



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

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|--------------------------------|--------------------------------------|-------------------------|-------------|
| Location: | Chugiak, Alaska | Accident Number: | ANC11FA037 |
| Date & Time: | May 27, 2011, 10:14 Local | Registration: | N4955A |
| Aircraft: | Cessna 180 | Aircraft Damage: | Substantial |
| Defining Event: | Loss of control on ground | Injuries: | 5 Fatal |
| Flight Conducted Under: | Part 91: General aviation - Personal | | |

Analysis

The pilot and four passengers departed on a cross country flight; witnesses reported that the airplane took off in a very nose-high attitude. One witness stated that the airplane went off the left side of the runway before becoming airborne, and, once aloft, it headed toward a row of trees on the east side of the airport. The airplane climbed over the trees, turned to the south, and then quickly rolled right and descended to the ground. A postcrash fire consumed most the airplane. A postaccident examination of the airplane revealed no mechanical anomalies that would have precluded normal operation.

The pilot's logbook noted about 4 hours in the accident airplane, and, according to his logbook entries, he had not flown since June 12, 2010, after receiving instruction in the airplane, thus he did not meet the FAA's recent experience requirement for the required number of takeoff and landings to carry passengers.

The airplane's estimated gross weight at the time of the accident was about 243 pounds over its approved maximum takeoff weight.

Given the witness accounts of the airplane swerving off the runway during the takeoff roll, and of its subsequent nose-high attitude and rapid roll prior to impact, it is likely that the pilot lost control during the takeoff roll and then applied excessive nose-up pitch to become airborne. Once airborne, he failed to attain sufficient airspeed to avoid an aerodynamic stall, and the airplane descended out of control to the ground.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of control of the airplane during takeoff, which resulted in an aerodynamic stall. Contributing to the accident was the pilot's lack of experience in make and model, his lack of currency in FAA required takeoffs and landings, and his excessive loading of the airplane.

Findings

| | |
|------------------|---|
| Personnel issues | Aircraft control - Pilot |
| Personnel issues | Decision making/judgment - Pilot |
| Personnel issues | Total experience w/ equipment - Pilot |
| Personnel issues | Weight/balance calculations - Pilot |
| Personnel issues | Recent experience - Pilot |
| Aircraft | Directional control - Not attained/maintained |

Factual Information

History of Flight

| | |
|-----------------------------|--|
| Takeoff | Loss of control on ground (Defining event) |
| Initial climb | Aerodynamic stall/spin |
| Uncontrolled descent | Collision with terr/obj (non-CFIT) |

HISTORY OF FLIGHT

On May 27, 2011, about 1014 Alaska daylight time, a Cessna 180, N4955A, collided with terrain after a loss of control during the initial climb after takeoff from the Birchwood Airport, Chugiak, Alaska. The airplane received substantial damage as a result of the impact and a postcrash fire. The airplane was registered to the pilot, and operated under the provisions of 14 Code of Federal Regulations (CFR) Part 91 as a personal cross-country flight. Visual meteorological conditions prevailed at the time of the accident. The certificated private pilot and the four passengers were killed. The flight was originating at the time of the accident and was en route to Seldovia, Alaska.

Several witnesses stated that they saw the accident airplane takeoff from runway 19R in a very nose high attitude. One witness stated that the airplane went off of the left side of the runway before becoming airborne, headed toward a row of trees on the east side of the airport. The airplane climbed over the trees, turned to the south, then rolled right and descended into the ground. The witnesses said that the engine sounded like it was running at full power.

During a telephone interview, a personal acquaintance of the accident pilot told the NTSB investigator-in-charge (IIC), that the family was building a cabin in Seldovia, and he thought that this was the first trip of the year for the pilot. Another acquaintance stated that he had flown the accident airplane with the accident pilot in May 2010. During that flight he said the accident pilot almost stalled the airplane on takeoff, and after the flight he had told him that he shouldn't try and fly the airplane by himself, and should get additional flight training in the airplane.

PERSONNEL INFORMATION

The pilot, age 46, held a private pilot certificate with a rating for airplane single engine land. He was issued a third class airman medical certificate without limitations on May 6, 2010.

The pilot's flight logbook was examined by the NTSB IIC. The logbook covered the period from April 4, 1982, through June 12, 2010, and indicated that he had logged 198.9 hours total time, and 3.7 hours in a Cessna 180. Between June 10, 2010 and June 12, 2010, the pilot received instruction in the Cessna 180, and completed the requirements of a flight review. He also

received endorsements for acting as pilot in command of a tailwheel airplane as well as a high performance airplane. There were no entries after June 12, 2010.

AIRCRAFT INFORMATION

The accident airplane was equipped with a Continental Motors O-470-K engine, rated at 230 horsepower at 2,600 rpm. The engine was equipped with a two-blade McCauley propeller.

At the time of its last annual inspection, May 1, 2010, the airplane and engine had 4,908 service hours. The last annual inspection prior to the 2010 inspection was completed on December 7, 2000, at 4,906.4 service hours. The tachometer was found at the accident site; however, damage precluded determining the current reading.

The engine had a major overhaul on June 2, 1994, and was operated about 240 hours before the accident.

The most recent official weight and balance documentation was not located in the airplane records.

METEOROLOGICAL INFORMATION

The closest official weather observation station is Birchwood, Alaska. At 1016, an aviation routine weather report (METAR) was reporting, in part: Wind 250 degrees (true) at 4 knots; visibility 10 statute miles; sky condition, clear; temperature 55 degrees F; dew point, 39 degrees F; altimeter 29.86 inHg.

WRECKAGE AND IMPACT INFORMATION

On May 27, 2011, the NTSB IIC, along with another NTSB investigator, and an FAA operations inspector from the Anchorage Flight Standards District Office (FSDO), examined the airplane wreckage at the accident site.

The airplane collided with terrain in a rail yard approximately 700 yards southeast of the departure end of runway 19 right. The main wreckage came to rest upright, on an approximate heading of 050 degrees magnetic. The point of initial impact was determined to be a series of propeller strike marks, and pieces of fiberglass from the right wingtip, approximately 45 feet from the main wreckage. All of the airplane's major components were at the main wreckage site.

The majority of the fuselage was consumed by a postcrash fire. The right wing was crushed aft and bent upward to approximately mid-span, and had extensive fire damage over the entire span. The left wing showed leading edge damage near the wingtip, and the inboard half of the wing had fire damage. The empennage was mostly free of impact and fire damage from the front of the vertical stabilizer aft. The tailwheel assembly was broken and displaced upward

from its mounts.

Due to impact and fire damage, the flight controls could not be moved by their respective control mechanisms, but continuity of the flight control cables was established to the cockpit area.

The engine remained connected to the engine mounts and was extensively damaged by the postcrash fire. The propeller assembly remained connected to the engine and showed extensive impact and fire damage. Both propeller blades remained attached to the propeller hub, but both were loose in the hub. One propeller blade was bent aft from the mid section approximately 130 degrees, showed leading edge gouging, and approximately 5 to 10 inches of the outboard blade was separated. The opposite propeller exhibited torsional twisting, leading edge gouging, and approximately 3 to 5 inches of the outboard blade was separated. One of the separated sections of propeller blade was heavily gouged, bent, and splintered. The other separated portion of propeller was gouged and showed chord-wise scratching.

The runway the accident airplane departed from had a set of tire marks that were observed in the area that witnesses stated the airplane departed the runway. The tire marks showed a curved path leading from the edge of the left side of the runway, through the dirt, to a point approximately halfway between runway 19 right and runway 19 left.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination of the pilot was done under the authority of the Alaska State Medical Examiner, Anchorage, Alaska, on May 31, 2011. The examination revealed that the cause of death was attributed to severe thermal charring, in addition to severe blunt force injuries.

A toxicological examination by the FAA's Civil Aeromedical Institute (CAMI) on June 27, 2011, was negative for any alcohol or drugs.

TESTS AND RESEARCH

On May 31, the NTSB IIC, along with representatives of the FAA, Cessna Aircraft Company, and Continental Motors, revisited the accident site to further document the airplane and its components.

Airframe

The horizontal stabilizer trim setting was measured at 7.6 inches, which equates to minus 5 degrees. According to Cessna aircraft, the normal takeoff trim position is minus 3.5 degrees. The stabilizer trim setting range is from positive 1.5 degrees to minus 8.5 degrees.

The fuel selector valve was found to be in the right main tank position.

Seats Track Rails

The two front seats are individually mounted on set of tracks, and each seat is individually adjustable, forward and aft. A seat adjustment handle is located on the left side of each seat. When the seat adjustment handle is raised, it disengages a spring-loaded locking pin from 1 of 17 holes situated on the top of the left side seat track rail. Once the locking pin is disengaged, the seat is free to roll forward or backward on a set of 4 rollers.

On September 24, 1990, the FAA issued a revised Airworthiness Directive (AD) 87-20-03 R2, which defines the airworthiness requirements and minimum acceptable wear limits on the seat locking mechanism and seat track components. The AD states, in part: "...If the wear dimension across any hole exceeds 0.36 inches but does not exceed 0.42 inches, continue to measure each hole every 100 hours for excessive wear. ...If the wear dimension across any hole exceeds 0.42 inches, prior to further flight, replace the seat track."

On May 14, 2007, Cessna Aircraft Company issued service bulletin SEB07-5, which provides for the installation of a secondary seat stop kit for the pilot seat. The service bulletin states, in part: "The secondary seat stop is designed to assist in providing an additional margin of safety by limiting the aft travel of the seat in the event the primary latch pin is not properly engaged in the seat rail/track. In certain instances, seat slippage could result in some pilots not being able to reach all the controls and/or subsequently losing control of the airplane. Compliance is mandatory: Shall be accomplished within the next 200 hours of operation or 12 months, whichever occurs first." Installation of the Cessna secondary seat stop inertial reel kit (SK 210-147A) is required to comply with the service bulletin.

The airplane logbooks indicate that the Cessna secondary seat stop inertial reel kit (SK 210-174A) was installed, and the airworthiness directive (AD 87-20-03 R2) for seat track inspection was complied with, at the last annual inspection (May 1, 2010).

The rear leg of the pilot's seat was found melted into the seat rail, in a position approximately 22 inches forward of the aft end of the seat rail. This equates to a seat location that would be in the first or second most forward seat position. The seat latch pin on the pilot's seat was bent forward approximately 20 degrees. The left outboard seat track had a seat stop installed, and the right inboard seat track also had a seat stop installed.

There was no evidence of seat slippage with the pilot's seat.

Control locks

The airplane was delivered with a cabin type control gust lock device, which connects to the control yoke, rudder pedals, and the floor of the airplane. There was no evidence that the control gust lock was installed in the airplane at the time of the accident. The airplane was not equipped with a yoke-inserted control wheel lock.

Engine

The engine had extensive fire damage. The crankcase had impact damage from the crankshaft forward oil seal to the forward side of the No. 6 cylinder. The carburetor had fire damage, and the control cables were still attached. The carburetor was disassembled and no anomalies were noted besides the fire damage. The spark plugs exhibited "Normal-Worn out" wear signatures in accordance with the Champion AV-27 chart. The fuel manifold valve fuel screen was clear of debris. The engine cylinders were inspected with a lighted borescope, and the piston heads and combustion chambers were undamaged with dark gray deposits. The valve heads were undamaged, and showed no signs of abnormal thermal discoloration.

No mechanical anomalies were noted with the airframe or engine that would have precluded normal operation.

The wreckage was not retained by the NTSB, and was removed from the accident site by the family on June 11, 2011.

ADDITIONAL INFORMATION

Recent Flight Experience

The recent flight experience requirements of 14 CFR Part 61.57 state that, in order to act as the pilot in command of an airplane carrying passengers, the pilot must have made at least three takeoffs and three landings within the preceding 90 days in the same category, class, and type (if required) of aircraft to be flown. In addition, if the aircraft to be flown is an airplane with a tailwheel, the takeoffs and landings must have been made to a full stop in an airplane with a tailwheel.

There were no logbook entries or other evidence that showed the pilot had completed the recent flight experience requirements to act as pilot in command of an airplane carrying passengers.

Estimated Weight and Balance

Due to the extensive fire damage, an exact weight and balance calculation could not be made. However, enough information was available for the IIC to make a conservative estimation of the airplane's weight at the time of the accident.

The pilot's weight was taken from his most current FAA medical examination. The weight of the front seat passenger was taken from her reported weight on her Alaska driver's license. Weights for the rear seat passengers (girls; age 11 and 13, and boy; age 12) were estimated using the Centers for Disease Control (CDC) growth charts showing average weight by age and gender (refer to the public docket).

Items of cargo that were identifiable are listed as follows:

- Chainsaw
- Pistol
- Multiple bags of food and grocery items
- Personal clothing and bags
- Pots
- Kitchen utensils
- Rope
- Bundle of electrical wire

During a conversation with the IIC, the pilot's son said that the airplane's fuel tanks were completely filled previous to the accident flight from the pilot's personal fuel storage tank.

The last documented official weight and balance information located in the aircraft records was dated March 5, 1991. At that time, the basic empty weight of the airplane was 1,631.1 pounds, with a center of gravity of positive 35.22 inches.

Estimated weights

- Basic Empty Weight (from March 5, 1991) – 1631 pounds
- Pilot and Front seat Passenger – 417 pounds
- Rear Seat Passengers – 293 pounds
- Cargo – 100 pounds
- Fuel (55 gallons) – 330 pounds
- Oil (12 quarts) – 22 pounds

The gross weight of the airplane at the time of the accident was conservatively estimated to be 2,793 pounds, or 243 pounds over the approved maximum takeoff gross weight for the airplane. The estimated center of gravity at the time of the accident was positive 42.18 inches. The center of gravity range at 2,550 pounds (maximum gross weight) is positive 39.5 inches to positive 45.8 inches.

Passenger Seating and Restraint

The three child passengers were seated in the rear seat of the airplane. The passenger on the far right of the rear seat was restrained by a seat belt. The method and level of restraint for the other two rear seat passengers could not be determined.

The Cessna 180 rear seat has provisions to accommodate two people.

Title 14 CFR Part 91.107 states, in part: "each person on board a U.S.-registered civil aircraft must occupy an approved seat or berth with a safety belt and, if installed, shoulder harness,

properly secured about him or her during movement on the surface, takeoff, and landing.” The FAA issued an interpretation to this rule that allows the shared use of a single restraint under certain conditions for Part 91 operations. (Refer to FAA Legal Interpretation 1990-14 in the public docket.)

On August 11, 2010, as the result of a separate accident, the NTSB issued Safety Recommendation A-10-121 (refer to the public docket), which asked the FAA to “amend 14 Code of Federal Regulations Part 91 to require separate seats and restraints for every occupant.” This recommendation was issued as a result of the NTSB’s concern that, if the FAA were to continue allowing multiple occupants aboard airplanes operating under Part 91 to share a single seat position and a single restraint system, then those occupants would not benefit from the improved protection provided by the crashworthiness requirements of Part 23.

On June 23, 2011, the FAA published its Clarification of Prior Interpretations of the Seat Belt and Seating Requirements for General Aviation Flights. The FAA’s proposal did not include a provision to prohibit the shared use of a seat and restraint system, which is currently allowed under Part 91. Instead, the proposal relies on the “good judgment of the pilot” to determine the proper method of restraint for children during operations conducted under Part 91.

Pilot Information

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|----------------------------------|--|--|---------------|
| Certificate: | Private | Age: | 46, Male |
| Airplane Rating(s): | Single-engine land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | |
| Instrument Rating(s): | None | Second Pilot Present: | Yes |
| Instructor Rating(s): | None | Toxicology Performed: | Yes |
| Medical Certification: | Class 3 Without waivers/limitations | Last FAA Medical Exam: | May 6, 2010 |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | June 12, 2010 |
| Flight Time: | 199 hours (Total, all aircraft), 4 hours (Total, this make and model), 0 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft) | | |

Aircraft and Owner/Operator Information

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|--------------------------------------|---|---------------------------------------|-----------------|
| Aircraft Make: | Cessna | Registration: | N4955A |
| Model/Series: | 180 | Aircraft Category: | Airplane |
| Year of Manufacture: | | Amateur Built: | |
| Airworthiness Certificate: | Normal | Serial Number: | 32352 |
| Landing Gear Type: | Tailwheel | Seats: | 4 |
| Date/Type of Last Inspection: | May 1, 2010 Annual | Certified Max Gross Wt.: | 2550 lbs |
| Time Since Last Inspection: | | Engines: | 1 Reciprocating |
| Airframe Total Time: | 4908 Hrs | Engine Manufacturer: | CONT MOTOR |
| ELT: | C91A installed, activated, did not aid in locating accident | Engine Model/Series: | O-470 SERIES |
| Registered Owner: | | Rated Power: | 230 Horsepower |
| Operator: | On file | Operating Certificate(s) Held: | None |

Meteorological Information and Flight Plan

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|---|----------------------------------|---|------------------|
| Conditions at Accident Site: | Visual (VMC) | Condition of Light: | Day |
| Observation Facility, Elevation: | PABV | Distance from Accident Site: | 0 Nautical Miles |
| Observation Time: | 10:16 Local | Direction from Accident Site: | |
| Lowest Cloud Condition: | Clear | Visibility | 10 miles |
| Lowest Ceiling: | None | Visibility (RVR): | |
| Wind Speed/Gusts: | 4 knots / | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | 250° | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 29.85 inches Hg | Temperature/Dew Point: | 13°C / 4°C |
| Precipitation and Obscuration: | No Obscuration; No Precipitation | | |
| Departure Point: | Chugiak, AK (PABV) | Type of Flight Plan Filed: | None |
| Destination: | Seldovia, AK (PASO) | Type of Clearance: | None |
| Departure Time: | 10:10 Local | Type of Airspace: | |

Airport Information

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|-----------------------------|------------------------|----------------------------------|---------|
| Airport: | Birchwood Airport PABV | Runway Surface Type: | Asphalt |
| Airport Elevation: | | Runway Surface Condition: | Dry |
| Runway Used: | 19R | IFR Approach: | None |
| Runway Length/Width: | 4008 ft / 100 ft | VFR Approach/Landing: | None |

Wreckage and Impact Information

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|----------------------------|---------|-----------------------------|----------------------------|
| Crew Injuries: | 1 Fatal | Aircraft Damage: | Substantial |
| Passenger Injuries: | 4 Fatal | Aircraft Fire: | On-ground |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 5 Fatal | Latitude, Longitude: | 61.414722,-149.506668(est) |

Administrative Information

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|--|---|
| Investigator In Charge (IIC): | Shaver, Christopher |
| Additional Participating Persons: | Tony Fischer; FAA; Anchorage, AK Andrew Hall; Cessna Aircraft Company; Wichita, KS Andrew Swick; Continental Motors; Mobile, AL |
| Original Publish Date: | March 8, 2012 |
| Note: | The NTSB traveled to the scene of this accident. |
| Investigation Docket: | https://data.nts.gov/Docket?ProjectID=79237 |

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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](#).