



National Transportation Safety Board Aviation Accident Final Report

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| Location: | Raton, NM | Accident Number: | CEN15FA255 |
| Date & Time: | 06/05/2015, 0628 MDT | Registration: | N162WR |
| Aircraft: | CUB CRAFTERS CC18-180 | Aircraft Damage: | Substantial |
| Defining Event: | Loss of control in flight | Injuries: | 2 Fatal |
| Flight Conducted Under: | Public Aircraft | | |

Analysis

The airplane, which was being operated as a public aircraft, departed with the pilot and a gunner on board for the local flight. The purpose of the flight was to locate and kill coyotes in a geographical area with a history of livestock damage. According to the ground-based spotter, the pilot established radio contact with him after the airplane passed over the mesa that bordered the western edge of the target area. The pilot transmitted that he had observed a coyote behind the spotter's position and that they were going to perform a low-altitude pass for the gunner to kill the coyote. The spotter turned around and located the coyote using his binoculars. He reported that he heard 2 to 3 shotgun blasts as the airplane passed through his field of view on a northeast heading. He remained focused on the coyote as the airplane exited his field of view, and, shortly thereafter, he heard it impact the ground.

A review of recovered GPS data indicated that the airplane descended to about 41 ft above the ground and then entered a climbing left turn. The airplane's calculated groundspeed decreased from 77 mph to 55 mph during the climbing left turn. According to the airplane flight manual, the wings-level aerodynamic stall speed was 52 mph with the flaps retracted; however, the stall speed increased to 56 mph when the airplane was in a coordinated 30° banked turn and 74 mph when the airplane was in a coordinated 60° banked turn. A postaccident examination established that the airplane had crashed in a nose-low, near-vertical attitude. Based on the GPS data and the near-vertical impact angle, the pilot likely did not maintain adequate airspeed during the climbing left turn, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall at a low altitude. The postaccident wreckage examination did not reveal any anomalies that would have precluded normal operation of the airplane during the flight.

Although postaccident toxicological testing of the pilot identified three over-the-counter sedating antihistamines, the lack of available blood for testing prevented a determination as to whether they affected the pilot's psychomotor or cognitive functioning during the accident flight.

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 while maneuvering at a low altitude, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall.

Findings

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| Aircraft | Airspeed - Not attained/maintained (Cause) Angle of attack - Not attained/maintained (Cause) |
| Personnel issues | Aircraft control - Pilot (Cause) Use of medication/drugs - Pilot |

Factual Information

History of Flight

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| Maneuvering-low-alt flying | Loss of control in flight (Defining event) Collision with terr/obj (non-CFIT) |
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On June 5, 2015, about 0628 mountain daylight time, a Cub Crafters CC18-180 airplane, N162WR, was substantially damaged when it impacted terrain near Raton, New Mexico. The commercial pilot and the gunner were fatally injured. The airplane was registered to and operated by the United States Department of Agriculture (USDA) as a public aircraft. Day visual meteorological conditions prevailed for the local flight, which departed Raton Municipal Airport (RTN), Raton, New Mexico, about 0615.

The purpose of the flight was to locate and terminate coyotes in a predetermined geographic area with a history of livestock damage. A typical mission profile consisted of locating coyotes with the aid of a ground-based spotter, after which the pilot would fly a low-altitude pass and the rear-seated gunner would shoot the coyote with a shotgun. According to the ground-based spotter, on the day of the accident, the pilot established radio contact with him after the airplane had passed over the mesa that bordered the western edge of the target area. The pilot transmitted that he saw a coyote behind the spotter's position and that they were going to perform a low-altitude pass for the gunner to kill the coyote. The spotter turned around and located the coyote using his binoculars. He reported that he heard 2 to 3 shotgun blasts as the airplane passed through his field of view on a northeast heading. He remained focused on the coyote as the airplane exited his field of view; shortly thereafter, he heard it impact the ground. He looked up from his binoculars and saw that the airplane had crashed about 3/4 mile from his position.

Pilot Information

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| Certificate: | Commercial | Age: | 54, Male |
| Airplane Rating(s): | Single-engine Land | Seat Occupied: | Front |
| Other Aircraft Rating(s): | None | Restraint Used: | Unknown |
| Instrument Rating(s): | Airplane | Second Pilot Present: | No |
| Instructor Rating(s): | None | Toxicology Performed: | Yes |
| Medical Certification: | Class 2 With Waivers/Limitations | Last FAA Medical Exam: | 06/11/2014 |
| Occupational Pilot: | Yes | Last Flight Review or Equivalent: | 11/20/2014 |
| Flight Time: | 13484 hours (Total, all aircraft), 13034 hours (Pilot In Command, all aircraft), 142.4 hours (Last 90 days, all aircraft), 62.4 hours (Last 30 days, all aircraft), 5.3 hours (Last 24 hours, all aircraft) | | |

According to Federal Aviation Administration (FAA) records, the 54-year-old pilot held a commercial pilot certificate with single-engine land and instrument airplane ratings. The pilot's last aviation medical examination was completed on June 11, 2014, when he was issued a second-class medical certificate with a limitation for corrective lenses. His last flight proficiency review was completed on November 20, 2014.

The pilot's flight history was established using his logbook and a field diary in which he recorded his recent flights. The final logbook entry was dated April 23, 2015, at which time he had accumulated 13,411.3 hours total flight time. According to the field diary, the pilot had accumulated 72.9 hours since the final logbook entry. At the time of the accident, the pilot had a total flight experience of 13,484.2 hours of which 13,033.6 hours were as pilot-in-command. The operator reported that nearly all of the pilot's total flight experience was flown in Piper PA-18 or Cub Crafters CC18-180 airplanes. He had flown 397.9 hours during the year before the accident, 319.5 hours during the 6 months before the accident, 142.4 hours during the 90 days before the accident, and 62.4 hours during the month before the accident. Including the accident flight, the pilot had flown 5.3 hours during the 24-hour period before the accident.

Aircraft and Owner/Operator Information

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| Aircraft Make: | CUB CRAFTERS | Registration: | N162WR |
| Model/Series: | CC18-180 | Aircraft Category: | Airplane |
| Year of Manufacture: | 2008 | Amateur Built: | No |
| Airworthiness Certificate: | Normal | Serial Number: | CC18-0035 |
| Landing Gear Type: | Tailwheel | Seats: | 2 |
| Date/Type of Last Inspection: | 05/19/2015, Annual | Certified Max Gross Wt.: | 2300 lbs |
| Time Since Last Inspection: | 33 Hours | Engines: | 1 Reciprocating |
| Airframe Total Time: | 3125.7 Hours at time of accident | Engine Manufacturer: | Lycoming |
| ELT: | Installed, activated, did not aid in locating accident | Engine Model/Series: | O-360-C4P |
| Registered Owner: | USDA-APHIS-WS | Rated Power: | 180 hp |
| Operator: | USDA-APHIS-WS | Operating Certificate(s) Held: | None |

The airplane was a two-seat, single-engine Cub Crafters CC18-180, serial number CC18-0035. The airplane was a high-wing monoplane with a steel tube fuselage structure and fabric covering for the wings, fuselage, and tail surfaces. The airplane was powered by a 180-horsepower, 4-cylinder Lycoming O-360-C4P engine, serial number L-42046-36E. The engine provided thrust through a fixed-pitch, two-blade, McCauley 1A200/FA8241 propeller, serial number AHA46002. The tandem seat airplane was equipped with a fixed conventional landing

gear and wing flaps. The airplane had a maximum allowable takeoff weight of 2,300 pounds. The Federal Aviation Administration (FAA) issued the airplane a standard airworthiness certificate on December 29, 2008.

The airplane's recording tachometer indicated 3,125.7 hours at the accident site. The airframe had accumulated 3,125.7 hours since new. The factory-new engine was installed on February 1, 2013, at 1,992.8 tachometer hours. The engine subsequently accumulated 1,132.9 hours total time. The factory-new propeller was installed on February 4, 2013, at 1,996.9 tachometer hours. The propeller subsequently accumulated 1,128.8 hours total time. The last 100 hour/annual inspection of the airplane was completed on May 19, 2015, at 3,092.5 total airframe hours. The airplane had accumulated 33.2 hours since the inspection. A postaccident review of the maintenance records found no history of unresolved airworthiness issues.

The airplane had a total fuel capacity of 50 gallons (44 gallons usable) distributed between two wing fuel tanks. Based on available fueling records, the airplane likely departed with a full fuel load after being refueled the day before the accident with 33 gallons of 100 low-lead aviation fuel.

Meteorological Information and Flight Plan

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| Conditions at Accident Site: | Visual Conditions | Condition of Light: | Day |
| Observation Facility, Elevation: | RTN, 6352 ft msl | Distance from Accident Site: | 21 Nautical Miles |
| Observation Time: | 0653 MDT | Direction from Accident Site: | 273° |
| Lowest Cloud Condition: | Clear | Visibility | 10 Miles |
| Lowest Ceiling: | None | Visibility (RVR): | |
| Wind Speed/Gusts: | 7 knots / | Turbulence Type Forecast/Actual: | / None |
| Wind Direction: | 50° | Turbulence Severity Forecast/Actual: | / N/A |
| Altimeter Setting: | 30.19 inches Hg | Temperature/Dew Point: | 12°C / 7°C |
| Precipitation and Obscuration: | No Obscuration; No Precipitation | | |
| Departure Point: | Raton, NM (RTN) | Type of Flight Plan Filed: | Company VFR |
| Destination: | Raton, NM (RTN) | Type of Clearance: | None |
| Departure Time: | 0615 MDT | Type of Airspace: | Class G |

The nearest aviation weather reporting station was located at Raton Municipal Airport (RTN), Raton, New Mexico, about 21 miles west of the accident site. At 0653, the RTN automated surface observing system reported: wind 050° at 7 knots, a clear sky, 10 miles surface visibility; temperature 12°C; dew point 7°C; and an altimeter setting of 30.19 inches of mercury.

The ground-based spotter reported that, at the time of the accident, the surface wind was calm to 1 mph with high altitude clouds observed to the east of the accident site.

Wreckage and Impact Information

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| Crew Injuries: | 2 Fatal | Aircraft Damage: | Substantial |
| Passenger Injuries: | N/A | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 2 Fatal | Latitude, Longitude: | 36.716389, -104.133333 |

The airplane wreckage was located in an open pasture with no trees or other obstructions in the general vicinity of the accident site. The elevation of the accident site was 6,982 ft mean sea level (msl). The aircraft wreckage was orientated on a 010° magnetic heading. The airplane was found in a near-vertical attitude with the engine pushed back into the cabin. There was no appreciable wreckage propagation from the point-of-impact. The main wreckage consisted of the entire airframe, including all structural components and flight control surfaces. Flight control cable continuity was established from the forward cockpit controls to the individual control surfaces. The rear-seat control stick had been removed for the accident flight. The elevator trim jack screw was found in a neutral position. The cockpit flap handle was displaced aft during impact; however, the wing flaps appeared to be in the fully retracted position. Both wing tanks were damaged during the accident and did not contain any residual fuel; however, first responders reported that there was a substantial fuel odor at the accident site. The cockpit fuel selector was found in the BOTH position. The fuel filter assembly contained a fluid consistent in color and odor to 100 low-lead aviation fuel. The fuel filter assembly fuel sample did not exhibit water or particulate contamination. The magneto switch was observed in the BOTH position before it was turned OFF by first responders. The stall warning horn was extracted from the right wing root and rewired to the wing-mounted lift sensor switch. Although the lift sensor switch had evidence of impact damage, the stall warning horn produced an aural tone when electrical power was applied and the switch contact was closed. The airspeed indicator exhibited a visible outline of the pointer that had been deposited on the gauge face. The observed white outline was pointed toward 69 mph. The propeller had separated from the engine crankshaft flange and was buried about 4 inches into the ground. The propeller blades exhibited S-shape spanwise bending, chordwise scratches and burnishing, and a leading-edge gouge.

The engine remained partially attached to the firewall by its mounts and control cables. Mechanical continuity was confirmed from the engine components to their respective cockpit controls. Internal engine and valve train continuity was confirmed as the engine crankshaft was rotated. Compression and suction were noted on all cylinders in conjunction with crankshaft rotation. The upper spark plugs were removed and exhibited features consistent with normal engine operation. Both magnetos provided spark on all leads when rotated. There were no obstructions between the air filter housing and the carburetor. The carburetor fuel

bowl contained a liquid that was consistent with the color and odor of 100 low-lead aviation fuel. The fuel sample obtained from the carburetor bowl did not exhibit any water or particulate contamination.

The postaccident wreckage examination did not reveal any anomalies that would have precluded normal operation of the airplane during the accident flight.

Medical And Pathological Information

The New Mexico Office of the Medical Investigator in Albuquerque, New Mexico, performed an autopsy on the pilot. The cause of death was attributed to multiple blunt-force injuries sustained during the accident. Additionally, the autopsy report indicated that no ethanol was detected in vitreous fluid. The FAA's Bioaeronautical Sciences Research Laboratory in Oklahoma City, Oklahoma, performed toxicology tests on samples obtained during the autopsy. The test results were limited by the absence of available blood for testing. However, acetaminophen (125 ug/ml) and salicylate were detected in urine; doxylamine (0.028 ug/ml), cetirizine, and chlorpheniramine were identified in kidney tissue; and chlorpheniramine and dextropropofol were found in liver. No ethanol was detected in urine.

Acetaminophen is a pain and fever reliever commonly sold with the name Tylenol. Salicylate is a metabolite of aspirin, an anti-inflammatory analgesic. Cetirizine is an antihistamine available over the counter with a variety of names including Zyrtec. Chlorpheniramine is another antihistamine available over the counter in a variety of combination products many of which also include acetaminophen and dextromethorphan. Doxylamine is another antihistamine available in several combination products such as Nyquil, but it is also the active ingredient in some Unisom products designed to induce sleep. Dextropropofol is a metabolite of dextromethorphan, an over the counter cough medicine. Cetirizine, chlorpheniramine, and doxylamine all carry label warnings, "May impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery)."

Tests And Research

A Garmin GPSMAP 496 device was recovered from the wreckage, and its non-volatile memory was downloaded onsite with computer software. According to a review of the recovered data, the accident flight departed RTN at 0615:43 and proceeded eastbound toward the target area. At 0627:22, the airplane passed over the mesa that bordered the western edge of the target area about 140 ft agl and subsequently descended into the valley on an easterly track. At 0627:54, the airplane turned to the northeast and continued to descend. At that time, the airplane was about 160 ft agl and had a calculated ground speed of about 120 mph. At 0628:32, the airplane had descended to about 41 ft agl and had a ground speed of about 77 mph. The airplane subsequently entered a climbing left turn, during which the airplane's groundspeed decreased to about 55 mph. At 0628:41, the final GPS data point was recorded about 95° into

the airplane's climbing left turn. The airplane was about 100 ft agl and had a groundspeed of about 62 mph. The final GPS data point was located about 221 ft northeast of the accident site.

According to the Cub Crafters CC18-180 airplane flight manual, the wings-level aerodynamic stall speed was 52 mph with the flaps retracted. The stall speed increased to 56 mph when the airplane was in a coordinated 30° banked turn and 74 mph when the airplane was in a coordinated 60° banked turn.

Additional Information

According to National Transportation Safety Board (NTSB) Safety Alert No. SA-019, Prevent Aerodynamic Stalls at Low Altitude, many aerodynamic stalls occur in visual meteorological conditions (VMC) when a pilot becomes momentarily distracted from the primary task of flying, such as while maneuvering in the airport traffic pattern, during an emergency, or when fixating on ground objects. Additionally, depending on how an airplane is being operated, an aerodynamic stall can occur at any airspeed, at any attitude, and with any engine power setting. The safety alert further indicated that an increase in airplane bank angle will increase the aerodynamic stall speed exponentially.

Administrative Information

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| Investigator In Charge (IIC): | Andrew T Fox | Report Date: | 05/11/2017 |
| Additional Participating Persons: | Jeff Burns; Federal Aviation Administration - Albuquerque FSDO; Albuquerque, NM Kyle Hunsaker; USDA/ APHIS/ Wildlife Services; Cedar City, UT Brad Damm; Cub Crafters; Yakima, WA Troy Helgeson; Lycoming Engines; Milliken, CO | | |
| Publish Date: | 11/30/2018 | | |
| Note: | The NTSB traveled to the scene of this accident. | | |
| Investigation Docket: | http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=91312 | | |

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](#).