward the south. The end of the recorded data was at 15:26:14 as the flight was proceeding south towards Anchorage.

Examination of the iPhone revealed that it contained a text message referring to the accident flight as well as some photos taken during the accident flight near Pioneer Peak. No other content on the phone was pertinent to the investigation.

Review of the downloaded GPS data revealed that the GPS was operated for about 2.13 hours, which included recorded flight logs 26 to 28 since the airplane was most recently refueled on August 23, 2013. Flight logs 22 to 25, showed that the GPS was operated for about 2.6 hours from when the airplane was

refueled on August 17. In addition, flight logs 15 through 21 revealed that the GPS was operated for about 4.85 hours since the airplane was refueled on August 13. It was noted that flight log 16 contained a partial flight where recorded data began just south of Seward, Alaska.

For further information, see the Electronic Devices Report and downloaded GPS data within the public docket for this accident.

Pilot Information

Certificate:	Commercial	**Age:**	31
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	September 12, 2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	536.7 hours (Total, all aircraft), 999999 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N18699
Model/Series:	150L	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	15074051
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	1600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-200-A
Registered Owner:	LILLY ROBERT W	**Rated Power:**	100 Horsepower
Operator:	LILLY ROBERT W	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PAMR,137 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:		**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.63 inches Hg	**Temperature/Dew Point:**	21°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Wasilla, AK	**Type of Flight Plan Filed:**	None
Destination:	Anchorage, AK (PAMR)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class D

Airport Information

Airport:	Merrill Field Airport PAMR	**Runway Surface Type:**	Asphalt
Airport Elevation:	137 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	25	**IFR Approach:**	None
Runway Length/Width:	4000 ft / 100 ft	**VFR Approach/Landing:**	Go around

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	61.215831,-149.856109

Administrative Information

Investigator In Charge (IIC):	Cawthra, Joshua
Additional Participating Persons:	David Nordby; Federal Aviation Administration; Anchorage, AK Andrew Hall; Cessna Aircraft Company; Wichita, KS
Original Publish Date:	October 30, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=87853