Aviation Investigation Final Report

Location:	Talkeetna, Alaska	**Accident Number:**	ANC03FA051
Date & Time:	May 28, 2003, 13:30 Local	**Registration:**	N70176
Aircraft:	Cessna 185	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	4 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled - Sightseeing		

Analysis

The airline transport pilot was conducting an on-demand charter flight in a wheel/ski-equipped airplane, with three passengers and climbing gear aboard. The flight was en route to a mountain climbing base camp located on a glacier, at the 7,200-foot msl level. A passing airplane discovered the accident airplane's wreckage at the 8,200-foot level of a remote mountain pass, along the anticipated flight route. The summit of the pass is situated about 9,000 feet msl, and oriented about east/west. The flight's anticipated direction of travel to the base camp was westbound. The airplane wreckage came to rest atop snow-covered glacial terrain, within a large "U" shaped, up-sloping valley, about 500 east of the pass summit. The nose of the airplane was oriented in the opposite direction of the flight's anticipated direction of travel. The airplane struck the snow-covered terrain in a near horizontal position, wings level, and about 5 degrees nose down. The NTSB investigator-in-charge documented all passenger, pilot, and cargo positions. After recovery, actual occupant and climbing gear/cargo weights were documented. The gross weight of the airplane at the time of the accident was estimated to be 20 pounds over the airplane's maximum gross weight limit of 3,350. Since there are no center of gravity (CG) limits for weights over maximum gross weight, the estimated CG of the airplane at the time of the accident, 154.1 inches, was compared to the limits at maximum gross weight, 140 to 156 inches, and found to be near the aft limit. No evidence of any preaccident mechanical anomalies was noted. The engine was placed on an engine test stand, started, and operated at various power settings, for an extended time. The engine produced its maximum rated rpm.

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 adequate airspeed which resulted in an inadvertent stall, an uncontrolled descent and in-flight collision with terrain. A factor associated with the accident was rising terrain.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
1. (F) TERRAIN CONDITION - RISING
2. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
3. STALL - INADVERTENT - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. TERRAIN CONDITION - SNOW COVERED

Factual Information

HISTORY OF FLIGHT

On May 28, 2003, about 1330 Alaska daylight time, a tailwheel/ski-equipped Cessna 185 airplane, N70176, was destroyed during a collision with snow-covered glacial terrain following a loss of control during cruise flight, about 40 miles north-northwest of Talkeetna, Alaska. The airplane was being operated as a visual flight rules (VFR) on-demand charter flight under Title 14, CFR Part 135, when the accident occurred. The airplane was operated by McKinley Air Service, Talkeetna. The airline transport pilot, and the three passengers, received fatal injuries. Visual meteorological conditions prevailed, and a company VFR flight plan was filed. The flight originated at the Talkeetna Airport, Talkeetna, about 1253, and was en route to a mountain climbing base camp located on the Kahiltna Glacier.

During an interview with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), on May 29, the operator's office manager reported that the accident flight was the pilot's third flight of the day. She said that the purpose of all three flights was to transport climbers to a base camp located at 7,200 feet msl on the southeast fork of the Kahiltna glacier, about 48 miles northwest of Talkeetna. She added that on board the accident flight were two mountain climbers and one sightseeing passenger, who would have returned to Talkeetna on the return leg of the flight.

According to other operators that were flying in the area, the accident airplane pilot transmitted a position report about 1325, stating that her airplane was over the toe of the Tokositna Glacier, at 8,000 feet. No further radio transmissions were received from the accident airplane.

About 1430, a passing airplane discovered the accident airplane's wreckage at the 8,200-foot level of South Hunter Pass. There was no emergency locator transmitter (ELT) signal received from the accident airplane. A National Park Service (NPS) high altitude rescue helicopter was dispatched to the accident site, and discovered that the pilot and three passengers were deceased.

CREW INFORMATION

The pilot held an airline transport pilot certificate with an airplane multiengine land rating. She also held commercial pilot privileges with single-engine land and sea ratings. She held a flight instructor certificate with airplane single-engine, multiengine land, and instrument ratings. The most recent second-class medical certificate was issued to the pilot on June 24, 2002, and contained no limitations.

No personal flight records (logbooks) were located for the pilot. On the pilot's medical certificate application, dated June 24, 2002, the pilot indicated that her total aeronautical experience consisted of 8,000 hours, of which 200 were accrued in the previous 6 months.

The pilot's normal scheduled duty day was from 0800 to 2200. The pilot was off duty on May 26 and 27, the two days prior to the accident. According to the operator's office manager, May 26 and 27 were considered "weather days." On the accident date of May 28, she flew a total of 5.5 hours.

The pilot's most recent Federal Aviation Administration (FAA) Part 135.293 and Part 135.299 airman competency/proficiency check was conducted on April 30, 2003. An FAA operations inspector from the Anchorage Flight Standards District Office conducted the check in the accident airplane.

The pilot received an interagency pilot evaluation/qualification recurrent check from a Department of the Interior, Office of Aircraft Services inspector, on May 15, 2003, in the accident airplane.

AIRCRAFT INFORMATION

The airplane had accumulated a total time in service of 7,859.3 hours. The airplane was maintained on an Approved Airworthiness Inspection Program (AAIP). The most recent inspection (Event 1) was accomplished on February 10, 2003, 48.3 hours before the accident.

The airplane was equipped with a Teledyne Continental Motors (TCM) IO-520D-116B engine, and a two-bladed McCauley Propeller, model number D2A34C58-0. The engine had accrued a total time in service of 3,133.3 hours. The maintenance records note that a major engine overhaul was accomplished on January 27, 2000, 1,410.3 hours before the accident. The propeller had accrued a total time in service of 2,096.3 hours. The maintenance records note that a major propeller overhaul was accomplished on January 15, 2002, 552.3 hours before the accident.

At the time of the accident, the airplane was outfitted with Fluidyne C-3600 wheel/skis, and a tailwheel mounted ski. According to the accident airplane's maintenance records, the Fluidyne C-3600 wheel/skis were reinstalled on the airplane on August 9, 2002. On August 15, 2002, the accident airplane's maintenance records note the removal of the Fluidyne C-3600 wheel/ski assembly, and the installation of oversized tundra tires with an oversized tailwheel. According to the accident airplane's maintenance records (logbooks), no additional landing gear configuration changes were recorded prior to the accident.

The accident airplane received an interagency evaluation/qualification data card from a Department of the Interior, Office of Aircraft Services airworthiness inspector, on May 19, 2003.

METEOROLOGICAL INFORMATION

The closest official weather observation station is located at the Talkeetna Airport, which is located about 40 miles southeast of the accident site. On May 28, at 1353, an Aviation Routine Weather Report (METAR) was reporting, in part: Wind, 330 degrees at 7 knots, variable 290 degrees at 10 knots; visibility, 10 statute miles; ceiling and clouds, clear; temperature, 68 degrees F; dew point, 34 degrees F; altimeter, 29.79 in Hg.

A pilot, who departed from Talkeetna about 4 minutes after the accident airplane's departure, characterized weather conditions as "clear and calm" while en route to the Kahiltna Glacier base camp. He added that he elected to take an alternate route through One-Shot Pass, located about 3 miles south of South Hunter Pass.

During interviews with a number of pilots, who were flying in the area on the day of the accident, most reported similar flight conditions. One pilot reported to the NTSB IIC that while flying through One-Shot Pass at 8,500 feet, about 1410, he encountered moderate turbulence. He said that once he climbed the airplane to 10,000 feet msl, the turbulence subsided.

WRECKAGE AND IMPACT INFORMATION

The NTSB IIC, along with members of the NPS high altitude rescue team, and a member of the Talkeetna Fire Department, examined the airplane wreckage at the accident site on May 28. Diminishing daylight limited time at the scene.

The NTSB IIC, NPS personnel, and a Federal Aviation Administration (FAA) airworthiness inspector from the Anchorage Flight Standards District Office, returned to the accident site on May 29, and completed the on-scene portion of the wreckage examination.

The terrain surrounding the accident site consisted of steep and near vertical mountainous terrain, with peaks ranging between 11,000 and 14,000 feet above msl. The airplane wreckage came to rest at the 8,200-foot level, atop snow-covered glacial terrain, within a large "U" shaped valley. The snow conditions at the accident site consisted of about 12 inches of fresh snow, covering an undetermined amount of densely packed snow and glacial ice.

The area around the wreckage site was surrounded by large glacial crevasses, ranging in depth from 25 to 50 feet. The west end of the valley, where the wreckage was found, has rising terrain of about 15 degrees, which leads to the summit of South Hunter Pass. The airplane was situated about 500 yards east of the pass summit. The summit of Hunter Pass is situated about 9,000 feet msl, and oriented about east/west.

All of the airplane's major components were located at the main wreckage area. The airplane came to rest with the nose of the airplane oriented on a 060 degree heading, and in the opposite direction of the flight's anticipated direction of travel. (All headings/bearings noted in this report are oriented toward magnetic north.)

The airplane came to rest in an area of snow-covered terrain in a near horizontal position, wings level, and about 5 degrees nose down. There was no wreckage debris trail, or discernable snow disruption, around the perimeter of the accident site.

The left wing was observed slightly lower than the right wing. The disruption in the snow around the left wing measured about 15 inches deep, and about 5 inches deep on the right wing. The nose of the airplane, forward of the firewall, was buried in about 6 feet of snow.

The wings remained attached to the forward fuselage wing attach points. The aft fuselage to wing attach points were both broken free. Both wing lift struts were attached to the wings and lower fuselage attach points.

The outboard half of the left wing had spanwise leading edge aft crushing, with more crushing evident along the outboard portion of the leading edge. The left wing aileron was torn from the outboard hinge assembly in a downward (vertical) direction. The inboard and center hinges remained attached, but were extensively distorted in a downward (vertical) direction. The inboard and underside of the left wing, in the area of the left wing fuel tank, displayed evidence of minor downward liquid (fuel) hydraulic bulging.

The outboard half of the right wing had spanwise leading edge aft crushing with more crushing evident along the outboard portion of the leading edge. The right wing aileron was torn from the outboard hinge assembly in a downward (vertical) direction. The inboard and center hinges remained attached, but were extensively distorted in a downward (vertical) direction. The inboard and underside of the right wing, in the area of the right wing fuel tank, displayed evidence of substantial downward liquid (fuel) hydraulic bulging.

Both wing fuel tanks were ruptured during the accident. A strong smell of fuel was noted when the snow was moved adjacent and forward of the airplane's wings.

All of the wheel/ski assembly coiled spring/cables remained attached to each ski at the ski tips and trailing ends. The fuselage cable attachment points remained attached.

The upper portion of the tail section of the airplane was broken free from the fuselage, just aft of the passenger compartment. The lower portion remained attached, but was extensively distorted to the left. The tail section of the airplane came to rest 15 degrees to the left in relation to the main portion of the fuselage.

According the airplane manufacturer, the horizontal stabilizer jackscrew setting was set at approximately 7 degrees nose down trim.

The rudder and elevators remained connected to their respective attach points. Due to impact damage, the flight controls could not be moved by their respective control mechanisms, but the continuity of the flight control cables was established to the cabin/cockpit area.

The instrument panel was crushed and twisted against the back of the engine firewall. The engine firewall was crushed against the back of the engine accessory case.

The propeller assembly remained connected to the engine crankshaft. One propeller blade exhibited almost 90 degree aft bending about mid-span, and the second propeller blade exhibited about 70 degrees aft bending about mid-span. Both propeller blades had minor leading edge gouging and chordwise scratching.

The underside portion of the engine sustained impact damage. The muffler was crushed upward against the engine, as was the muffler exhaust tube. The crushed and folded edges of the muffler exhaust tube did not exhibit any cracking or breaks.

The pilot and front seat passenger were found restrained with diagonal shoulder harnesses and lap seat belts. The two rear seat passengers were found restrained with lap seat belts. The cargo (climbing gear) in the aft baggage area remained in place and restrained by ropes and a cargo net. The NTSB IIC, prior to removal, documented all passenger, pilot, and cargo positions.

The Emergency Locator Transmitter (ELT) was found broken free from its mounting plate, just aft of the baggage area. The battery-pack was torn from the ELT, and was found lying in the tail cone area. The "ON-OFF-ARM" switch was in the "ARM" position.

No evidence of any preaccident mechanical anomalies were discovered during the on-scene portion of the investigation.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination of the pilot was conducted under the authority of the Alaska State Medical Examiner, 4500 South Boniface Parkway, Anchorage, Alaska, on May 29, 2003. The examination revealed that the cause of death was massive blunt force injuries.

A toxicological examination conducted by the FAA's Civil Aero Medical Institute (CAMI) on June 30, 2003, was negative for alcohol or drugs.

TESTS AND RESEARCH

After the airplane was removed from the accident site, a detailed airframe and engine inspection was accomplished on June 10, in Big Lake, Alaska, with representatives of all parties to the investigation present. No evidence of any preaccident mechanical anomalies was noted.

On June 10, the engine was removed from the accident airplane, and transported to Anchorage, Alaska. On June 11, the engine was placed on an engine test stand at Alaskan

Aircraft Engines, Inc., in Anchorage. The engine was started and operated at various power settings, for an extended time. The engine produced its full rated rpm.

Weight & Balance

According to the Cessna 185 Flight Manual, the maximum takeoff gross weight of the airplane is 3,350 pounds. The center of gravity range, at the maximum gross weight, is from 140 to 156 inches aft of the airplane's datum point.

The accident airplane's most current (computed) Weight/Balance and Equipment List, dated July 14, 2002, listed the airplane's empty weight as 1,822 pounds, the center of gravity was listed as 35.85 inches, and the moment arm was 65,307.945 inch pounds. The computed empty weight included the pilot's seat, unusable fuel, engine oil, and 850 x 6 main landing gear tires.

The weights and locations used to determine the airplane's estimated gross weight and center of gravity at the time of the accident were based on the airplane's most current weight and balance records, the actual weight and seating location of each occupant, and the actual weight and location of the climbing gear/cargo removed from the accident airplane's baggage area.

According to the engine manufacturer, at an engine power setting between 70 to 75 percent, the airplane has a fuel consumption rate between 14.7 and 15.6 gallons per hour. At the time of departure from Talkeetna, the fuel in the airplane was estimated to be 55 gallons (330 pounds). Other pilots operating between Talkeetna and the Kahiltna Glacier base camp, also flying Cessna 185 airplanes outfitted in the same configuration as the accident airplane, reported that the standard fuel load for that trip is about 55 gallons. They noted they typically flight plan fuel consumption, including takeoff, climb, and cruise flight, at 15 gallons per hour. According to witnesses, the airplane's right wing fuel tank was topped off prior to departing on the accident flight. Using an estimated fuel consumption rate of 15 gallons per hour, with .6 hours time en route to the accident site, the estimated fuel that would have been consumed is about 9 gallons, or 54.0 pounds.

Empty weight of airplane:	1,822.0 pounds
Co-pilot seat assembly:	14.0 pounds
Aft seat assemblies:	18.6 pounds
Fluidyne C-3600 wheel/skis:	138.0 pounds
Tailwheel ski	7.5 pounds
Pilot's weight from 06/24/02 medical:	157.0 pounds
Passenger, right front:	184.0 pounds
Passenger, left rear:	225.0 pounds
Passenger, right rear:	212.0 pounds
Fuel @ 55.0 gallons:	330.0 pounds
Cargo / Climbing Gear:	316.0 pounds

En route fuel burn (.6 Hrs @ 15 Gal/Hr): (54.0 pounds)

The estimated gross weight of the airplane at the time of the accident was 3,370.1 pounds, and the estimated center of gravity was 154.1 inches aft of airplane's datum point.

Pilot Information

Certificate:	Airline transport	**Age:**	35,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	June 24, 2002
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 30, 2003
Flight Time:	8000 hours (Total, all aircraft), 200 hours (Last 90 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N70176
Model/Series:	185	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18502037
Landing Gear Type:	Tailwheel; Ski/wheel	**Seats:**	4
Date/Type of Last Inspection:	August 30, 2002 AAIP	**Certified Max Gross Wt.:**	3350 lbs
Time Since Last Inspection:	95.3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	7859.3 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-520-D-116B
Registered Owner:	McKinley Air Service	**Rated Power:**	300 Horsepower
Operator:	McKinley Air Service	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	McKinley Air Service	**Operator Designator Code:**	M6TC

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PTKA,358 ft msl	**Distance from Accident Site:**	40 Nautical Miles
Observation Time:	13:53 Local	**Direction from Accident Site:**	110°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.79 inches Hg	**Temperature/Dew Point:**	20°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Talkeetna , AK (TKA)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Talkeetna , AK (TKA)	**Type of Clearance:**	None
Departure Time:	12:53 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Fatal	**Latitude, Longitude:**	62.878887,-151.066665

Administrative Information

Investigator In Charge (IIC):	Johnson, Clinton
Additional Participating Persons:	Donald LeClaire ; Federal Aviation Administration ; Anchorage , AK Steve M Miller; Cessna Aircraft Company ; Wichita, KS John T Kent ; Teledyne Continental Moters, Inc. ; Seagoville, TX Terrence Mangione; McKinley Air Service ; Talkeetna , AK LeeAnn Wetzol; McKinley Air Service ; Talkeetna , AK
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