

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA15LA083	05/04/2015 1045	Regis# N504WD	Hamilton, MT	Apt: Ravalli County 6S5
Acft Mk/Mdl AIRBUS AS-350-BA		Acft SN 1800	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl TURBOMECA ARRIEL 1B		Acft TT 5697	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: HAT CREEK HELICOPTERS LLC		Opr dba:		Aircraft Fire: NONE

Events

1. Autorotation - Hard landing
3. Autorotation - Hard landing

Narrative

On May 4, 2015 about 1045 mountain daylight time, an Airbus AS-350 BA helicopter, N504WD, had a hard landing during a practice hovering autorotation at the Ravalli County Airport (6S5) in Hamilton, Montana. The flight instructor and the pilot receiving instruction were not injured. The helicopter sustained substantial damage. The helicopter was registered to Hat Creek Helicopters LLC, Hamilton, Montana, and operated by the flight instructor as a day, visual flight rules instruction flight under 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed at the time of the accident and no flight plan was filed. The flight originated from the Ravalli County Airport (6S5), Hamilton, Montana.

The flight instructor reported that during hovering autorotation training, the pilot receiving instruction pulled in too much collective pitch, the helicopter ballooned, and subsequently landed hard. The flight instructor reported that they performed several additional training maneuvers and then landed without further incident. A postflight inspection revealed substantial damage to the tailboom.

The flight instructor reported that it was difficult to control the throttle (fuel flow control lever - FFCL) due to its location, mounted on the pedestal between the front seats, necessitating the release of either the cyclic or collective control to manipulate the FFCL. Further, not having an idle detent, made the pilot/instructor vulnerable to inadvertently shutting down the engine while trying to manipulate the throttle for training or emergency purposes. He reported that the accident could have been prevented had the throttle been co-located on the collective as in other helicopter designs he'd flown, allowing the pilot/instructor to manipulate the throttle without relinquishing control of the collective or cyclic controls.

He further explained that seated in the left seat, he had to lean over the center console to the right, to control the FFCL. While in this position, he was unable to prevent the pilot on the controls from pulling too much collective, resulting in a drop in main rotor RPM as the helicopter ballooned. He added that he felt that if there was a governor or tail rotor problem, he would not be in position to handle the emergency while trying to manipulate three controls with two hands.

The Federal Aviation Administration (FAA) aviation safety inspector stated in the FAA Form 8020-23 Accident/Incident Report, (June 2015), "Due to the location of the throttle on the AS-350 BA and no idle detent, it is difficult for a flight instructor sitting in the left seat to manipulate the throttle."

The flight instructor verified that there were no preimpact mechanical failures or malfunctions with the airframe or engine that would have precluded normal operation.

ADDITIONAL INFORMATION

Fuel Flow Control Lever Design

The accident helicopter had a control quadrant located on the floor between the pilot's seat (right) and left front seat. The quadrant was comprised of a rotor brake lever, a fuel flow control lever, and a fuel shut-off lever. The fuel flow control lever is the center lever. The lever's track is designed with three positions and two detents that require the pilot to pull the lever to the right to move out of the detent and move the lever forward or back. The lever is made of thin spring steel and is easily flexed to the right. The upper detent serves as the stop (fuel cut-off) and start position. The second detent serves as the flight position. This position automatically meters fuel to the engine based on power demands. When moved out of flight position detent and forward, the emergency range is entered.

Cockpit Restraint System Testing

During November 2015, the cockpit restraint system with a floor mounted FFCL was tested for compliance with 14 Code of Federal Regulation (CFR) Part 27

National Transportation Safety Board - Aircraft Accident/Incident Database

Airworthiness Standards: Normal Category Rotorcraft and FAA Advisory Circular (AC) 27-1B Certification of Normal Category Rotorcraft.

§27.777 Cockpit controls

Cockpit controls must be-

- (a) Located to provide convenient operation and to prevent confusion and inadvertent operation; and
- (b) Located and arranged with respect to the pilots' seats so that there is full and unrestricted movement of each control without interference from the cockpit structure or the pilot's clothing when pilots from 5'2" to 6'0" in height are seated.

Essential controls should be evaluated with the shoulder harness locked in the retracted position.

The following are examples of cockpit control issues which should be avoided:

- (iv) Control/seat relationship which requires unusual pilot contortions at extreme control displacements.
- (viii) Controls for accessories or equipment which require a two-handed operation.
- (x) Essential controls which cannot be actuated during emergency conditions with the shoulder harness locked.
- (xi) Throttle controls which can be inadvertently moved through idle to the cutoff position.
- (xii) Switches, buttons, or other controls which can be inadvertently activated during routine cockpit activity including cockpit entry.

The tests were conducted by an FAA airworthiness inspector at the request of the National Transportation Safety Board (NTSB) investigator in charge (IIC).

The inspector tested the cockpit restraint system with personnel of varying heights. The four-point cockpit restraint system had an inertia reel with a manual lock. He reported that the test subjects reached the floor mounted control quadrant, but none were able to grab the controls with a full or partially closed hand. With the FFCL in the "flight" gate, the test subjects were able to reach it with the first segments of their fingers and fingertips. The same minimal accessibility was reported for the fuel shutoff lever. He also surmised that during a violent oscillation of a helicopter during a crash, it would be impossible to control the FFCL.

An example of a violent oscillation in a helicopter accident sequence can be viewed in the video footage of WPR16FA029 (Airbus AS-350 B3 accident).

NTSB report MIA07TA017 (AS-350 BA) reported that the pilot removed his hand from the collective to manipulate the FFCL during an emergency. The pilot had slowly advanced the FFCL to the flight gate detent, when he observed a sudden spike in torque and then heard the engine begin to rev rapidly. The helicopter started to shake violently and bounce on the ground. He attempted to close the fuel shutoff valve; however, the collective control rose each time he released it, when attempting to close the FFCL, lifting the helicopter off the ground.

NTSB report CEN11FA599 (AS-350 B2) reported in the Party Submission on the design of the FFCL that, "Because of this design, the pilot must remove his hand from the collective flight control to alter the engine RPM. Additionally, the floor mounted fuel flow lever does not have an "idle detent" that would normally provide a pilot with a tactile indication or a physical stop at the engine idle point. Without the tactile feedback or physical "stop" it is possible to inadvertently reduce engine RPM below idle and potentially cause the engine to shut down. Due to the design limitation, the aircraft manufacturer has a restriction when conducting engine failure training.

A08A0007 (AS-350 BA, Canada) discussed the FFCL having no idle detent position, "Because there is no physical stop between the flight detent and the stop detent, it is possible that the FFCL was inadvertently set at or accidentally moved to a position that caused the engine to spool down."

SL 2013/11 (AS-350 BA, Norway) reported that the FFCL having no idle detent position, "Thus there is a risk of an inadvertent shut-down of the engine while

reducing the FFCL to set the engine at idle."

The FAA published Safety Alert for Operators (SAFO) 16006 in June 2016. This SAFO discusses the location of the hydraulic switch for the Bell UH-1 series helicopter and showed that in a recent accident, due to the aircraft configuration, the pilot was forced to remove his hand from the collective, place it on the cyclic so he could reach across with his right hand to shut off the hydraulic switch. This action of removing the pilot's hand from the collective control, might have created a situation where control of the helicopter was compromised.

Governor Failure Procedure - Excessive Fuel Flow Rate

An internal FAA memorandum (April 2010) from the Systems Safety and Analysis Branch (AAL-240) to the Recommendations and Analysis Division (AAI-200) discusses the emergency procedures for a governor failure (excessive fuel flow rate) and states in part:

The emergency procedure requires the pilot to release the collective control while flying to modulate fuel flow with the fuel flow control lever. When a collective input is made the fuel lever would have to be readjusted. Modulating fuel in the manual governor mode while flying without collective input at low level and maneuvering would be nearly impossible.

14 CFR Part 27 Airworthiness Standards: Normal Category Rotorcraft prescribes airworthiness standards for the issue of type certificates, and changes to those certificates, for normal category rotorcraft with maximum weights of 7,000 pounds or less and nine or less passenger seats. Additional information on the human factors aspect of cockpit control design can be found in the FAA Human Factors Division report DOT/FAA/TC-13/44 Human Factors Considerations in the Design and Evaluation of Flight Deck Displays and Controls (2013).

§27.771 Pilot compartment

For each pilot compartment-

(b) If there is provision for a second pilot, the rotorcraft must be controllable with equal safety from either pilot seat; and

§27.777 Cockpit controls

Cockpit controls must be-

(a) Located to provide convenient operation and to prevent confusion and inadvertent operation; and

(b) Located and arranged with respect to the pilots' seats so that there is full and unrestricted movement of each control without interference from the cockpit structure or the pilot's clothing when pilots from 5'2" to 6'0" in height are seated.

Essential controls should be evaluated with the shoulder harness locked in the retracted position.

As background, the following are examples of cockpit control issues which should be avoided:

(iv) Control/seat relationship which requires unusual pilot contortions at extreme control displacements.

(viii) Controls for accessories or equipment which require a two-handed operation.

(x) Essential controls which cannot be actuated during emergency conditions with the shoulder harness locked.

(xi) Throttle controls which can be inadvertently moved through idle to the cutoff position.

(xii) Switches, buttons, or other controls which can be inadvertently activated during routine cockpit activity including cockpit entry.

↳27.1143 Engine controls

(d) If a power control incorporates a fuel shutoff feature, the control must have a means to prevent the inadvertent movement of the control into the shutoff position. The means must-

(1) Have a positive lock or stop at the idle position; and

(2) Require a separate and distinct operation to place the control in the shutoff position.

(4) If throttle controls incorporate a fuel shut-off feature, a means should be provided to prevent inadvertent movement to the shut-off position. This means should-

(i) Provide a positive lock or stop at the idle position. An idle detent (mechanical or electrical/mechanical such as solenoid) is an accepted arrangement.

(ii) Require a separate and distinct operation to place the control in the shut-off position. Separate action (switch or button) to displace the idle stop or distinct offsets in throttle motion to allow movement from the idle stop to shutoff are accepted arrangements.

In its 2006 study of the aircraft certification process, the NTSB made two recommendations to the FAA concerning human/aircraft interaction issues in the certification of aircraft. Safety Recommendation A-06-37 asked the FAA to - amend the advisory materials associated with 14.[CFR] 25.1309 to include consideration of structural failures and human/airplane system interaction failures in the assessment of safety-critical systems.

Safety Recommendation A-06-38 asked the FAA to. require a program for the monitoring and ongoing assessment of safety-critical systems throughout the life cycle of the airplane. Once in place, use this program to validate that the underlying assumptions made during design and type certification about safety-critical systems are consistent with operational experience, lessons learned, and new knowledge.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN15FA290	07/03/2015 1339	Regis# N390LG	Frisco, CO	Apt: Summit Medical Center 91CO
Acft Mk/Mdl AIRBUS HELICOPTERS INC AS350B3E	Acft SN 7595	Acft Dmg: DESTROYED	Fatal 1	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl TURBOMECA ARRIEL 2D		Ser Inj 2	Flt Conducted Under: FAR 135	
Opr Name: AIR METHODS CORP	Opr dba:		Aircraft Fire: GRD	
			AW Cert: STN	

Summary

The NTSB's full report is available at <http://www.nts.gov/investigations/AccidentReports/Pages/AccidentReports.aspx>. The Aircraft Accident Report number is NTSB/AAR-17/01.

On July 3, 2015, about 1339 mountain daylight time, an Airbus Helicopters AS350 B3e helicopter, N390LG, registered to and operated by Air Methods Corporation, lifted off from the Summit Medical Center Heliport, Frisco, Colorado, and then crashed into a parking lot; the impact point was located 360 feet southwest of the ground-based helipad. The pilot was fatally injured, and the two flight nurses were seriously injured. The helicopter was destroyed by impact forces and a postcrash fire. The flight was conducted under the provisions of 14 Code of Federal Regulations Part 135 on a company flight plan. Visual meteorological conditions prevailed at the time of the accident.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN15MA290	07/03/2015 1339	Regis# N390LG	Frisco, CO	Apt: Summit Medical Center 91CO
Acft Mk/Mdl AIRBUS HELICOPTERS INC AS350B3E	Acft SN 7595	Acft Dmg: DESTROYED	Rpt Status: Factual Prob Caus: Pending	
Eng Mk/Mdl TURBOMECA ARRIEL 2D	Acft TT 487	Fatal 1 Ser Inj 2	Flt Conducted Under: FAR 135	
Opr Name: AIR METHODS CORP	Opr dba:	Aircraft Fire: GRD		AW Cert: STN

Summary

The NTSB's full report is available at <http://www.nts.gov/investigations/AccidentReports/Pages/AccidentReports.aspx>. The Aircraft Accident Report number is NTSB/AAR-17/01.

On July 3, 2015, about 1339 mountain daylight time, an Airbus Helicopters AS350 B3e helicopter, N390LG, registered to and operated by Air Methods Corporation, lifted off from the Summit Medical Center Heliport, Frisco, Colorado, and then crashed into a parking lot; the impact point was located 360 feet southwest of the ground-based helipad. The pilot was fatally injured, and the two flight nurses were seriously injured. The helicopter was destroyed by impact forces and a postcrash fire. The flight was conducted under the provisions of 14 Code of Federal Regulations Part 135 on a company flight plan. Visual meteorological conditions prevailed at the time of the accident.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: Airbus Helicopters' dual-hydraulic AS350 B3e helicopter's (1) preflight hydraulic check, which depleted hydraulic pressure in the tail rotor hydraulic circuit, and (2) lack of salient alerting to the pilot that hydraulic pressure was not restored before takeoff. Such alerting might have cued the pilot to his failure to reset the yaw servo hydraulic switch to its correct position during the preflight hydraulic check, which resulted in a lack of hydraulic boost to the pedal controls, high pedal forces, and a subsequent loss of control after takeoff. Contributing to the accident was the pilot's failure to perform a hover check after liftoff, which would have alerted him to the pedal control anomaly at an altitude that could have allowed him to safely land the helicopter. Contributing to the severity of the injuries was the helicopter's fuel system, which was not crash resistant and facilitated a fuel-fed postcrash fire.

Events

1. Takeoff - Preflight or dispatch event
2. Takeoff - Loss of control in flight
3. Uncontrolled descent - Collision with terr/obj (non-CFIT)
4. Post-impact - Fire/smoke (post-impact)

Findings - Cause/Factor

1. Organizational issues-Development-Design-Equipment design-Manufacturer - C
2. Organizational issues-Development-Design-Design of document/info-Manufacturer - C
3. Aircraft-Aircraft systems-Hydraulic power system-(general)-Design - C
4. Aircraft-Aircraft systems-Hydraulic power system-Hydraulic, indicating system-Design - C
5. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C
6. Personnel issues-Action/decision-Action-Forgotten action/omission-Pilot - C
7. Personnel issues-Task performance-Use of equip/info-Use of checklist-Pilot - C
8. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
9. Personnel issues-Action/decision-Action-Lack of action-Pilot - F
10. Personnel issues-Task performance-Use of equip/info-Use of policy/procedure-Pilot - F
11. Aircraft-Aircraft systems-Fuel system-(general)-Design - F

Narrative

The NTSB's full report is available at <http://www.nts.gov/investigations/AccidentReports/Pages/AccidentReports.aspx>. The Aircraft Accident Report number is NTSB/AAR-17/01.

On July 3, 2015, about 1339 mountain daylight time, an Airbus Helicopters AS350 B3e helicopter, N390LG, registered to and operated by Air Methods Corporation, lifted off from the Summit Medical Center Heliport, Frisco, Colorado, and then crashed into a parking lot; the impact point was located 360 feet southwest of the ground-based helipad. The pilot was fatally injured, and the two flight nurses were seriously injured. The helicopter was destroyed by impact forces and a postcrash fire. The flight was conducted under the provisions of 14 Code of Federal Regulations Part 135 on a company flight plan. Visual meteorological conditions prevailed at the time of the accident.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR15LA203	06/30/2015 800 MDT	Regis# N6199D	Salt Lake City, UT	Apt: Salt Lake City Intl Airport SLC
Acft Mk/Mdl BEECH C 99		Acft SN U-169	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl PRATT AND WHITNEY PT6		Acft TT 31957	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 135
Opr Name: AMERIFLIGHT LLC		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Events

1. Takeoff - Flight control sys malff/fail

Narrative

HISTORY OF FLIGHT

On June 30, 2015, about 0800 mountain daylight time, the pilots of a Beech C-99, N6199D, aborted takeoff at the Salt Lake City International Airport (SLC), Salt Lake City, Utah after experiencing a flight control malfunction shortly after liftoff. The two commercial pilots were uninjured and the airplane sustained substantial damage to the left wing. The airplane was registered to UAS Transervices Inc and operated by Ameriflight under the provisions of 14 Code of Federal Regulations Part 135. Visual meteorological conditions prevailed for the flight which operated on an instrument flight rules flight plan.

The pilots reported that after a normal start and taxi the airplane was cleared to takeoff. The airplane rolled down the runway and the pilot in command (PIC) rotated the airplane about 100 knots. Immediately, the airplane yawed to the right and the right rudder pedal was at the floor. The copilot did not note anything abnormal with the engines and instruments. Both pilots applied pressure to the left rudder pedal, however, the pedal barely moved. The PIC then manipulated the rudder trim, however, that also did not reduce the right yaw. He jockeyed the throttles and attempted to land the airplane back onto the runway. The airplane touched down onto the left side of the runway and the airplane remained difficult to control; the left landing gear collapsed and the airplane slid to a stop on its left wing.

PERSONNEL INFORMATION

Pilot in Command (PIC)

The PIC held a commercial pilot certificate for airplane single- and multi-engine land with an instrument rating. The pilot also held an instructor certificate for airplane single- and multi- engine land. The pilot's most recent second-class airman medical certificate was issued on April 7, 2015 with the limitation that he must wear corrective lenses. At the time of the accident, the pilot had accumulated about 1,458 total flight hours, of which 151 hours were in the accident airplane make and model.

The pilot had been employed by the company since April 13, 2015 and was checked off to fly as a first pilot on May 15, 2015.

Copilot

The copilot held a commercial pilot certificate for airplane single- and multi-engine land with instrument rating. The pilot's most recent first-class airman medical certificate was issued January 22, 2015 with no limitations. At the time of the accident the pilot had accumulated about 952 total flight hours, of which 718 hours were in the accident airplane make and model.

The pilot was a part of a program where he is designated to fly about 750 hours with the operator to gain experience before he transitioned to a foreign airline.

AIRCRAFT INFORMATION

The two-seat, low-wing, retractable gear airplane, serial number U169, was manufactured in 1981. It was powered by two Pratt & Whitney PT6A 715 horsepower engines, and was equipped with Hartzell HC-B3TN-3B controllable pitch propellers. Review of the maintenance logbook records revealed the airplane's most recent maintenance was a routine examination that occurred on June 28, 2015, at an airframe total time of 31,957.2 hours. The accident flight was the first flight after maintenance.

The airplane's most recent maintenance was an "Event III and Routine Inspection," performed in accordance with the Ameriflight approved aircraft inspection

program. During the inspection, the rudder pedals were removed from the pedal arms and the arm bolt holes were inspected for elongations and wear. The rudder control system components were also inspected throughout. The rudder free play limit check was performed, and all flight controls and tabs were checked for freedom of operations. There were no system anomalies documented within the maintenance log.

METEOROLOGICAL INFORMATION

At 0753, the weather at SLC was reported as wind from 160 degrees at 3 knots, visibility 10 statute miles, broken clouds at 14,000 feet above ground level (agl) and 22,000 feet agl, temperature 28 degrees C, dewpoint 12 degrees C, and an altimeter setting of 30.07 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

Due to the nature of the accident, an on scene examination was completed by the Federal Aviation Administration. The airplane came to rest about midway down the runway. Examination of the cockpit revealed the rudder trim was fully trimmed to the nose right position. The cargo was removed from the airplane; during the removal, it was noted that the cargo was secured in place and properly balanced.

TESTS AND RESEARCH

A postaccident examination of the airframe revealed that the rudder and rudder trim controls were properly rigged, and continuity was established. There was evidence of rubbing on the left rudder cable pulley located in the lower tail cone; however, there was no evidence of binding or jamming of the rudder control cables. Foreign object debris (FOD) was also noted underneath the fuselage floor; however, there was no evidence that the pieces interfered with the rudder control system.

The rudder pedals were tested and it was harder to move the left rudder pedal than the right pedal. It was noted that there was damage to the nose wheel which kept the wheel slightly turned to the right. The nose steering disconnect motor was removed and tested; it operated normally. The left and right rudder pedals were manipulated a second time, both pedals required similar pressure to move and the neutral positions were near neutral.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ANC17FA021	05/01/2017	1350 AKD	Regis# N803TH	Chignik Lake, AK	Apt: N/a
Acft Mk/Mdl CESSNA 208B			Acft SN 208B0321	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl P&W PT6A SER				Fatal 1 Ser Inj 0	Flt Conducted Under: FAR 135
Opr Name: GRANT AVIATION INC			Opr dba:		Aircraft Fire: NONE
					AW Cert: STN

Events

1. Enroute-cruise - Unknown or undetermined

Narrative

On May 1, 2017, about 1350 Alaska daylight time, a turbine-powered Cessna 208B Grand Caravan airplane, N803TH, sustained substantial damage after impacting steep, mountainous terrain about 8 miles south of Chignik Lake Airport, Chignik Lake, Alaska. The airplane was being operated as Flight 341 by Grant Aviation, Inc, Anchorage, Alaska, as a scheduled commuter flight under the provisions of 14 Code of Federal Regulations (CFR) Part 135 and visual flight rules (VFR). The airline transport pilot, the sole occupant, sustained fatal injuries. Visual meteorological conditions prevailed at the airplane's point of departure, and company flight following procedures were in effect. Flight 341 departed Port Heiden Airport, Alaska, at 1305, destined for Perryville Airport, Perryville, Alaska.

Flight 341 originated at the King Salmon Airport, Alaska, with one passenger who disembarked at the Port Heiden Airport. The scheduled flight continued to the Perryville Airport, which was about 80 miles away, with 1,322 lbs. of mail and no passengers. According to the director of operations for Grant Aviation, at 1353 he received a notification from the US Coast Guard Rescue Coordination Center (RCC) Juneau, of a signal from a 406 megahertz (MHz) Emergency Locator Transmitter (ELT) that was registered to N803TH. The Director of Operations initiated the company's overdue aircraft procedures.

According to the US Coast Guard District 17 Command Center, the initial ELT signal was received from the COSPAS/SARSAT system at 1353. RCC Juneau initiated a search mission that included a HC-130 airplane and MH-60 helicopter from Air Station Kodiak, which is located about 275 miles northeast of the initial ELT position. At 1730, the wreckage was located and a rescue swimmer was hoisted down to the site. The crewman determined that the pilot was deceased. The crew could not extricate the pilot due to limited resources, time, fuel and deteriorating weather.

The Alaska State Troopers coordinated a recovery mission conducted on May 4 that included a Coast Guard MH-60 from Air Station Kodiak, and volunteer members of the Alaska Mountain Rescue Group. The remains of the pilot were removed from the scene and transported to a secure location. The wreckage will be recovered and examined at a future date.

According to information and photographs provided by the recovery crew, the wreckage came to rest in deep snow at about 2,993 feet on the west face of a treeless, steep mountain in the Alaska Peninsula National Wildlife Refuge of the Aleutian Range. It is located about 500 feet from the top of the mountain ridge and partially submerged in the snow on its left side with the nose section under the snow pack. The fragmented wreckage was contained in an area of about 100 feet by 40 feet, on a heading of about 030 θ magnetic, with the right wing separated and located about 40 feet forward of the main wreckage. The wings and fuselage sustained substantial damage.

At 1239, an aviation special weather report (SPECI) from the Chignik Airport (the closest weather reporting facility) reported, in part: wind variable at 4 knots; visibility 10 statute miles, light rain; sky condition, overcast at 1,700 feet; temperature 39 θ F, dewpoint 36 θ F; altimeter, 29.51 inHg.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN15FA136	02/04/2015 2109 CST	Regis# N441TG	Argyle, TX	Apt: Denton Municipal Airport DTO
Acft Mk/Mdl CESSNA 441		Acft SN 441-0200	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl HONEYWELL TPE331-10N		Acft TT 3830	Fatal 1 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: DEL AIR ENTERPRISES II, LLC		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The instrument-rated commercial pilot was approaching the destination airport after a cross-country flight in night instrument meteorological conditions. According to radar track data and air traffic control communications, while receiving radar vectors to the final approach course, the pilot did not always immediately comply with assigned headings and, on several occasions, allowed the airplane to descend below assigned altitudes. According to airplane performance calculations based on radar track and GPS data, the pilot made an engine power reduction about 2.5 minutes before the accident as he maneuvered toward the final approach fix. Following the engine power reduction, the airplane's airspeed decreased from 162 to 75 knots calibrated airspeed, and the angle of attack increased from 2.7° to 14°. About 4 miles from the final approach fix, the airplane descended below the specified minimum altitude for that segment of the instrument approach. The tower controller subsequently alerted the pilot of the airplane's low altitude, and the pilot replied that he would climb. At the time of the altitude alert, the airplane was 500 ft below the specified minimum altitude of 2,000 ft mean sea level. According to airplane performance calculations, 5 seconds after the tower controller told the pilot to check his altitude, the pilot made an abrupt elevator-up input that further decreased airspeed, and the airplane entered an aerodynamic stall. A witness saw the airplane abruptly transition from a straight-and-level flight attitude to a nose-down, steep left bank, vertical descent toward the ground, consistent with the stall. Additionally, a review of security camera footage established that the airplane had transitioned from a wings-level descent to a near-vertical spiraling descent. A postaccident examination of the airplane did not reveal any anomalies that would have precluded normal operation during the accident flight.

Although the pilot had monocular vision following a childhood injury that resulted in very limited vision in his left eye, he had passed a medical flight test and received a Statement of Demonstrated Ability. The pilot had flown for several decades with monocular vision and, as such, his lack of binocular depth perception likely did not impede his ability to monitor the cockpit instrumentation during the accident flight.

The pilot had recently purchased the airplane, and records indicated that he had obtained make and model specific training about 1 month before the accident and had flown the airplane about 10 hours before the accident flight. The pilot's instrument proficiency and night currency could not be determined from the available records; therefore, it could not be determined whether a lack of recent instrument or night experience contributed to the pilot's difficulty in maintaining control of the airplane.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain adequate airspeed during the instrument approach in night instrument meteorological conditions, which resulted in the airplane exceeding its critical angle of attack and an aerodynamic stall/spin at a low altitude.

Events

1. Approach-IFR initial approach - Altitude deviation
2. Approach-IFR initial approach - Loss of control in flight
3. Approach-IFR initial approach - Aerodynamic stall/spin
4. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Not attained/maintained - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Angle of attack-Not attained/maintained - C
3. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
4. Personnel issues-Psychological-Attention/monitoring-Monitoring equip/instruments-Pilot

Narrative

HISTORY OF FLIGHT

On February 4, 2015, about 2109 central standard time, a Cessna 441 (Conquest II) twin turbo-prop airplane, N441TG, was substantially damaged when it collided with terrain following a loss of control during an instrument approach to Denton Municipal Airport (DTO), Denton, Texas. The commercial pilot was fatally injured. The airplane was registered to Del Air Enterprises II, LLC, and was operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 while on an instrument flight rules (IFR) flight plan. Night instrument meteorological conditions prevailed for the cross-country flight that departed

National Transportation Safety Board - Aircraft Accident/Incident Database

Willmar Municipal Airport (BDH), Willmar, Minnesota, about 1828.

According to Federal Aviation Administration (FAA) air traffic control data, at 2050:46, the pilot established contact with Dallas-Fort Worth Terminal Radar Approach Control and reported being level at 4,000 ft mean sea level (msl). According to radar data, the flight was about 35 miles northwest of DTO and was established on a southbound course. The approach controller issued the current weather conditions at DTO and told the pilot to expect the GPS runway 36 approach. At 2052:54, the approach controller told the pilot to fly direct to WOBOS, an intermediate fix associated with the instrument approach. The plotted radar data showed that the flight turned to the south-southeast to a direct course toward WOBOS. At 2059:35, the flight was cleared to descend to and maintain 3,000 ft msl, and the pilot acknowledged the altitude clearance.

At 2101:24, the DTO tower controller advised the approach controller that a Cessna 172 had just landed at DTO and that the Cessna's pilot reported light-to-moderate turbulence during approach and an in-flight visibility of about 1.5 miles. The approach controller subsequently advised the accident pilot of the light-to-moderate turbulence. At 2103:08, the flight was cleared to descend to and maintain 2,500 ft msl, and the pilot acknowledged the altitude clearance.

At 2103:24, the approach controller told the pilot to turn to a south heading. The pilot acknowledged the heading change and subsequently turned southbound. According to radar data, at 2104:09, the airplane descended below 2,500 ft msl. At 2104:27, the approach controller told the pilot to turn to an east heading. The pilot acknowledged the heading change, but, according to radar data, did not initiate the turn as requested. The airplane continued to descend while on a southbound course until reaching 2,100 ft msl at 2104:46 when it began to climb. At 2104:59, after noticing that the flight had not turned to the assigned heading, the approach controller told the pilot to turn to a heading of 080°. The pilot acknowledged the assigned heading, and radar data showed the flight entering a climbing left turn toward the east.

At 2105:39, when the flight was 8 miles from the final approach fix (NULUX), the approach controller told the pilot to turn to a heading of 030° to intersect the final approach course, to maintain 2,500 ft msl until established on the final approach course, and that the flight was cleared for the GPS runway 36 approach. The pilot responded, "Okay, 030 maintain 2.5 until established on the approach." According to radar data, the flight turned to a north heading instead of the assigned heading of 030°.

At 2106:16, the approach controller told the pilot to contact the DTO tower controller, and the pilot replied with the correct frequency change. The flight continued due north until 2106:38, when it turned to a 030° course and subsequently descended through 2,500 ft msl at 2107:01. At 2107:16, the pilot established communications with the DTO tower controller. The tower controller told the pilot that the surface wind was 360° at 19 knots with 25 knot gusts and then cleared the flight to land on runway 36. The tower controller also asked the pilot if he had received the pilot report (PIREP) that had been issued by the preceding Cessna 172. The pilot confirmed that he had received the PIREP from the approach controller. According to radar data, the airplane continued to descend as it intersected the final approach course and continued northbound toward NULUX.

At 2108:44, the automated air traffic control system issued a low altitude alert for the accident flight. The system presented the low altitude alert on both the control tower and the approach control radar displays. According to radar data, at the time of the low altitude alert, the airplane had descended to about 1,500 ft msl. At 2108:47, the tower controller told the pilot to "... check your altitude, you are still a couple of miles from the marker [NULUX], and uh believe your altitude should be about 2,100 there." At 2108:54, the pilot replied, "Okay, going back to (unintelligible)." According to radar data, following the altitude alert, the airplane continued to descend until the final radar return, recorded at 2109:11, about 2.5 miles south of NULUX at 1,000 ft msl (about 300 ft above the ground). At 2109:12, the tower controller transmitted again that the airplane was lower than the specified minimum altitude (2,000 ft msl) for that segment of the instrument approach. There was no response from the accident pilot.

The flight path of the airplane was captured by a security video camera installed on the exterior of a building that was located about 1/2 mile southeast of the accident site. The video camera, which was facing west, captured the accident airplane's wingtip navigation and strobe lights as the airplane crossed from left to right in the upper portion of the camera's field of view. The airplane entered the camera's field of view at 2108:48 and appeared to be in a wings level descent as it continued across the first half of the camera's lateral field of view. At 2109:00, the descent angle increased substantially before the airplane entered a near-vertical spiraling descent. The airplane's navigational lights and strobes were not visible after 2109:09.

According to 911 emergency calls received following the accident, several individuals reported hearing an airplane overfly their position at a low altitude followed by the sound of a large ground impact. One witness, who was located about 1 mile from the accident site, reported that he saw an airplane's navigation lights and rotating beacon as it flew north below an overcast ceiling toward DTO. The witness stated that the airplane abruptly transitioned from a straight-and-level flight attitude to a nose-down, steep left bank, vertical descent towards the ground. He also heard a momentary increase and then decrease

National Transportation Safety Board - Aircraft Accident/Incident Database

in engine power before the airplane entered the descent. The witness lost sight of the airplane as it descended behind trees shortly before he heard a sound consistent with a ground impact.

PERSONNEL INFORMATION

According to FAA records, the 52-year-old pilot held a commercial pilot certificate with single-engine land, multi-engine land, and instrument airplane ratings. The pilot's last aviation medical examination was completed on January 13, 2014, when he was issued a second-class medical certificate with a limitation for corrective lenses. On the application for his current medical certificate, the pilot reported having accumulated 3,900 hours of total flight experience of which 120 hours were flown within the previous 6 months. A search of FAA records showed no previous accidents, incidents, or enforcement proceedings.

A comprehensive pilot logbook was not located during the investigation. A pilot journal was found in the accident airplane; however, the final journal entry was for simulator-based training for a Socata TBM 700 airplane that was completed on an unspecified date during 2014. The final journal entry indicated that the pilot had a total flight experience of 4,935 hours of which 4,899 hours were flown as pilot-in-command and that he had flown 4,834 hours in single-engine airplanes and 101 hours in multiengine airplanes. The journal also contained a flight instructor's endorsement for a flight review and instrument proficiency check dated August 13, 2013. The pilot's estate provided an airplane utilization spreadsheet that the pilot used to log his recent flight experience. The spreadsheet did not document the pilot's instrument proficiency, night currency, or his accumulated total flight experience. According to the spreadsheet, the pilot had flown 56 hours during the previous 6 months, 23.6 hours during the previous 90 days, and 9.7 hours during the previous 30 days. The pilot's first flight in the accident airplane was on January 23, 2015. As of the final spreadsheet entry, dated January 25, 2015, the pilot had flown the accident airplane 9.7 hours.

The pilot completed simulator-based training for the Cessna 441 on March 27, 2014, at SimCom Training Centers, located in Grapevine, Texas. On January 4, 2015, the pilot completed additional Cessna 441 training provided by Executive Flight Training, Beaufort, South Carolina.

AIRCRAFT INFORMATION

The accident airplane was a 1981 Cessna 441 (Conquest II), serial number 441-0200. Two Honeywell TPE331-10N-512S turbine engines provided thrust through constant-speed, full-feathering, four-blade, McCauley 4HFR34C661/90LNA-2 propellers. The low-wing airplane was of conventional aluminum construction and was equipped with a retractable tricycle landing gear and a pressurized cabin that was configured to seat seven individuals. The airplane was approved for night operations in instrument meteorological conditions and for flight in known icing conditions. On April 5, 1984, the airplane was issued a standard airworthiness certificate and a registration number when it was imported back to the United States of America after being based and operated in France. The pilot purchased the airplane on January 22, 2015.

According to the current weight-and-balance record, dated January 3, 2011, the airplane had an empty weight of 5,855 pounds (lbs), a maximum takeoff weight of 9,850 lbs, and a useful load at takeoff of 3,995 lbs. The airplane had a total fuel capacity of 481.5 gallons (475 gallons usable) distributed between two wing fuel tanks. According to fueling documentation, the airplane departed on the accident flight with a full fuel load after being topped-off with Jet-A fuel premixed with an icing inhibitor.

The airplane had been maintained under the provisions of an approved manufacturer inspection program. The recording hour (Hobbs) meter indicated 2,070.2 hours at the accident site. The airplane had accumulated 3,830.2 hours since new. The airplane had accumulated 62.4 hours since the last phase inspection that was completed on August 22, 2014, at 3,767.8 total airframe hours. The engines had accumulated 35.4 hours since their last 100-hour inspections that were completed on October 22, 2014. The engines, serial numbers P-77413 and P-77421, had accumulated a total service time of 3,830.2 hours since new and 2,303.5 hours since being overhauled. The propellers, serial numbers 972373 and 972370, had accumulated a total service time of 2,303.5 hours since new and 284.6 hours since being overhauled. A postaccident review of the maintenance records found no history of unresolved airworthiness issues.

METEOROLOGICAL INFORMATION

At 2103, the DTO automated surface observing system reported: wind 350ø at 17 knots, gusting 25 knots; an overcast ceiling at 900 ft above ground level (agl); 2 miles surface visibility with light rain and mist; temperature 3øC; dew point 3øC; and an altimeter setting of 30.26 inches of mercury.

The pilot of a Cessna 172 that landed at DTO about 8 minutes before the accident issued a pilot report (PIREP) for light-to-moderate turbulence and an inflight

visibility of 1.5 miles during his approach.

The United States Naval Observatory data indicated that the sunset and end of civil twilight at the accident site were at 1803 and 1829, respectively. The moon was in a waxing gibbous phase, with 99% of the moon's visible disk illuminated; however, the moonlight would have been obscured by the overcast ceiling.

AIDS TO NAVIGATION

The published inbound course for the GPS runway 36 approach was 357 \emptyset magnetic; the crossing altitude for the final approach fix (NULUX) was 2,000 ft msl; and the distance between NULUX and the runway threshold was 4.2 nautical miles (nm). After crossing NULUX, lateral-navigation (LNAV)-equipped aircraft descended to 1,300 ft msl until crossing the stepdown fix (SHIEV) that is located 2 nm from the end of runway 36. After crossing SHIEV, LNAV-equipped aircraft descended to the minimum descent altitude of 1,040 ft msl (413 feet agl). The instrument approach minimums required a 1-mile inflight visibility at the missed approach point to continue the landing. The missed approach instructions were to climb on runway heading to 4,000 ft msl, proceed direct to the ZITAG waypoint, then turn left and proceed direct to the CRAFF waypoint and hold.

COMMUNICATIONS

A review of available air traffic control information indicated that the accident flight received normal services and handling. Transcripts of the voice communications recorded between the accident pilot, the approach controller, and the tower controller are included in the docket materials associated with the investigation.

AIRPORT INFORMATION

Denton Municipal Airport (DTO), a public airport located about 3 miles west-southwest of Denton, Texas, was owned and operated by the City of Denton. The airport field elevation was 642 ft msl. The airport had a single asphalt runway, runway 18/36 (7,002 ft by 150 ft). Runway 36 had a displaced threshold that reduced the available runway landing length by 100 ft. Runway 36 was equipped with medium intensity runway lights and a four-light precision approach path indicator. The airport was equipped with an air traffic control tower that was operational at the time of the accident.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was found in a grass-covered industrial storage yard located about 6.4 nm south of the runway 36 threshold. The accident site was about 400 ft northeast of the final radar return and about 207 ft right of the final approach course. The main wreckage consisted of the entire airplane, which was orientated on a west-northwest heading. The elevation of the accident site was 679 ft msl. The wreckage was in an upright position, and there was no appreciable wreckage debris path. There was no evidence of an inflight or postimpact fire. All observed airframe structural separations were consistent with impact-related damage. The entire lower fuselage surface was crushed upward, consistent with a vertical impact while in a near level pitch attitude. The airplane's tail section was found partially separated immediately aft of the aft pressure bulkhead. The vertical stabilizer, rudder, horizontal stabilizers, and elevators remained relatively undamaged. The leading edges of both wings, the propeller spinners, and the airframe radome did not exhibit evidence of a ground impact.

Aileron control cable continuity was established through an overstress separation of the aileron sector drive cable in the mid-cabin area and a separation of the balance cable near the right wing root. All other flight control cables were continuous from the cockpit control inputs to their respective flight control surfaces. The elevator trim actuators measured 1.6 inches, which corresponded to the trailing-edge of the elevator trim tab being deflected up about 5 \emptyset . The aileron trim actuator measured 1.1 inches, which corresponded to the trailing-edge of the aileron trim tab being deflected down about 5 \emptyset . The rudder trim actuator measured 2.4 inches, which corresponded to the trailing-edge of the rudder trim tab being deflected right about 5 \emptyset . The landing gear were found extended. The landing gear selector handle was damaged during impact. The flap actuator measured 5.7 inches, which was consistent with a 10 \emptyset flap extension. The flap selector handle and indicator were damaged during impact. The stall warning horn and landing gear warning horn were extracted from the cockpit, and both horns produced an aural tone when electrical power was applied. Switch continuity for the wing-mounted lift sensor was confirmed with an ohmmeter. The left-side altimeter's Kollsman window was centered on 30.24 inches-of-mercury. The right-side altimeter's Kollsman window was centered on 30.09 inches-of-mercury.

Both engines remained attached to their respective wing nacelle structures. The first stage compressor impeller of each engine exhibited blade tip bends that

National Transportation Safety Board - Aircraft Accident/Incident Database

were opposite the direction of rotation and visible scoring as a result of the rotating compressor impeller contacting its respective shroud. The third axial turbine stage of each engine exhibited re-solidified metallic splatter on the stator vanes and turbine blades. The observed damage to the first compressor stage and third turbine stage was consistent with each engine operating at the time of impact. Both propeller assemblies remained attached to their respective engines. There were two approximately 12-inch deep holes observed aside and slightly behind the engines where the rotating propellers had dug into the soil during impact. Both propellers exhibited significant bending of their blades opposite the direction of rotation. Additionally, all propeller blades exhibited leading edge gouges, chordwise scratches, and burnishing of the cambered side.

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 Tarrant County Medical Examiner's Office, located in Fort Worth, Texas, performed an autopsy on the pilot. The cause of death was attributed to multiple blunt-force injuries sustained during the accident. The FAA's Bioaeronautical Sciences Research Laboratory located in Oklahoma City, Oklahoma, performed toxicology tests on samples obtained during the autopsy. The test results were negative for carbon monoxide, ethanol, and all tested drugs and medications.

The pilot had monocular vision following a childhood injury that resulted in very limited vision in his left eye. On June 18, 1991, after a review by an ophthalmologist and passing a medical flight test, the pilot was issued a Statement of Demonstrated Ability (SODA) that authorized a third-class medical certificate. On June 24, 1995, the pilot was issued an updated SODA after he passed another medical flight test and was authorized for a second-class medical certificate. The pilot continued to routinely receive second-class medical certificates with a limitation for corrective lenses.

TESTS AND RESEARCH

The airplane was equipped with a Honeywell KMH-820 Multi-Hazard Awareness System, serial number 1340. With the assistance of the manufacturer, the non-volatile memory was downloaded from the damaged device. The recovered data identified two alerts that had been issued during the accident flight. The first alert was issued when the airplane's flight path came near a tower during the final seconds of the flight. The airplane was located about 361 ft south of the accident site and about 700 ft west of the tower when the obstacle pull-up (OBPU) alert was issued. The airplane was at a GPS altitude of 1,030 ft (about 330 ft agl) and 46.7 knots groundspeed. The OBPU would have resulted in an audible alert "Obstacle, Obstacle, Pull-Up." The second alert was for an excessive sink rate; however, additional data was not recorded to non-volatile memory before there was a loss of electrical power to the device during impact.

The pilot's Apple iPhone, Apple iPad, and Appareo Stratus II were recovered at the accident site and sent to the National Transportation Safety Board (NTSB) Vehicle Recorders Laboratory to be examined. The content of the Apple iPhone and Apple iPad were examined using forensic software, and there was no data found that was associated with the accident flight. The Appareo Stratus II was an automatic dependent surveillance broadcast (ADS-B) device with GPS capability. The device had been configured to interface with the pilot's iPad ForeFlight application. An external examination of the device revealed minor impact damage; however, an internal examination revealed additional damage to the Wi-Fi module. The device was repaired and examined using laboratory hardware and software. The device contained flight parameter data for the accident flight.

The recovered Appareo Stratus II flight parameters and recorded ATC radar track data were used to develop an aircraft performance study. According to the study, at 2106:38, during the approach, the pilot made an engine power reduction that resulted in a 1,500 ft per minute descent and a 25 knot per minute airspeed deceleration. Between 2106:38 and 2109:00, the airplane's airspeed decreased from 162 to 75 knots calibrated airspeed (KCAS), and the angle of attack increased from 2.7° to 14°. At 2108:52, 5 seconds after the tower controller told the pilot to check his altitude, the pilot made an abrupt elevator-up input that increased the airspeed deceleration to 168 knots per minute. At 2109:00, the airplane entered an aerodynamic stall after it decelerated to 75 KCAS.

ADDITIONAL DATA/INFORMATION

According to first responders with the Argyle Fire Department, upon their arrival at the accident site, there was no evidence of ice or frost accumulation on the airplane's fuselage, wings, or tail. Additionally, the first responders reported that there was a substantial smell of Jet-A fuel at the accident site; however, there was no evidence of an explosion or postimpact fire. The pilot was seated in the left cockpit seat and was secured by a lap belt. The available shoulder harness did not appear to have been used.

According to the FAA Airplane Flying Handbook (FAA-H-8083-3B), "Night flying is very different from day flying and demands more attention of the pilot. The

most noticeable difference is the limited availability of outside visual references. Therefore, flight instruments should be used to a greater degree in controlling the airplane." The handbook further states, "Distance may be deceptive at night due to limited lighting conditions. A lack of intervening references on the ground and the inability to compare the size and location of different ground objects cause this. This also applies to the estimation of altitude and speed. Consequently, more dependence must be placed on flight instruments, particularly the altimeter and the airspeed indicator."

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17FA012	10/06/2016 1645 CDT	Regis# N4035G	Lino Lakes, MN	Apt: N/a
Acft Mk/Mdl FAIRCHILD HILLER FH 1100-NO SERIES	Acft SN 502	Acft Dmg: DESTROYED	Rpt Status: Factual	Prob Caus: Pending
Eng Mk/Mdl ALLISON C20B	Acft TT 502	Fatal 2 Ser Inj 0	Flt Conducted Under: FAR 091	
Opr Name: PILOT	Opr dba:		Aircraft Fire: GRD	
			AW Cert: STN	

Events

1. Enroute - Mast bumping

Narrative

HISTORY OF FLIGHT

On October 6, 2016, about 1645 central daylight time, a Fairchild Hiller FH-1100 helicopter, N4035G, was destroyed when it impacted the ground near Lino Lakes, Minnesota, following an in-flight separation of the main rotor assembly. The airline transport pilot and passenger sustained fatal injuries, and the helicopter was destroyed. The helicopter was registered to Helicopter Connection LLC, and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as personal flight. Day visual meteorological conditions prevailed, and no flight plan was filed for the local flight, which originated from the Anoka County-Blaine Airport (ANE), near Minneapolis, Minnesota, about 1620.

According to a pilot-rated passenger who had flown with the accident pilot in the helicopter earlier in the day, the accident pilot had not flown the helicopter for about a year and wanted the passenger to "ride along" as a safety pilot. Both the pilot and passenger performed a preflight inspection of the helicopter, which revealed no anomalies. About 1000, they departed on a 5-minute flight then returned and went to lunch. After lunch, they departed on a local flight, which lasted about 45 minutes. After the flight, the passenger asked the pilot if he wanted help moving the helicopter into the hangar, and the pilot indicated that he may fly the helicopter later.

Later that day, several witnesses saw the helicopter flying in a northerly direction. One witness stated that he observed the helicopter rocking back and forth before it "spun sideways" and "a bunch of parts" departed the helicopter. Some reported hearing a "clunk" sound, and others reported hearing a "pop" sound. One witness saw the main rotor blades "seize," then "snap off," followed by the tail rotor departing the helicopter. The witness stated that the helicopter then "dropped out of the sky." Several of the witnesses saw parts departing the helicopter as it descended to ground contact.

PERSONNEL INFORMATION

The 48-year-old pilot held an airline transport pilot certificate with an airplane multi-engine land rating. He held commercial pilot privileges in airplane single engine land, airplane single engine sea, and rotorcraft-helicopter. The pilot also held a flight instructor certificate with airplane single- and multi-engine and instrument airplane ratings. He held a flight engineer certificate with a turbojet rating. The pilot held a Federal Aviation Administration (FAA) special issuance first class medical certificate, dated August 16, 2016, with limitations for corrective lenses and not valid for any class after February 28, 2017. The pilot reported that he had accumulated 15,000 total hours of flight time and 400 hours of flight time during the six months before the medical exam. The last entry in the pilot's logbook was dated September 4, 2015, which was the date he passed his commercial rotorcraft-helicopter checkride. The pilot accumulated 55.5 hours of total flight experience in helicopters at the time of that entry, of which about 38 hours were in the accident helicopter make and model.

The pilot's helicopter flight instructor reported that, from April 15, 2015, to August 4, 2015, he provided instruction to the pilot in the accident helicopter to prepare him for his checkride to obtain a rotorcraft-helicopter rating. The flight instructor stated that the pilot had some trouble at first in the transition from fixed wing to helicopter and that this is fairly common for high-time fixed-wing pilots, such as the accident pilot. After some time, the accident pilot seemed to handle the transition as well as any other of his students that had previous fixed-wing time.

The instructor stated that he gave the pilot ground instruction on teetering rotor systems. When asked how the pilot responded during training situations that could precipitate mast bumping, the instructor stated that the pilot responded correctly to flight in turbulent conditions. He added that, during power loss simulations, the pilot initially was slow to lower the collective and would allow the nose to drop. Eventually, the pilot demonstrated proper entry into and proficiency in autorotations.

The pilot's helicopter flight instructor reported that all the instruction he provided to the pilot took place near Lake Charles, Louisiana, and, after passing his

rotorcraft-helicopter checkride, the pilot trailered the helicopter to the Minneapolis area. During the trip, one of the doors of the helicopter came open and cracked the windshield of the helicopter. According to the flight instructor, the pilot had just completed replacement of the windshield a short time before the accident.

AIRCRAFT INFORMATION

The accident helicopter was issued an FAA standard airworthiness certificate on October 20, 1982, and was certificated for normal category operations. The Allison (Rolls Royce) model M250-C20B engine powered a two-bladed, teetering main rotor system. The engine manufacturer indicated that the rated horsepower for the M250-C20B engine is 420 shaft horsepower. According to the helicopter's type certificate data sheet, the engine had a takeoff power rating of 274 shaft horsepower (hp) for a maximum of 5 minutes, and a maximum continuous power rating of 233 shaft hp. The helicopter had a maximum gross weight of 2,750 lbs and could be configured to accommodate a pilot, another pilot or passenger in the cockpit, and three passengers in the cabin. The helicopter's flight manual had limitations to prohibit acrobatic flight and to avoid abrupt control movements when flying in turbulence. The helicopter's most recent annual inspection was completed on June 18, 2015, at a total time in service of 501.7 hours.

In January 2004, the helicopter manufacturer issued Alert Service Letter 23 - 5. The letter indicated that several instances of internal and external mast corrosion had been discovered even when the mast was properly sealed. The corrective action was to remove the transmission top case, with the mast attached, and ship the assembly to the factory for non-destructive inspections. A special coating was to be applied on the interior surfaces. This process is only approved at the factory and cannot be performed in the field. Subsequent to the initial inspection, this process must be done at each overhaul of the transmission or every 10 years whichever comes first.

METEOROLOGICAL INFORMATION

At 1645, the recorded weather at ANE, about 4 miles southwest of the accident site, included wind from 010ø at 6 knots, visibility 10 statute miles, overcast clouds at 6,000 feet; temperature 15øC, dew point 6øC, and an altimeter of 29.95 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The main wreckage came to rest on its right side about 4 nautical miles and 52ø magnetic from ANE, on a heading about 20ø magnetic. The area around the main wreckage was discolored and charred, consistent with a postaccident ground fire. The remaining sections of wreckage did not exhibit any evidence of pre- or postimpact fire.

The initial piece of wreckage was a section of composite material located about 1,675 ft south of the main wreckage. A debris path extended to the main wreckage and contained the floor mats, a section of white interior material, an exhaust stack, exhaust duct, a section of the tailboom, the engine cowl, a section of exterior metal with the rotating beacon, a seat cushion, and a section of the tail, including the tail rotor and its gearbox. The separated main rotor blades and hub were found east of this debris path in a pond about 500 ft south of the main wreckage. All major components were accounted for at the scene.

The main wreckage, consisting of the cockpit and cabin, was destroyed by impact and postimpact fire. Cyclic, collective, and tail rotor control continuity could not be established due to substantial damage to the cockpit and cabin areas. However, all observed control discontinuities were consistent with overload or thermal damage.

The engine, transmission, and tail rotor driveshafts exhibited separations. All observed separations were consistent with torsional overload and overload. Circumferential witness marks were observed on the exterior of the tail rotor driveshaft.

The main transmission exhibited sections with thermal melting damage, soot-colored discoloration, and deformation. The separation surface at the top of the mast exhibited overload fractures. The mast could not be rotated by hand.

The main rotor blades and hub exhibited overload fractures on the separation surface. Examination of the main rotor system and components found outside the

main wreckage site did not exhibit soot colored discoloration or thermal damage.

Examination of the engine revealed that several compressor blades were missing. The remaining compressor blades were found bent opposite the direction of rotation.

A section of the transmission's main rotor mast and the section of mast from the main rotor hub were removed and were sent to the National Transportation Safety Board (NTSB) Materials Laboratory for detailed examination.

MEDICAL AND PATHOLOGICAL INFORMATION

An Anoka County Coroner arranged for the Midwest Medical Examiner's Office, Ramsey, Minnesota, to conduct an autopsy on the pilot. Toxicological samples were taken during the autopsy. The cause of death was listed as multiple blunt force injuries and the manner of death was indicated as an accident.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on the pilot. Testing was negative for carbon monoxide, ethanol, and all tested-for drugs.

TESTS AND RESEARCH

The retained sections of rotor mast were examined by the NTSB Materials Laboratory. The mast showed deformation and fractures on slant angles consistent with an overstress fracture under bending and torsion loads. Deformation to the mast associated with impact marks adjacent to the fracture were consistent with mast bumping. No evidence of preexisting cracks or corrosion was observed.

ADDITIONAL INFORMATION

The NTSB database was queried for previous mast bumping accidents with Fairchild-Hiller FH 1100 helicopters. The FTW68A0085, NYC83FA102, LAX83FA362, IAD98FA049, and DFW07FA198 investigations listed occurrences of mast bumping findings and their reports are appended to the docket material associated with this investigation.

The NTSB database also contained the CHI00FA266 investigation. Internal corrosion was observed within the main rotor mast on that helicopter. This previous investigation report is also appended to the docket material associated with this investigation.

The FAA Helicopter Flying Handbook (FAA-H-8083-21A), in part, stated:

Low-G Conditions and Mast Bumping

Low acceleration of gravity (low-G or weightless) maneuvers create specific hazards for helicopters, especially those with semirigid main rotor systems because helicopters are primarily designed to be suspended from the main rotor in normal flight with only small variations for positive G load maneuvers. Since a helicopter low-G maneuver departs from normal flight conditions, it may allow the airframe to exceed the manufacturer's design criteria. A low-G condition could have disastrous results, the best way to prevent it from happening is to avoid the conditions in which it might occur.

Low-G conditions are not about the loss of thrust, rather the imbalance of forces. Helicopters are mostly designed to have weight (gravity pulling down to the earth) and lift opposing that force of gravity. Low-G maneuvers occur when this balance is disturbed. An example of this would be placing the helicopter into a very steep dive. At the moment of pushover, the lift and thrust of the rotor is forward, whereas gravity is now vertical or straight down. Since the lift vector is no longer vertical and opposing the gravity (or weight) vector, the fuselage is now affected by the tail rotor thrust below the plane of the main rotor. This tail rotor thrust moment tends to make the helicopter fuselage tilt to the left. Pilots then apply right cyclic inputs to try to correct for the left. Since the main rotor system does not fully support the fuselage at this point, the fuselage continues to roll and the pilot applies more right cyclic until the rotor system strikes the mast (mast bumping), often ending with unnecessary fatal results. In mast bumping, the rotor blade exceeds its flapping limits, causing the main rotor hub to "bump" into the rotor shaft. The main rotor hub's contact with the mast usually becomes more violent with each successive flapping motion. This creates a greater flapping

displacement and leads to structural failure of the rotor shaft. Since the mast is hollow, the structural failure manifests itself either as shaft failure with complete separation of the main rotor system from the helicopter or a severely damaged rotor mast.

In situations like the one described above, the helicopter pilot should first apply aft cyclic to bring the vectors into balance, with lift up and gravity down. Since helicopter blades carry the helicopter and have limited motion attachment, care must be given to those attachment limits. Helicopter pilots should always adhere to the maneuvering limitations stated in the [rotorcraft flight manual]. There may be more than one reason or design criteria which limits the helicopter's flight envelope. Heed all of the manufacturer's limitations and advisory data. Failure to do so could lead to dire, unintended consequences.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17FA168 04/28/2017 2348 CDT Regis# N933DC Amarillo, TX Apt: Rick Husband Amarillo Intl AMA
Acft Mk/Mdl PILATUS AIRCRAFT LTD PC 12 Acft SN 105 Acft Dmg: DESTROYED Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl P&W CANADA PT6A-67B Fatal 3 Ser Inj 0 Flt Conducted Under: FAR 135
Opr Name: RICO AVIATION LLC Opr dba: Aircraft Fire: GRD
AW Cert: STN

Events

1. Initial climb - Loss of control in flight

Narrative

On April 28, 2017, about 2348 central daylight time, a Pilatus PC-12 airplane, N933DC, impacted terrain near Rick Husband Amarillo International Airport (AMA), Amarillo, Texas. The airline transport pilot and two flight crew were fatally injured. The airplane was destroyed. The airplane was registered to and operated by Rico Aviation LLC, under the provisions of 14 Code of Federal Regulations Part 135 as an air ambulance flight. Instrument meteorological conditions prevailed at the time of the accident and the flight was operated on an instrument flight rules (IFR) flight plan. The flight was originating at the time of the accident and was en route to Clovis Municipal Airport (CVN), Clovis, New Mexico.

At 2248, the flight request was received from a medical center in Clovis to retrieve and transfer a patient to Lubbock, Texas. The flight was accepted by the Rico Aviation crew at 2334.

A review of preliminary Federal Aviation Administration (FAA) air traffic control information revealed that about 2332 the pilot received an IFR clearance and about 2344 he taxied to runway 4 at intersection A. About 2345 the airport tower controller cleared the airplane for takeoff on course, which was a right turn. About 2346 the same controller instructed the pilot to reset his transponder and then transferred communications to the departure controller. About 2347 the pilot reported at 6,000 ft msl and the departure controller radar identified the airplane. About 2348 the controller advised the pilot that he was no longer receiving the transponder, but the pilot did not respond. The controller made 3 more transmissions to the pilot without response. The airport tower controller observed a fireball and reported a crash.

Surveillance video from a nearby business recorded the accident airplane in a steep descent at a high rate of speed followed by an explosion.

The airplane impacted a pasture (figure 1) adjacent to several stationary train cars about 1 nautical mile south of AMA and a post impact fire ensued. The wreckage debris path was generally oriented southwest. All major structural components of the airplane were located within the wreckage.

The pilot, age 57, held an airline transport pilot certificate with a rating for airplane multi-engine land; a commercial pilot certificate with ratings for airplane single engine land, airplane single engine sea, airplane multi-engine sea, rotorcraft-gyroplane; a flight engineer certificate for turbojet powered aircraft; a flight instructor certificate for airplane single engine and multi-engine, instrument airplane, and rotorcraft-gyroplane; an advanced and instrument ground instructor certificate; a powerplant mechanic certificate; and a repairman experimental aircraft builder certificate.

On the medical certificate application, dated January 19, 2017, the pilot reported that his total flight experience included 5,800 hours and 80 hours in last six months. This pilot was issued a second-class medical certificate with the limitation "must have available glasses for near vision."

According to FAA and maintenance records, the airplane was manufactured in 1994. Its most recent annual and 100-hour inspections were completed March 2, 2017, at 4,407.5 hours total time.

At 2353, the AMA automated weather observation recorded wind from 360° at 21 knots gusting to 28 knots, 10 statute miles visibility, broken clouds at 700 ft above ground level (agl), overcast cloud layer at 1,200 ft agl, temperature 45° F, dew point 45° F, altimeter setting 29.78 inches of mercury. Remarks: peak wind from 360° at 32 knots at 2346, lightning distant west, rain began at 2314 and ended at 2325, variable ceiling from 500 to 900 ft agl.

A preliminary review of the weather data revealed wind shear beginning about 6000 ft msl along with a temperature inversion at the same altitude.

The wreckage has been retained by the NTSB for further examination.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR16FA120	06/06/2016 745 PDT	Regis# N4191X	De Smet, ID	Apt: N/a
Acft Mk/Mdl ROCKWELL S2R		Acft SN 1956R	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl ALLIED SIGNAL TPE331-6-252M		Acft TT 10109	Fatal 1 Ser Inj 0	Flt Conducted Under: FAR 137
Opr Name: GREGORY R FAUNCE		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPR

Events

1. Maneuvering-low-alt flying - Low altitude operation/event

Narrative

HISTORY OF FLIGHT

On June 6, 2016, about 0745 Pacific daylight time, a Rockwell International S-2R restricted-category agricultural airplane, N4191X was substantially damaged during a collision with guy wires, powerlines, and trees while engaged in an aerial application flight about 3 nautical miles (nm) west of De Smet, Idaho. The airplane was owned and operated by Faunce Ag Aviation Inc., Tekoa, Washington. The commercial pilot, who was the sole occupant, sustained fatal injuries. Visual meteorological conditions prevailed for the flight, which was being operated in accordance with 14 Code of Federal Regulations Part 137, and a flight plan was not filed. The flight departed a private airstrip near Tekoa at about 0700.

According to a witness whose residence was located about 700 ft. east of the accident site, she was watching the pilot spray the field that was located immediately north of and across the road from her house. The pilot was making spray passes in the west and east direction, parallel to a powerline that bordered the south side of the field. The witness stated that she saw the airplane flying south along the west side of the field; the airplane turned left until it was heading east and began a spray pass on the south edge of the field, next to the powerline. The witness reported that, shortly thereafter, she observed downed powerline wires, followed by the sound of the airplane's impact with terrain. The witness stated that she did not see the airplane collide with the wires.

In a telephone interview with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the owner of the property being sprayed stated that the pilot had been applying a fungicide to the wheat field when the accident occurred. The property owner stated that the pilot had sprayed this field for the past 25 years, that he thought the pilot was very familiar with the environment, and that the pilot had never had any issues while spraying the field in the past.

In an interview with a Federal Aviation Administration (FAA) aviation safety inspector, a family member of the pilot who was familiar with the operation reported that the accident occurred on the pilot's fourth load of the morning. The amount of chemical the pilot departed with was not determined during the investigation.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with an airplane single-engine land rating and a second-class airman medical certificate issued on January 12, 2016, with the following limitations: "Not valid for night flying or by color signal control. Not valid for any class after January 31, 2017."

According to operator-supplied records and the pilot's airman medical application, at the time of the accident, the pilot had accumulated 10,109 hours flight time of which, 7,124 hours were in the accident airplane make and model. The pilot's personal flight logbook was not provided to the IIC during the investigation.

AIRCRAFT INFORMATION

The single-seat, low-wing, fixed-gear, tailwheel-equipped airplane, serial number 1956R, was manufactured in 1974. It was powered by a Garrett TPE331-6-252M engine, serial number P-03069C, rated at 715 horsepower. The most recent annual inspection was performed on November 6, 2015, at a total airframe time of 9,944 hours and an engine total time of 9,888.7 hours. At the time of the accident, the airplane had accumulated a total of 167.1 flight hours since its last inspection.

METEOROLOGICAL INFORMATION

At 0753, the weather reporting facility at the Pullman/Moscow Regional Airport (PUW), Pullman, Washington, located about 24 nm south of the accident site, reported wind calm, visibility 10 miles, sky clear, temperature 23ø C, dew point 13ø C, and an altimeter setting of 29.92 inches of mercury.

At the time of the accident, the sun was about 13.8° above the horizon. Additionally, the sun's lateral position was about 20° to the left of the heading of the airplane's eastbound spray run over the field.

WRECKAGE AND IMPACT INFORMATION

On the day following the accident, the NTSB IIC and the FAA inspector surveyed the accident site. Physical evidence showed that the airplane initially impacted a set of guy wires about 660 ft. west of where the airplane entered the field on its spray run: the guy wires were directly in line with and perpendicular to the airplane's flight path. The guy wires were secured to the top of one of the utility poles that supported the powerline bordering the south side of the field. The guy wires descended to the ground on about a 45° angle and were anchored in the field about 65 ft. north of the utility pole. After impacting the guy wires, the airplane collided with and went through the powerline wires, crossed a county road, and impacted a stand of fir trees. The airplane came to rest within the stand of trees about 490 ft. southeast of the initial impact point with the guy wires. An outboard section of the airplane's right wing, about 30 inches in length, was located about 160 ft. east-southeast of the first point of impact with the guy wires. Additionally, yellow and black paint chips, which were consistent with the wing's paint scheme, were located about 100 ft. southeast of the guy wires.

The airplane was severely fragmented and deformed by impact forces. With the exception of about 7 ft. of the inboard section of the forward spar, the right wing was observed separated from the fuselage and destroyed. Additionally, the left wing was observed completely separated from the fuselage and destroyed by impact forces as was the aft fuselage from the cockpit to the forward section of the empennage. The entire empennage separated due to impact forces and was located about 20 ft. south of the main wreckage. The engine remained attached to the fuselage at its mounts. The cockpit was crushed and deformed. With the exception of the outboard section of the right wing, the entire wreckage was located within about a 50-ft radius of the main wreckage site.

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

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot at the Office of the Medical Examiner, Spokane, Washington. The cause of death was attributed to blunt force trauma.

The FAA's Bioaeronautical Research Laboratory conducted toxicological testing on the pilot. The results were negative for carbon monoxide and ethanol; ibuprofen was detected in cavity blood. Testing for cyanide was not performed.

Ibuprofen is a medication in the nonsteroid anti-inflammatory drug class that is commonly used for treating pain, fever, and inflammation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# DCA17FA109	05/05/2017 0	Regis# N334AC	Charleston, WV		
Acft Mk/Mdl SHORT BROS. & HARLAND SD3		Acft SN SH3029	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim	Prob Caus: Pending
Eng Mk/Mdl P&W PT6A SER			Fatal 2	Ser Inj 0	Flt Conducted Under: FAR 135
Opr Name: AIR CARGO CARRIERS		Opr dba:		Aircraft Fire: NONE	
				AW Cert: STN	

Events

1. Landing-flare/touchdown - Loss of control in flight
-

Narrative

On May 5, 2017 at 6:51 a.m. eastern daylight time (EDT), Air Cargo Carriers flight 1260, a Shorts SD3-30, N334AC, crashed during landing on runway 5 at the Charleston Yeager International Airport (CRW), Charleston, West Virginia. The airplane was destroyed and the two pilots suffered fatal injuries. The flight was operating under the provisions of 14 CFR Part 135 as a cargo flight from Louisville International Airport (SDF), Louisville, Kentucky. Instrument meteorological conditions prevailed at the time of the accident.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA16CA527	06/20/2016 1758 EDT	Regis# N127WD	Farmingdale, NY	Apt: Republic FRG
Acft Mk/Mdl SWEARINGEN SA226-T(B)		Acft SN T-297	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl GARRETT TPE33110U501G		Acft TT 4500	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: PONDEROSA AIR LLC		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Events

1. Landing-flare/touchdown - Abnormal runway contact
-

Narrative

According to the pilot in command (PIC), he was conducting an instructional flight for his "new SIC (second in command)," and seated in the left seat. He reported that they had flown two previous legs in the retractable landing gear-equipped airplane. During the approach, he recalled that they discussed the events of their previous flights and had complied with the airport control tower's request to "keep our speed up". During the approach, he called for full flaps and retarded the throttle to flight idle. The PIC asserted that there was no indication that the landing gear was not extended, as he did not hear a landing gear warning horn; however, he was wearing a noise cancelling headset. He added that the landing gear position lights were not visible because the knee of SIC obstructed his view of the lights. He recalled that following the flare he heard the airplane propellers hit the runway, and he made the decision not to go-around because of the unknown damage sustained to the propellers. The airplane touched down, and slid to a stop on the runway. The airplane sustained substantial damage to the fuselage bulkheads, longerons and stringers.

The SIC reported that the flight was a training flight in VFR conditions. He noted that the airspace was busy, and during the approach he applied full flaps, but they failed to extend the landing gear. He added that he did not hear the landing gear warning horn; however, he was wearing a noise cancelling headset.

The Federal Aviation Administration, Aviation Safety Inspector that examined the wreckage reported that during recovery the pilot extended the nose landing gear via the normal extension process. However, due to significant damage to the main gear doors, the main landing gear was unable to be extended hydraulically or manually. He added that an operational check of the landing gear warning horn, was not accomplished because the wreckage was unsafe to enter after it was removed from the runway.

Both pilots were wearing noise canceling headsets, and the landing gear warning horn is presented by an aural tone in the cockpit, and is not configured to be heard through the crew's headsets.

When asked, the PIC and the SIC both stated that they could not remember who read the airplane flight manual (AFM) before landing checklist.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA176	05/05/2017 1500 CDT	Regis# N3045R	Gypsum, KS	Apt: N/a
Acft Mk/Mdl THRUSH AIRCRAFT INC		Acft SN H80-140	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl GE AV H80-100			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 137
Opr Name: CENTRAL AG AIR LLC		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPR

Events

1. Maneuvering-low-alt flying - Loss of engine power (total)
-

Narrative

On May 5, 2017, about 1500 central daylight time, a Thrush Aircraft Inc. S2R-H80 airplane, N3045R, impacted terrain during a forced landing near Gypsum, Kansas, following a loss of engine power. The commercial pilot was uninjured. The airplane sustained substantial fuselage damage during the forced landing. The airplane was registered to and operated by Central Ag Air LLC as a 14 Code of Federal Regulations 137 aerial application flight. Day visual meteorological conditions prevailed in the area about the time of the accident, and the flight was not operated on a flight plan. The local flight originated from a private airstrip at time unknown.

According to preliminary information, the pilot reported that the engine did not produce full power when the throttle was applied during an aerial application maneuver. The airplane was unable to maintain altitude and the pilot subsequently performed a forced landing where the airplane sustained the substantial damage.