

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR15LA265 09/21/2015 1620 Regis# N222JS Boise, ID Apt: Boise Air Terminal/gowen Field BOI
Acft Mk/Mdl AERO COMMANDER 680 E Acft SN 680E-721-28 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING GSO-480-B1A6 Acft TT 7500 Fatal 0 Ser Inj 1 Flt Conducted Under: FAR 091
Opr Name: METZGER JAMES Opr dba: Aircraft Fire: NONE

Summary

The commercial pilot was conducting a personal flight. He reported that he did not recall what happened the day of the accident. One witness, who was former pilot, reported that he saw the airplane fly over his house and that the engines sounded as if they were "out of sync." A second witness, who lived about 5 miles away from the airport, reported that she saw the airplane flying unusually low. She added that the engines sounded terrible and that they were "popping and banging." A third witness, who was holding short of the runway waiting to take off, reported that he saw the airplane approaching the runway about 75 ft above ground level (agl). He then saw the airplane descend to about 50 ft agl and then climb back to about 75 ft agl, at which point the airplane made a hard, right turn and then impacted terrain.

Although a postaccident examination of both engines revealed no evidence of a mechanical failure or malfunction that would have precluded normal operation, the witnesses' described what appeared to be an engine problem. It is likely that one or both of the engines was experiencing some kind of problem and that the pilot subsequently lost airplane control. The pilot reported in a written statement several months after the accident that, when he moved the left rudder pedal back and forth multiple times after the accident, neither the torque tubes nor the rudder would move, that he found several of the rivets sheared from the left pedal, and that he believed the rudder had failed. However, postaccident examination of the fractured rivets showed that they exhibited deformation patterns consistent with overstress shearing that occurred during the accident sequence. No preimpact anomalies with the rudder were found.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain airplane control following an engine problem for reasons that could not be determined because postaccident examination of both engines and the rudder revealed no malfunctions or anomalies that would have precluded normal operation.

Events

1. Landing - Loss of control in flight
2. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-(general)-Not attained/maintained - C
3. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot

Narrative

This report was modified on August 24, 2017. Please see the docket for this accident to view the original report.

HISTORY OF FLIGHT

On September 21, 2015 about 1620 mountain daylight time, an Aero Commander 680-E, N222JS, impacted terrain while attempting to land at the Boise Air Terminal/Gowen Field (BOI), Boise, Idaho. The commercial pilot, sole occupant, sustained serious injuries and the airplane sustained substantial damage. The airplane was registered to, and operated by, the pilot as a 14 Code of Federal Regulations Part 91 personal flight. Visual meteorological conditions prevailed, and no flight plan was filed. The flight originated from Weiser Municipal Airport (S87), Weiser, Idaho at an unknown time.

The pilot initially reported that he did not recall what happened the day of the accident. However, in a written statement provided several months after the accident, he reported that, after the accident, while disassembling the airplane, he moved the left rudder pedal back and forth multiple times, neither the torque tubes nor the rudder would move and that he believed the rudder had failed. Several of the rivets were sheared from the left pedal. Postaccident examination of the fractured rivets showed that they exhibited deformation patterns consistent with overstress shearing.

One witness reported he observed the airplane fly over his house, he mentioned that the engines sounded as if they were out of sync. A second witness who lives about 5 miles away from the airport reported she observed the airplane flying abnormally low; the engines sounded terrible, they were popping and banging. A third witness, who was holding short of the runway waiting to takeoff, reported that they observed the airplane approaching the runway about 75 feet above the ground. They saw the airplane descend to about 50 feet, then climb back up to about 75 when the airplane suddenly made a hard right turn and impacted terrain.

National Transportation Safety Board - Aircraft Accident/Incident Database

PERSONNEL INFORMATION

The pilot, age 63, held a commercial pilot certificate for airplane single- and multi-engine land, and single-engine sea, as well as an airframe and powerplant mechanic certificate issued on August 8, 2012. The pilot held a second-class medical certificate issued April 13, 2015, with the limitation that he must wear corrective lenses and possess glasses for near/intermediate vision. The pilot estimated that he had 18,000 total hours, 2,500 of which were in the airplane make and model.

AIRCRAFT INFORMATION

The seven seat, high wing, retractable-gear airplane, serial number 680E-721-28, was manufactured in 1959. It was powered by two Lycoming GSO-480-B1A6 engines, and equipped with Hartzell Propeller controllable pitch propellers. Review of copies of maintenance logbook records showed an annual inspection was completed on October 10, 2014 at a recorded tachometer reading of 784 hours, with 487 hours since left engine major overhaul, and 412 hours since right engine major overhaul.

WRECKAGE AND IMPACT INFORMATION

An onscene examination of the airplane was conducted by a Federal Aviation Administration Inspector.

The first identified point of impact was in the gravel just south of taxiway "A"; gravel and scratch marks were spread across the taxiway, and slice marks were noted in the gravel just north of the taxiway. In addition, there were other disruptions in the gravel along with small fragments of the wing tips and other airframe pieces. The airplane came to rest on top of, and slightly on the other side of, a fence on the north side of the airport and taxiway "A".

The airframe was heavily damaged. The inspector observed no fuel in the left and right wing fuel tanks; and due to the position of the airplane, he was unable to observe the fuel within the main fuel tank. The fuel selector for both engines were selected to the center tank. The right engine propellers were still secured to their hub, and the engine sustained minimal damage. The left engine propeller hub had separated from the engine; all three blades sustained mostly forward bending.

During the recovery process, the recovery crew removed about 11-12 gallons of fuel from the center fuel tank.

TESTS AND RESEARCH

A postaccident examination of the airplane's engines was completed by representatives from the Federal Aviation Administration and Lycoming engines. There were no indications of preimpact anomalies with either engine.

The left engine was still secured to the airframe, however, the propeller gearbox and assembly was found separated. All propeller blades were bent forward, and exhibited leading edge damage. The top spark plus were removed and displayed "worn out-normal" signatures when compared to the Champion Aviation Check a Plug Chart AV-27. The engine was rotated by hand; thumb compression was obtained on all cylinders and engine drive train continuity was established throughout.

The right engine was still secured to the fuselage. The propeller hub and blades remained attached, and the blades were found mostly straight. One blade exhibited chordwise scratches, and a second blade had leading edge scratches, both of which were on the outboard about 10 inches of the blade. The third blade exhibited minor leading edge damage. The top spark plugs were removed and displayed "worn out-normal" signatures when compared to the Champion Aviation Check a Plug Chart AV-27. The engine was rotated by hand; thumb compression was obtained on all cylinders and engine drive train continuity was established.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA110 02/18/2017 1657 CST Regis# N6807V Clever, MO Apt: N/a
Acft Mk/Mdl AEROSTAR ACFT CORP OF TEXAS Acft SN 21-0003 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO-360-A1A Acft TT 3777 Fatal 0 Ser Inj 2 Flt Conducted Under: FAR 091
Opr Name: BARNETT RUSSELL L Opr dba: Aircraft Fire: NONE

Summary

The flight instructor reported that, after takeoff on the instructional flight, the engine was running smoothly before it "missed" or "hesitated." The flight instructor initiated a return to the airport; shortly thereafter, the engine began to make loud noises and vibrate, ultimately experiencing a total loss of power. The flight instructor performed a forced landing to a field, resulting in substantial damage.

Examination of the engine revealed that the No. 2 connecting rod had failed. Remnants of the connecting rod bearing found within the oil pan exhibited evidence of bearing failure and extrusion. Due to the extensive secondary engine damage, the reason for the failure of the No. 2 bearing could not be determined. The engine was overhauled 11 years 6 months before the accident, and had accumulated about 16 hours of flight time in the preceding 3 years. Guidance published by the engine manufacturer stated that abnormal wear could occur during engine start due to a loss of protective oil film after an extended period of inactivity and recommended that all engines not in continuous service be overhauled every 12 years.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The failure of the engine No. 2 connecting rod bearing for reasons that could not be determined due to the extensive secondary engine damage.

Events

1. Enroute-cruise - Loss of engine power (total)

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Engine (reciprocating)-Recip engine power section-Failure - C
2. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

On February 18, 2017, about 1657 central standard time, an Aerostar model M20E airplane, N6807V, sustained substantial damage during a forced landing following a complete loss of engine power during cruise flight near Clever, Missouri. The pilot and flight instructor received serious injuries. The airplane's fuselage and both wings were damaged. The aircraft was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as an instructional flight. Visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The local flight originated from the Gimlin Airport (18MO), Ozark, Missouri, about 1650.

The flight instructor reported that he and the pilot departed on an instructional flight to practice instrument approaches. He reported that a complete runup was performed and the flight departed without incident. He reported that the engine was running smooth when it "missed or hesitated." Less than 20 seconds later the engine again missed and they started heading back to 18MO. Before the 180-degree turn was completed, the engine started making loud noises and vibrating. The pilot transferred control of the airplane to the flight instructor. The vibration increased and oil covered the windshield. Ultimately the engine stopped and a forced landing was made to a field. The airplane struck a ditch that was not visible due to the oil covered windshield.

A report of the accident was not received from the pilot.

Examination of the airframe and engine was conducted after its recovery from the accident site. The aft fuselage of the airplane had been cut to facilitate removal from the accident site. The engine was separated from the airframe and was resting on the ground when the examination began. The wings and aft fuselage had impact damage but remained predominately intact. All control surfaces remained attached in their proper locations and no evidence of control system anomalies were found. The electronic engine tachometer reading was 3776.64 hours.

There were cracks in the engine case. The magnetos were removed and they both produced spark when rotated by hand. The engine was completely disassembled and oil was present in the engine. The accessory gears were intact and no anomalies were noted with respect to the accessory section of the engine. The crankshaft and camshaft were intact. During disassembly, it was discovered that the No. 2 connecting rod had failed at the crankshaft end. The connecting rod remained attached to the piston. The piston with the attached portion of the connecting rod could not be removed from the cylinder due to subsequent damage to the cylinder skirt. Remnants of the broken pieces of connecting rod were found in the engine oil pan. Remnants of the No. 2 rod bearing were also found in the oil pan. The portions of rod bearing material found within the oil pan were consistent with bearing failure and extrusion. The No.2 rod bearing journal on the crankshaft had rotational scoring. The other crankshaft bearings exhibited varying wear signatures. The forward and rear main crankshaft

bearings had anomalous appearance, while the center main bearing exhibited wear through of the outer layer exposing the copper backing. The No.1 rod bearing exhibited crushing damage and the rod cap was gouged and deformed consistent with impact damage. The bearing outer layer was not worn through. As mentioned previously, remnants of the No. 2 bearing showed evidence of extrusion and failure. The No. 3 rod bearing had its outer layer of material worn through exposing the copper layer underneath. The No. 4 rod bearing had some wear through of the outer layer but had an overall normal appearance. There was one broken valve lifter body for the No. 2 cylinder, but there were impact marks inside the engine case adjacent to the location of the broken lifter. No additional anomalies were observed. Due to the extensive internal engine damage, no evidence of what may have precipitated the failure of the No. 2 bearing could be found.

Review of the airplane maintenance records showed that the engine, a Lycoming IO-360-A1A, serial number L-7199-51A, had last been overhauled on August 20, 2005, and was installed on the airplane at 3344.1 hours recording tachometer time. Based on the logbook entry and the recording tachometer reading at the time of the examination, the engine had accumulated 432.54 hours, in the 11 years and 6 months since the overhaul. According to the aircraft maintenance records, the engine had accumulated the following hours between the annual inspection dates noted:

June 1, 2012 to July 8, 2013 - 45.12 hours

July 8, 2013 to August 18, 2014 - 2.4 hours

August 18, 2014 to August 20, 2015 - 4.28 hours

August 20, 2015 to October 8, 2016 - 9.3 hours

Lycoming Service Instruction No. 1009AZ, detailed the engine manufacturer's recommendation regarding time between overhaul (TBO). The recommended TBO for the accident engine was specified as 2,000 hours. The document stated that the recommendation applied to engines in "continuous service", which meant that the engine would not be out of service for more than 30 consecutive days. The Service Instruction further stated:

"Engine deterioration in the form of corrosion (rust) and the drying out and hardening of composition materials such as gaskets, seals, flexible hoses and fuel pump diaphragms can occur if an engine is out of service for an extended period of time. Due to the loss of a protective oil film after an extended period of inactivity, abnormal wear on soft metal bearing surfaces can occur during engine start. Therefore, all engines that do not accumulate the hourly period of TBO specified in this publication are recommended to be overhauled in the twelfth year."

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA330	08/24/2017 1000 CDT	Regis# N4532F	Pearsall, TX	Apt: N/a
Acft Mk/Mdl AIR TRACTOR INC AT 401-UNDESIGNAT	Acft SN 401-0769	Acft Dmg: SUBSTANTIAL	Fatal 0	Rpt Status: Prelim Prob Caus: Pending
		Ser Inj 0	Fit Conducted Under: FAR 137	
Opr Name: FITCH'S FLYING SERVICE	Opr dba:		Aircraft Fire: NONE	
			AW Cert: SPR	

Events

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

On August 24, 2017, about 1000 central daylight time, an Air Tractor AT-401, N4532F, sustained substantial damage during a forced landing near Pearsall, Texas. The commercial pilot was not injured. The airplane was registered to and operated by Fitch's Flying Service under the provisions of 14 Code of Federal Regulations Part 137 without a flight plan. Day visual meteorological conditions prevailed for the local aerial-application flight that departed at 0900 from McKinley Field Airport (T30), Pearsall, Texas.

The pilot reported that the airplane experienced a partial loss of engine power during a low-altitude spray run over a peanut field. He noted that the engine was surging and that he was unable to regain normal engine operation. He climbed to 100 feet above ground level, jettisoned the airplane's chemical load, but the engine operation did not improve. The pilot reported that he subsequently made a forced landing to a nearby field, during which the airplane nosed over after it encountered tall vegetation.

A postaccident examination of the engine revealed a fracture of the No. 9 cylinder head. The cylinder was removed and retained for an additional examination.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA512	08/27/2017 1700	Regis# N335SB	Cody, WY	Apt: Yellowstone Rgnl COD
Acft Mk/Mdl AVIAT AIRCRAFT INC A 1-B		Acft SN 2090	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR PUBU
Opr Name: PARK COUNTY SHERIFFS OFFICE		Opr dba:		Aircraft Fire: NONE

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA328	08/17/2017 927 CDT	Regis# N48TZ	Gonzales, LA	Apt: Louisiana Rgnl REG
Acft Mk/Mdl BEECH A36		Acft SN E-1804	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL IO-520			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: GULF CENTRAL AVIATION LLC		Opr dba:		Aircraft Fire: NONE

Events

1. Initial climb - Loss of engine power (total)
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Narrative

On August 17, 2017, about 0927 central daylight time, a Beech A36 airplane, N48TZ, was substantially damaged during a forced landing after departing from Louisiana Regional Airport (REG), Gonzales, Louisiana. The private pilot and flight instructor were not injured. The airplane was registered to and operated by Gulf Central Aviation LLC under the provisions of 14 Code of Federal Regulations Part 91 as an instructional flight. Day visual meteorological conditions prevailed for the local flight, which departed about 0926.

According to the pilot, the departure occurred on Runway 17, following a normal engine run up and takeoff roll. After climbing to about 150 ft agl, the pilot noticed the airplane was no longer climbing and lowered the nose. Based on his perceptions of a partial engine power loss, the pilot checked the throttle and mixture lever positions, which were both full forward. After maneuvering to avoid trees, the pilot initiated a forced landing into a hay field. During the landing roll, the airplane impacted a small ridge and nosed over, which damaged the engine firewall.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17FA331	08/28/2017 849 EDT	Regis# N87RY	Ellabell, GA	Apt: N/a
Acft Mk/Mdl BEECH A36-UNDESIGNAT		Acft SN E-2917	Acft Dmg: DESTROYED	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL MOTORS IO-550-B			Fatal 3 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: HUNTER RANDY D		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Events

1. Enroute-climb to cruise - Loss of engine power (total)

Narrative

On August 28, 2017, about 849 eastern daylight time, a Beechcraft model A36 airplane, N87RY, was destroyed when it collided with trees and terrain following a complete loss of engine power near Ellabell, Georgia. The pilot and two passengers were fatally injured. The airplane sustained damage to all major components during the accident sequence. The aircraft was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a business flight. Visual meteorological conditions prevailed for the flight, which operated on an instrument flight rules flight plan. The flight originated from the Savannah/Hilton Head International Airport (SAV), near Savannah, Georgia, at an undetermined time, and was destined for the Cobb County International Airport-McCollum Field (RYY), near Atlanta, Georgia.

The airplane impacted trees and terrain near Ellabell, GA. The airplane was found in a wooded swamp area at coordinates 32.23946, -81.43914, at a GPS elevation of 59 feet. The airplane was upright and facing 323 degrees. There was an impact crater centered about 10 feet directly in front of the nose of the airplane. Beyond the impact crater were trees with broken limbs and trunks that indicated a descent angle of about 45 degrees. The engine was partially separated from the fuselage. The fuselage was buckled in the cabin section with the aft section bent upward. The tail surfaces remained attached to the aft fuselage. The elevator was still attached to the horizontal stabilizer, and the rudder was still attached to the vertical stabilizer. The windshield and window posts had been cut by first responders to facilitate extrication of the occupants. The forward fuselage was crushed rearward. Both wings exhibited rearward crushing with the right wing crushing being more pronounced than the left. The crush angles indicated a ground impact that was about 25 degrees from vertical. Both wings remained attached to the fuselage and the flaps and ailerons remained attached to the wings. The location of the airplane and the terrain precluded a comprehensive on-scene examination. The airplane was recovered from the accident site and transported to a facility for a more comprehensive examination. Subsequent examination of the airframe revealed:

- The aft fuselage had been cut off to facilitate removal from the scene
- The left horizontal stabilizer and elevator had been cut to facilitate removal from the scene
- The right wing tip had been cut to facilitate removal from the scene.
- The engine had been removed to facilitate removal from the scene.
- Aileron control system continuity was verified from the cabin to the control surfaces.
- Elevator control system continuity was verified from the cabin to the elevator with the exception of the cuts made to the cable in order to extract the airplane.
- Rudder control system continuity was verified from the cabin to the rudder with the exception of the cuts made to the cable in order to extract the airplane.
- The flaps were found in the up position (0 degrees)
- The landing gear was retracted.

No pre-impact defects were noted with respect to the airframe.

Examination of the engine revealed a hole in the top right rear of the engine case that was about 2 inches in diameter. The crankshaft was visible through the hole and there was no connecting rod attached to the visible rod journal. The engine was retained for a future teardown examination.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR16LA105	05/10/2016 1215 PDT	Regis# N2052L	Groveland, CA	Apt: Pine Mountain Lake E45
Acft Mk/Mdl BEECH B24R		Acft SN MC-437	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO360 SER		Acft TT 1461	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: ROBERT BLOOME		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The passenger, who was a student pilot, recently purchased the airplane in an estate sale. He and the airline transport pilot, both of whom lived in Mississippi, had traveled to California to retrieve the airplane and fly it back to Mississippi. Before the purchase, the airplane had not been maintained, operated, or flown in almost 11 years. Following the purchase, the owner contracted with a mechanic in California to ensure the airplane was in airworthy condition, which the mechanic reportedly did. The day before the accident, the pilot and owner took the airplane for its first flight after its dormant period and flew one uneventful circuit in the airport traffic pattern, as planned. The following day, the pilot and owner planned to fly the airplane for some systems evaluations. During that takeoff attempt from runway 9, the airplane became airborne but failed to climb and struck trees and terrain beyond the runway end. Although the pilot believed that he was taking off into the wind, witness statements and other evidence indicated that the takeoff was attempted with an approximate 5-knot tailwind. The first 1,000 ft of the runway was level, but the remaining 2,000 ft was sloped uphill. Although the Pilot's Operating Handbook specified using 15° flaps for takeoff, and the pilot reported that he used that setting and did not alter the flap position during the flight, the flaps were found to have been fully retracted at impact. Surveillance camera imagery captured about 2 seconds of the flight, when the airplane was about midfield and 4 ft above ground level (agl). Review of that imagery and audio data indicated that the ground speed was about 68 knots and that the engine speed was about 2,640 rpm; both values were consistent with normal takeoff values. However, the exact winds (and thus airspeed) were unknown, and because the propeller was a constant-speed model, nominal takeoff rpm could be achieved even if the engine was not developing full-rated power. Detailed examination of the airplane, including the engine, revealed that, although its condition was not in accordance with Federal Aviation Administration and manufacturer guidance, none of the observed deficiencies could have caused or contributed to the loss of climb performance, except for one magneto that was found to be mistimed to the engine by 7°. Evidence suggested that this was likely a result of the accident but that could not be determined with certainty. Performance calculations conducted by the airplane manufacturer, which accounted for most of the known takeoff conditions, including fully retracted flaps, indicated that the distance to 50 ft agl was slightly more than the available runway. The estimated airplane takeoff weight was about 300 lbs (11%) below the maximum takeoff weight that was used in the calculations, which would yield better performance than the calculated results. However, those calculations did not account for off-nominal values of the many other variables that could adversely affect takeoff performance, including pilot technique, airframe and engine deterioration, and inaccurate or improperly set instrumentation and controls. Thus, although a successful downwind takeoff with no flaps was unlikely, it might have been possible, but there were too many other unknowns to determine its likelihood with greater certainty. The reason(s) for the retracted flaps could not be determined. It is possible that the pilot forgot to extend them or that they were inadvertently and unknowingly retracted. Given the location of the flap control switch and its design (momentary, paddle-type), it is possible that the pilot extended the flaps to the proper takeoff setting of 15° but that they were subsequently retracted when the nonpilot passenger inadvertently contacted and actuated the flap control. The size and location of the flap position indicator gauge, combined with the location of the flaps (behind the pilot on the low-wing airplane), minimized the possibility that the pilot would notice that they had been retracted.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's decision to conduct an upslope, downwind takeoff combined with an improper flap setting, which resulted in the airplane's inability to clear trees beyond the runway end. The reason for the improper flap setting could not be determined.

Events

1. Prior to flight - Preflight or dispatch event
2. Takeoff - Other weather encounter
3. Initial climb - Collision with terr/obj (non-CFIT)
4. Takeoff - Miscellaneous/other

Findings - Cause/Factor

1. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Climb rate-Capability exceeded - C
3. Environmental issues-Physical environment-Terrain-Sloped/uneven terrain-Decision related to condition - C
4. Environmental issues-Conditions/weather/phenomena-Wind-(general)-Decision related to condition - C
5. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C

Narrative

HISTORY OF FLIGHT

On May 10, 2016, about 1215 Pacific daylight time, a Beech B24R Sierra, N2052L, was substantially damaged when it impacted terrain during an attempted departure from Pine Mountain Lake Airport (E45), Groveland, California. The pilot and the passenger/owner received minor injuries. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan was filed.

The passenger, who was a student pilot, recently purchased the airplane in an estate sale. Both the pilot and owner lived in Mississippi, and had traveled to E45 to retrieve the airplane, and fly it back to Mississippi. The airplane was domiciled at E45, and had not been maintained, operated, or flown in over 10 years. Subsequent to his purchase, the new owner contracted with a mechanic at E45 to conduct maintenance on the airplane, in preparation for the flight to Mississippi.

The day prior to the accident, both fuel tanks were filled, and the pilot and owner took the airplane for its first flight after its dormant period. The airplane departed on runway 27, and flew one circuit in the airport traffic pattern, as planned. That flight was uneventful. The next day, the pilot and owner planned to again fly the airplane, this time departing the area for some systems evaluations, before returning to E45. This takeoff attempt, which terminated in the accident, was conducted on runway 9. The pilot reported that the first part of the takeoff roll and liftoff "appeared normal but during or at gear retraction the aircraft started losing power." He stated that with about 1,000 feet of runway remaining, the engine "was not producing enough power to climb or accelerate," and that it was apparent the airplane was not going to clear the trees beyond the runway end. The pilot focused on attempting to climb, while simultaneously avoiding a stall.

The airplane struck trees and a utility pole, and then thick underbrush and the ground. The airplane came to rest about 1,800 feet beyond the end of the runway, at a point slightly north (left) of the extended runway centerline. The fracture-separated outboard right wing was located adjacent to the utility pole, and the engine had separated from the fuselage. The fuselage was slightly crumpled and otherwise deformed, but the cabin retained its normal occupiable volume. There was no fire.

PERSONNEL INFORMATION

Pilot

The pilot reported that for both flights, he was seated in the left front seat, and was the sole manipulator of the controls. He held an airline transport pilot certificate, and reported about 22,800 total hours of flight experience, including about 4,310 hours in single engine airplanes. Prior to his flight in the airplane the day before the accident, the pilot had no experience in the accident airplane make and model. His most recent flight review was completed in May 2015, and his most recent Federal Aviation Administration (FAA) third-class medical certificate was issued in January 2015.

Owner

The owner was seated in the right front seat for both flights. He reported that he held a student pilot certificate, but had no experience in the accident airplane make and model, and was only an observer on the two flights.

Mechanic

The individual who conducted the maintenance on the airplane for the new owner, and who most recently made entries in, and signed, the airplane maintenance records, resided and had a hangar at E45. He also owned and operated a repair facility, Buchner Aircraft Specialties, at Fresno Chandler Executive Airport (FCH) in Fresno, California. According to FAA records, the individual had previously held a mechanic certificate, with Airframe, Powerplant, and Inspection Authorization (IA) ratings. However, during the period when the mechanic performed the maintenance on the accident airplane and returned it to service, his IA rating was not valid, due to its expiration more than a year prior.

FAA regulations require that IA ratings be renewed biennially, or they become invalid. One renewal method allows the applicant to take approved classes within a specified period near the end of their biennial period. If an applicant fails to renew in that manner within the designated timeframe, they must take specified FAA tests to re-validate their IA rating.

National Transportation Safety Board - Aircraft Accident/Incident Database

In March 2015, for undetermined reasons, the mechanic did not renew his IA rating within the designated period. He then attempted to re-validate his IA rating by taking the required FAA tests, but he did not successfully pass them; thus his IA rating remained expired/invalid.

AIRCRAFT INFORMATION

FAA information indicated that the airplane was manufactured in 1976, and was equipped with retractable landing gear, and a Lycoming IO-360-A1B6 series engine. The engine drove a constant-speed, two-blade propeller. The airplane's most recent FAA registration expired in 2011.

Excluding the maintenance conducted just prior to the accident, the most recent annual inspection had been completed in December 2005.

METEOROLOGICAL INFORMATION

E45 was not equipped with any official weather sensing or recording equipment. Resident and eyewitness reports indicated that about the time of the accident, the temperature was about 75 degrees F (23 C), and there was a light wind from the west. An individual who was a flight instructor and FAA-designated pilot examiner estimated that the tailwind component along runway 9 was about 5 knots.

Calculations using the available information indicated that the temperature was about 14 degrees C above the standard atmosphere value ("ISA"), and that the resulting density altitude was 4,686 feet.

AIRPORT INFORMATION

E45 was situated at an elevation of 2,933 feet above mean sea level, and was equipped with a single paved runway designated 9/27, which measured 3,624 ft by 50 ft. The western-most 1,000 ft segment of the runway was relatively level, but then the runway sloped uphill beyond that (towards the east). The slope of that uphill portion was not constant; a maximum up slope of 1.8 per cent was present for the segment between 2,500 and 3,000 ft from the threshold of runway 9. The overall average gradient was 1.1 per cent.

There was a 100 ft gravel overrun at the east end of the runway. Beyond that, the terrain descended about 30 feet, but that region was populated with numerous trees as high as about 100 feet.

WRECKAGE AND IMPACT INFORMATION

FAA inspectors examined the wreckage the day after the accident, before it was recovered. The airplane struck several trees and came to rest upright, in dense undergrowth. The cabin and fuselage remained relatively intact, which afforded protection for the occupants during impact. Both wings sustained significant impact damage, but remained attached to the fuselage. The left wing remained securely attached. The right wing was partially fracture-separated at the wing root, and its outboard end was fracture-separated; it was found at the base of the power pole that was struck about 20 feet agl. The ailerons and flaps remained attached to their respective wings. The right fuel tank was breached, but the left tank was full of fuel. The vertical stabilizer remained securely attached to the aft fuselage, and the rudder remained securely attached to the vertical stabilizer. The stabilator remained securely attached to the aft fuselage, and the pitch trim tab remained securely attached to the stabilator.

The engine was fracture-separated from the airframe, and came to rest inverted, about 10 feet ahead of the airplane. Both blades of the propeller remained securely installed in the propeller hub, and the hub remained attached to the engine.

All components of the airframe were accounted for, and were located in the debris path, or on or near the airplane. A detailed examination of the recovered wreckage was conducted a few weeks after the accident. There was no evidence of any in-flight or post-accident fire. No evidence consistent with any pre-impact malfunctions or failures of any airframe components that would have precluded continued normal operation was observed.

The fuselage had been cut for recovery, but flight control continuity was established for all flight controls. The cockpit stabilator trim tab indicator was observed to be set within the normal takeoff range. The stabilator trim actuator extension measurement was consistent with a stabilator trim tab position of 10° training edge down. However, because the fuselage had been cut and otherwise disturbed for the recovery, these values could not be considered to represent the takeoff pitch trim setting.

National Transportation Safety Board - Aircraft Accident/Incident Database

Witness marks on both sides of the fuselage, and on the inboard ends of both flaps, indicated that the flaps were in the retracted position at the time of impact. This was corroborated by flap jackscrew extension and cockpit position indicator information. The cockpit flap control was a momentary paddle-type switch, and the flap position indicator was a circular display with a face diameter of about 1 inch. Both were situated on the right side instrument sub-panel, just to the right of the center-mounted engine control quadrant.

Damage patterns were consistent with the landing gear being near- or fully-retracted at the time of impact; the three landing gear were essentially undamaged. The landing gear control handle was in the UP position.

The airspeed indicator was properly marked; the colored speed arcs were in accordance with the Pilot's Operating Handbook (POH) values.

All three engine control (throttle, mixture, and propeller) push-pull cables had been fracture-separated from their respective engine components, at locations forward of the firewall; all three exhibited continuity from the cockpit control to the fracture locations forward of the firewall.

The fuel boost pump switch was set to the OFF, and the fuel selector valve was set to the right tank. Detailed examination of the airframe fuel system, including operation of the fuel boost pump and internal inspections of all components, did not reveal any indications of any pre-impact anomalies or deficiencies that would have precluded normal operation.

The engine bore no evidence of any pre-impact damage or failures. The engine-driven fuel pump was fracture-separated from the engine. The pump diaphragm was intact, and the engine actuator lever functioned with engine rotation. The fuel flow divider (distribution valve) and the fuel servo internal components were generally clean and intact. All lines and fittings were found to be secure. The spark plugs were new. Manual rotation of the engine resulted in thumb compression at all cylinders, in the proper sequence.

Both magnetos remained securely attached to the engine, but the left magneto bore impact damage. Magneto to engine timing was found to be 20 degrees for the right magneto, and 27 degrees for the left magneto. The Lycoming-specified timing is 20 degrees.

Both magnetos tested satisfactorily to rpm levels above the specified maximum rpm value of 2,700 for that engine/airframe combination. One harness lead exhibited an electrical short; any short would have manifested itself as engine roughness during the pilot's magneto check, but he did not report any such roughness. The cause/source of the short was not determined.

Aside from Airworthiness Directive (AD) 2015-19-07 (see below), the airplane, engine, magnetos, and fuel servo appeared to be in compliance with all applicable ADs.

The condition of the airframe and engine were not consistent with an airplane that had been subjected to a thorough annual inspection, and the requisite maintenance for a return to service. Items that were found to be non-conforming to the complete performance of an Annual or 100 Hour inspection and return to service included:

- Age hardened, deteriorated fuel injector line support clamp cushions, not in compliance with AD 2015-19-07 per Lycoming Service Bulletin 342G
- Uncleaned fuel injector nozzles (evidenced by sooty, partially-obstructed air bleed screens)
- Re-used, un-annealed M-674 spark plug gaskets
- Spark plug 2T found installed finger-tight
- Severely deteriorated internal muffler baffling
- All (except propeller governor) non-metallic flexible fuel and oil pressure hoses were over 40 years old
- Fuel cap external and internal seals age-deteriorated and cracked
- Fuel strainer gaskets age-deteriorated and cracked

ADDITIONAL INFORMATION

Mechanic and Maintenance Record Information

According to the pilot and the owner, a few weeks prior to the accident, the owner had contracted with a mechanic at E45 to conduct an annual inspection on the airplane, and to perform the maintenance necessary to render the airplane airworthy for its return to service. They also reported that subsequent to the maintenance, and prior to the accident flight, the mechanic made airframe and engine logbook entries that indicated that the airplane had been inspected in accordance with an annual inspection, was in airworthy condition, and that the mechanic's signature block denoted that he was an IA. Subsequent to the accident, the mechanic refused to provide the logbooks to the owner. The mechanic claimed that the owner owed him \$6,000 for the maintenance that he had performed, and that he was retaining the logbooks for security until he was paid.

FAA and NTSB attempts to convince the mechanic to release the logbooks to the FAA or NTSB were unsuccessful; again the mechanic stated that he was holding the logbooks as security until he was paid by the owner. The mechanic eventually allowed an FAA inspector to examine and photograph the two most recent entries in each logbook. The FAA inspector, and his photographs, indicated that portions of the original airframe and engine logbook entries by the mechanic had been altered with "whiteout" and overwritten. The revised airframe and engine entry text indicated that the airplane had been inspected in accordance with a "ferry inspection," and the revised mechanic's signature block indicated that he was an "A&P."

"Ferry inspection" is not a term that is defined, referenced, or otherwise recognized by the FAA.

FAA and NTSB conversations with other aircraft owners at E45 revealed that subsequent to March 31, 2015, the mechanic had continued to represent himself as a valid IA holder, and that he had conducted and signed off numerous aircraft as an IA.

Airplane Performance

Takeoff performance distance data (ground roll, and total over 50 ft obstacle) for the airplane were presented in table form in the POH. The performance table values were predicated on the following fixed conditions:

- Gross weight: 2,750 lbs
- Engine/propeller rpm: 2,700
- Engine leaned "to field elevation"
- Flaps: 15§
- Landing gear retracted after lift-off
- Runway: paved, level, dry surface
- Takeoff speeds: lift off, 71mph; 50 ft height, 75 mph

The table provided for variations in the following parameters:

- Headwind (no tailwind accountability)
- Pressure altitude
- Ambient temperature

Because the POH performance data did not account for runway slope, tailwind, or 0§ flaps, the manufacturer provided calculated performance estimates that accounted for variations in those parameters for two example cases. The first case used the prescribed takeoff flap setting of 15§, and the second used the actual takeoff setting of 0§. Both cases use the calculated pressure altitude, a 1.1% runway upslope, a 5 knot tailwind, and all other fixed parameter values specified above.

The 15§ flap case resulted in an estimated ground roll distance of about 1,900 ft, and an estimated distance to 50 ft agl of about 3,250 ft. The 0§ flap case resulted in an estimated ground roll distance of about 2,300 ft, and an estimated distance to 50 ft agl of about 3,700 ft. It should be noted that these results do not represent certificated performance, and should not be construed as such.

The pilot estimated that the airplane actually weighed about 2,460 lbs for the takeoff. Although the POH performance table included a "NOTE" that provided a means to account for weights below 2,750 lbs, there was insufficient data to substantiate application of that correction factor to these two performance cases.

Other factors that can adversely affect takeoff performance, but whose specific values and effects could not be determined for this accident, included:

- Pilot techniques (engine leaning, airspeed, attitude) for the takeoff
- Airspeed indication system accuracy

- Engine, propeller, and airframe deterioration due to age, use, and care
- Engine rpm (tachometer, governor)
- Propeller blade pitch
- Ambient conditions (wind, temperature)

Airport Surveillance Video

There was a fixed-view surveillance camera mounted on a building on the north side of the runway at E45. The image and audio data from the camera was recorded, and the accident takeoff was captured. The data recording of the takeoff was provided to the investigation for review.

The camera view was oriented perpendicular to the runway, looking south. The camera was situated approximately 2,500 feet along the runway from the west (9) threshold. Its field of view encompassed the runway segment approximately 155 feet to either side, for a total field of view of about 310 feet of the runway. The airplane traversed the image from right to left. The airplane was already fully in the frame at the beginning of the image file. When it first appeared, it was airborne, with its landing gear extended, and the landing gear appeared to be about 2 feet above the runway. When it exited the frame, the gear altitude appears to have increased to about 6 feet. When the airplane was in mid-frame, perpendicular to the camera, the airplane attitude was measured to be approximately 11° nose up. The flaps appeared to be retracted, but the image resolution was insufficient to positively ascertain the flap position.

Analysis by NTSB Recorders Laboratory personnel indicated that the airplane operated at an average ground speed of about 68 kts during the nearly 2 second period that the airplane was visible in the image. During the first 40% of that time, the estimated average speed was about 66 kts, and during the last 60% it was about 70 kts.

A frequency analysis of the audio recording of the engine/propeller was conducted by NTSB Recorders Laboratory personnel. The analysis indicated that the engine speed was 2,640 rpm.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR16LA066 02/08/2016 1741 PST Regis# N113TM Santa Barbara, CA Apt: Santa Barbara Muni SBA
Acft Mk/Mdl BEECH B36TC Acft SN EA-386 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL MOTORS INC. Acft TT 1566 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: JOHNSON DONALD D Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The airline transport pilot was conducting a test flight following a recent replacement of the turbo wastegate controller, at which time the mechanic also tightened the intercooler hose. The pilot reported that, during the ground roll and initial climb, the engine tone was continuous, and both the manifold pressure and rpm indications were normal. As the airplane reached about 300 ft mean sea level, the engine lost power. The pilot attempted to restore engine power by switching the fuel tanks and cycling both the "low" and "high" settings of the fuel boost pump but was unsuccessful. He leveled the wings and extended the flaps to prepare for a forced landing, and a few seconds later, the airplane impacted a slough about 1/2 mile southeast of the departure end of the runway. A postaccident examination of the fuel system did not reveal any anomalies or obstructions. Further, examination of the engine did not reveal any mechanical malfunctions, except for the separation of the intercooler from its mounts, which had resulted from the accident. During a test run, the engine was not able to produce rated horsepower until the intercooler was removed; however, the engine was still able to produce normally aspirated engine power with the intercooler installed.

The Pilot's Operating Handbook warned against using the "high" fuel boost pump position when the engine-driven fuel pump is operating because it can result in an excessively rich fuel/air mixture and engine failure. Thus, the pilot's attempt to restart the engine with the fuel boost pump at the "high" setting may have prevented engine power from being restored; however, even if engine power had been restored, given the airplane's low altitude when the engine lost power, it is unlikely that the pilot would have had sufficient time to complete a successful engine restart and continue safe flight. The investigation could not determine the reason for the total loss of engine power during initial climbout.

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Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A total loss of engine power during initial climbout for reasons that could not be determined because postaccident examination and testing of the engine did not reveal any mechanical anomalies that would have precluded normal operation.

Events

1. Enroute-climb to cruise - Loss of engine power (total)
2. Emergency descent - Off-field or emergency landing
3. Emergency descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

HISTORY OF FLIGHT

On February 8, 2016, about 1741 Pacific standard time, a Beechcraft B36TC airplane, N113TM, completed a forced landing near Santa Barbara Municipal Airport (SBA), Santa Barbara, California, following a total loss of engine power during takeoff. The airline transport pilot, and sole occupant, received minor injuries. The airplane was owned and operated by a private individual as a 14 Code of Federal Regulations Part 91 personal flight. Visual meteorological conditions prevailed and no flight plan was filed for the local flight that departed SBA at 1740. The airplane was originating at the time of the accident.

The pilot reported that he planned to fly to 7,000 feet mean sea level (msl) to verify the turbocharger was functioning normally, as it had been recently serviced for a minor power issue. After an uneventful preflight inspection and engine run-up, the pilot departed runway 25. During his takeoff roll, the pilot noted the engine tachometer and manifold pressure instruments displayed normal readings and the engine tone was continuous. When the airplane reached 300 feet msl the engine lost power. After the pilot executed a tight left turn to return to the airport, he switched fuel tanks and cycled the "low" and "high" modes of the fuel boost pump, but was unsuccessful in restoring power to the engine. An air traffic controller approved the pilot to land on taxiway A, but the pilot decided to land in a nearby field. He leveled the wings, extended flaps, and moments later the airplane impacted a slough about one-half mile southeast of the departure end of runway 25. Photographs furnished by the Federal Aviation Administration (FAA) revealed substantial damage to the leading edge of the left wing and the forward fuselage.

According to archived air traffic control (ATC) information, the pilot was instructed to depart runway 25 and turn right 20 degrees for traffic. Moments after his

departure, the pilot reported to the controller that he was going to return to the airport. The controller cleared the pilot to land on any taxiway, but the pilot communicated that he would not be able to reach the airport.

During a postaccident examination of the airplane, an FAA inspector observed the fuel selector in the right fuel tank position. Power was applied to the airplane a few days after the accident by representatives of the airport with oversight from an FAA airworthiness inspector. Initially, the left fuel gauge indicated a total fuel quantity of about one-quarter tank, and the right fuel gauge needle was positioned in the yellow arc, but indicated that the tank's fuel quantity was less than one-quarter. When the avionics switch was re-cycled, the left fuel gauge displayed a fuel quantity above three-eighths and the right fuel gauge showed a quantity of about three-eighths. The inspector reported that 24 gallons of 100LL aviation grade gasoline were drained from the right wing fuel tank, and about 9 gallons were drained from the left wing fuel tank.

AIRPLANE INFORMATION

According to FAA records, the airplane was manufactured in 1983 and registered to the pilot on August 25, 2014. The pilot reported that he purchased the airplane from a bank following a repossession and without the airplane's maintenance records. A review of the airplane's registration file revealed that it was registered to its previous owner in 1999 under the name Tango Mike Enterprises. The previous owner reported that she operated the airplane for approximately 200 hours in the 15 years it was under her ownership, but was unable to locate the airplane's maintenance records after the airplane was repossessed.

The airplane was powered by a Continental TSIO-520-UB, direct drive, air cooled, 300 hp engine. A review of the airplane's maintenance records revealed that the engine was removed on July 1, 2015 at 1,555 total flight hours for an engine overhaul, which was completed on August 19, 2015. The engine was subsequently reinstalled on December 15, 2015. The logbook records indicate that a mechanic completed an annual inspection of the airframe and propeller on November 11, 2015, while the engine was away. Two records in the aircraft logbook showed that the vacuum pump was replaced on January 28, 2016, and an intake intercooler hose was tightened on February 8, 2016, the day of the accident flight. According to the airplane's tachometer, the engine had accumulated a total of 1,565 total flight hours at the time of the accident.

According to the pilot, the airplane was delivered by a maintenance facility about 2 weeks before the accident following the engine overhaul. The mechanic who reinstalled the overhauled engine reported that he completed several maintenance flights to "break in" the engine before he delivered it to the accident pilot in Van Nuys, California. At the time of the delivery the pilot was informed that the instrument pressure pump failed during the flight and would need to be replaced. The pump was replaced the following day. The pilot subsequently completed a short flight in the accident airplane, during which time he observed slightly low manifold pressure. The pilot then asked a mechanic to replace the waste gate and controller, as they had not been overhauled during the airplane's recent maintenance work. Subsequent to the work being completed, the mechanic reported to the pilot that the engine ran normally after he tightened a loose intercooler hose.

TESTS AND RESEARCH

Fuel System

The pilot reported that he used both a combination of the fuel gauges and his onboard fuel totalizer to monitor fuel quantity during flight.

The fuel system had a total fuel capacity of 108 gallons and was comprised of two interconnected bladder-type fuel cells in each wing; a 14 gallon outboard cell and an inboard 40 gallon cell. The tanks were filled utilizing a single filler neck located on the outboard wing fuel cell. Fuel is directed from the inboard tank through a fuel return line to a fuel selector and downstream to a dual pressure electric boost pump before the fuel reaches the engine driven pump. Total fuel quantity for each wing is measured by two float-operated fuel sensors located in each fuel cell. The sensors are electric and connected in series to a fuel quantity indicator gauge on the cockpit instrument panel.

The airplane was examined by representatives of the airframe and engine manufacturers under the supervision of the NTSB IIC in Santa Barbara, California.

An inspection of the fuel system revealed that both floats from the right and left fuel quantity indicators displayed normal wear, and the gauges exhibited normal measurements when the float arms were rotated. The inboard and outboard fuel sensors were tested for each wing, and the output signals to the instrument panel fuel quantity gauges were observed when the airplane's battery power was applied. Both the right and left wing instrument fuel gauges displayed empty and full indications when the inboard and outboard fuel sensors were at the lower and upper stops, respectively. The right and left fuel tank gauges also

displayed half-tank indications when one sensor was in the up position and the second sensor set in the low position. Resistance measurements taken for each sensor were within the prescribed limitations of the manufacturer, with the exception of the right wing outboard fuel tank sensor, which displayed an open circuit in the full position. Fuel was observed in the fuel strainer bowl, and the fuel strainer screen was free of contaminants.

A subsequent examination of the outboard fuel tank sensor was completed at the airplane manufacturer's facility with oversight from the FAA. The results revealed that the sensor displayed 0.06 ohms in both the empty and full positions, indicative of an empty fuel tank. An inspection of the sensor showed arc damage on the outer surface of the sensor at the point of contact between the rod and the pin. Additionally, the internal contact appeared off-center on the internal resistor, with most of the contact movement taking place on the un-wound portion of the internal resistor.

Both the low and high settings of the fuel boost pump were tested with power applied to the airplane; a plastic bag was used to collect samples of fuel at the fuel transducer. An audible sound was heard when the boost pump motor was tested in both the low and high modes.

Engine Examination

The engine crankshaft was manually rotated by hand at the propeller, and rotational continuity was established throughout the engine to the drive shaft of the instrument pressure pump at the accessory housing. Thumb compression and suction were obtained on all six cylinders. The cylinder combustion chambers and barrels were examined with a borescope, and no evidence of foreign object ingestion or detonation were observed. The combustion chambers displayed color signatures consistent with normal operation.

The top Tempest URHB-32E model spark plugs were removed for inspection. Each spark plug exhibited signatures consistent with normal wear, but were slightly dark and sooty.

Both magnetos remained attached to the engine case. The port holes to both magnetos were removed to observe the movement of the distributor gear. Both rotated normally when the propeller was operated by hand.

A Merlyn Products, Inc. induction air intercooler system had been installed in the airplane on July 30, 1987 at a tachometer time of 354.3 flight hours, and completed in accordance with supplemental type certificate numbers SA 3654NM and SE 3653NM. A postaccident inspection of the intercooler system showed that the induction hose from the intercooler to the induction system had separated from the unit, and the induction hose from the intercooler to the turbo compressor had also separated from the intercooler unit.

The engine was shipped to the engine manufacturer's facility in Mobile, Alabama. A subsequent engine examination and test run was completed by the engine manufacturer, with oversight provided by the NTSB IIC. The engine condition was considered optimal for testing and did not require any replacement of parts. Initial test results revealed that the engine manifold pressure did not exceed about 31 in Hg and 2,544 rpm when the throttle was advanced to full power. An induction leak was subsequently discovered at the intercooler's machined mounting holes. After the turbo discharged routing was returned to its standard configuration, the engine achieved rated horsepower, about 37 in Hg of manifold pressure at 2,756 rpm.

ADDITIONAL INFORMATION

The only purposes for the Aux Fuel Pump HI position are:

- 1) To prime the engine prior to starting.
- 2) To provide an alternate source of fuel pressure if the engine-driven fuel pump fails.

The Emergency Procedures section of the Pilot's Operating Handbook warns operators against use of the high boost pump when the engine-drive pump is operating, as the fuel/air mixture could become excessively rich, which may lead to engine failure.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA15FA308 08/12/2015 930 EDT Regis# N390Z Weirsdale, FL Apt: Love's Landing 97FL
Acft Mk/Mdl BEECH N35 Acft SN D-6762 Acft Dmg: DESTROYED Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL MOTORS IO-470-N Acft TT 6663 Fatal 2 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: WOMACK DAUPHIN R Opr dba: Aircraft Fire: GRD
AW Cert: SPS

Summary

The airline transport pilot was departing in his airplane on a personal flight. A witness, who was a pilot and had seen the airplane take off many times before, reported that, on this takeoff, the airplane appeared lower and slower than he expected. He further noted that the engine initially sounded normal but then started to "stall" as if a cylinder was "missing." The airplane impacted trees about 1,000 ft past the end of the runway and was partially consumed by a postcrash fire. Damage to the propeller blades was indicative of some engine power being produced at the time of impact. Examination of the engine's throttle body metering unit revealed that the mixture control arm remained attached to the unit; however, when turned, it rotated on the shaft with no shaft movement. Disassembly of the unit revealed the internal splines of the throttle and mixture arms were stripped, and brass material from the bronze arms was transferred to the external splines of the steel shafts. The bronze arms should have been replaced with stainless steel arms per a service bulletin issued by the engine manufacturer 8 years before the accident. Because of impact and fire damage to the metering unit; it could not be determined if the stripped arms were the result of impact or an undertorque condition.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A partial loss of engine power during takeoff. The reason for the partial loss of power could not be determined due to the extensive fire and impact damage to the engine.

Events

1. Takeoff - Loss of engine power (partial)
2. Initial climb - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Aircraft-Aircraft power plant-Engine (reciprocating)-(general)-Inoperative - C

Narrative

HISTORY OF FLIGHT

On August 12, 2015, about 0930 eastern daylight time, a Beech N35, N390Z, was destroyed when it impacted trees and terrain shortly after takeoff from Love's Landing (97FL), Weirsdale, Florida. The airline transport pilot and the pilot-rated passenger were fatally injured. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91. An instrument flight rules flight plan was filed for the personal flight from 97FL to Page Field (FMY), Fort Myers, Florida.

According to a witness, the airplane took off from runway 36. At the departure end of the runway, there was a crossing runway, designated 9/27. The witness, who was a pilot working outside his home located near the departure end of runway 36, reported that airplanes using runway 9/27 would typically stay low during takeoff, while those taking off from runway 36 would typically climb at a relatively high angle to avoid airplanes using the crossing runway.

The witness had seen the accident airplane take off many times on runway 36 and use a high climb angle, but, on the day of the accident, when he expected to see the airplane climb above houses about halfway along the runway, he was surprised when he did not see it. When he finally saw the airplane at a point about 300 to 400 ft before the departure end of the runway, it was about 50 ft in the air, with landing gear retracted, and about level with the eaves of the houses lining the runway. The witness then lost sight of the airplane and subsequently heard two loud "bangs."

The witness further noted that the airplane's engine sounded normal until takeoff, when it then started to "stall" as if a cylinder was "missing." He also noted that, when he saw the airplane, it appeared to be flying in ground effect and that it was in slow flight with a high angle of attack.

PERSONNEL INFORMATION

The pilot, age 78, held an airline transport pilot certificate with airplane single-engine land and airplane multi-engine land ratings. He also held a flight instructor certificate with airplane single-engine, airplane multi-engine, and instrument airplane ratings, a ground instructor certificate, a flight engineer certificate, and a mechanic certificate (airframe and powerplant). He held a Federal Aviation Administration (FAA) third-class medical certificate with a restriction to wear

corrective lenses.

A review of the pilot's personal logbook revealed that, as of the last recorded flight on August 9, 2015, he had logged about 10,545 hours, including 9,891 hours as pilot-in-command and 7,069 hours in single-engine airplanes. His most recent flight review was recorded on July 19, 2014.

AIRCRAFT INFORMATION

The four-seat, low-wing, retractable landing gear airplane was manufactured in 1961. It was powered by a 260-horsepower Continental IO-470-N reciprocating engine, which drove a Hartzell two-bladed, constant-speed propeller.

According to the maintenance logbooks, the airplane's most recent annual inspection was completed on July 15, 2015. At that time, the airframe total time was 6,663 hours. Based on pilot logbook entries, at the time of the accident, the airplane had accumulated about 5.5 hours since the last annual inspection.

METEOROLOGICAL INFORMATION

Leesburg International Airport (LEE), Leesburg, Florida, was located about 10 nm east-southeast of the accident site. The LEE 0853 weather observation included wind from 220ø at 5 knots, visibility 10 statute miles, sky clear, temperature 28øC, dew point 24øC, and altimeter setting 30.01 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The wreckage path began with broken tree branches about 40 ft up a tree, located about 355ø true, and about 1,000 ft from the airport fence at the north end of the runway. The path continued at a downward angle of about 20ø for about 130 ft to a ground impact mark containing the two-bladed propeller and spinner, which had separated from the engine crankshaft. One propeller blade exhibited "S" bending and blade twist signatures, and the other had relatively light twisting. Both blades exhibited leading edge burnishing and chordwise scratching.

About 10 ft beyond the propeller, the airplane was resting vertically against two trees, nose down, with the empennage bent over the fuselage. The right wing and the cabin area were consumed in a postcrash fire; there was no evidence of an inflight fire. The left wing and the right ruddervator exhibited tree impact marks.

All flight control surfaces were accounted for at the accident site, and control continuity was confirmed from the cockpit to the empennage and the wings.

The throttle and propeller controls were found full forward, and the mixture control was found pulled out about « inch as measured from the panel bulkhead. The fuel boost pump was found in the "ON" position. The pump switch did not appear to be impact-damaged and could be switched on and off without binding.

Engine crankshaft continuity was confirmed. Eleven of the 12 spark plugs were removed and examined. One plug was broken off in the cylinder and could not be removed. No anomalies were observed in the removed plugs. Five fuel injectors were examined and found to be internally clear of debris; one had molten metal around it and could not be removed.

The engine's throttle body metering unit was broken from its mount and was held onto the engine by fuel lines. The mixture control arm remained attached to the unit; however, when turned, it rotated on the shaft with no shaft movement. The throttle body metering unit was shipped to the manufacturer's facility for further examination.

MEDICAL AND PATHOLOGICAL INFORMATION

The Office of the Medical Examiner, District 5, Leesburg, Florida, performed autopsies of the pilot and pilot-rated passenger. The cause of death of the pilot was blunt force and thermal injuries, and the manner of death was accident. The cause of death of the pilot-rated passenger was multiple blunt force injuries, and the manner of death was accident.

The FAA's Bioaeronautical Research Sciences Laboratory, Oklahoma City, Oklahoma performed toxicology testing on specimens from the pilot and pilot-rated passenger.

Testing of the pilot identified 0.053 (ug/ml, ug/g) diphenhydramine in blood and diphenhydramine in urine. Ibuprofen was also detected in urine. Testing was negative for cyanide, ethanol, and major drugs of abuse, and 17% carbon monoxide was detected in blood.

Testing of the pilot-rated passenger identified cetirizine, quinine, and tolterodine in the liver and blood. Testing was negative for carbon monoxide, ethanol, and major drugs of abuse. Testing for cyanide was not performed.

TESTS AND RESEARCH

The engine's throttle body metering unit was examined on April 5, 2017, at the Continental Motors facility at Mobile, Alabama. The unit displayed fire and impact damage; the fire damage appeared to be greater on the mixture side of the unit than on the throttle side of the unit. The mixture and throttle control lever arms were secured to their respective shafts by attachment nuts. The attachment nuts were removed, and the spline areas of both arms were inspected. The internal splines of both arms were stripped, and brass material from the bronze arms was transferred to the external splines of the steel shafts.

The throttle and mixture control arms were manufactured from bronze. According to the engine manufacturer, both lever arms should have been replaced with stainless steel arms per Continental Motors Category 2 Critical Service Bulletin (CSB) CSB08-3C, dated March 14, 2008. The CSB was issued after reports that bronze mixture and throttle control arms were inadequately torqued and became loose, which could lead to a loss of engine control or engine power. A copy of the CSB is included in the public docket for this investigation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR15LA116	02/27/2015 1030 PST	Regis# N4774S	Ivanhoe, CA	Apt: N/a
Acft Mk/Mdl BELL 47G 2A		Acft SN WAV182	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING VO-435 A1F		Acft TT 4089	Fatal 0 Ser Inj 1	Flt Conducted Under: FAR 137
Opr Name: BARTON AERO INC		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The commercial pilot was maneuvering the helicopter at low altitude to conduct agricultural spraying operations. While departing the coverage area, the pilot saw power lines and attempted to fly underneath them, but the helicopter's main rotor mast struck a wire, and the helicopter subsequently collided with terrain. The pilot reported no mechanical failures or malfunctions with the helicopter that would have precluded normal operation.

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Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain clearance from a power line while maneuvering at low altitude.

Events

1. Maneuvering-low-alt flying - Collision with terr/obj (non-CFIT)
2. Maneuvering-low-alt flying - Abrupt maneuver

Findings - Cause/Factor

1. Environmental issues-Physical environment-Object/animal/substance-Wire-Decision related to condition - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Altitude-Not attained/maintained - C
3. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C
4. Environmental issues-Physical environment-Object/animal/substance-Wire-Effect on operation - C

Narrative

On February 27, 2015, at 1030 Pacific standard time, a Bell 47G 2A, N4774S, collided with a suspended power line 15 miles northeast of Ivanhoe, California. The helicopter was registered to Barton Aero, Inc., and operated by Gilbert Aviation as a 14 Code of Federal Aviation, Part 137 aerial application flight. The commercial pilot was seriously injured, and the helicopter was substantially damaged. Visual meteorological conditions prevailed, and a flight plan had not been filed.

A Federal Aviation Administration (FAA) inspector who spoke to the pilot, stated that the pilot knew about the power line and attempted to avoid it at the last second by flying under it. The wire caught the main rotor mast and the helicopter came to rest on its right side in an orange tree orchard. The pilot was able to self extract, and sustained numerous broken bones. Examination of the helicopter wreckage by the inspector confirmed that a electrical power cable had wrapped around the helicopter's rotor mast.

The pilot reported no mechanical failures or malfunctions with the helicopter that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA366	06/24/2017 800 CDT	Regis# N575JH	Burnet, TX	Apt: Burnet Muni Kate Craddock Fiel BMQ
Acft Mk/Mdl BELLANCA 1730-A		Acft SN 75-30791	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR IO-520-K		Acft TT 1841	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: BARRY A. STEIN		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot reported that, during the landing, as the nosewheel touched down, the airplane "hopped a bit" and began to veer left. He applied right rudder and brakes to no avail. He released the rudder and brakes, and the airplane exited the left side of the runway and impacted a raised taxiway.

The airplane sustained substantial damage to the right wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's improper landing flare and subsequent failure to maintain directional control during the landing.

Events

1. Landing - Abnormal runway contact
2. Landing - Loss of control on ground
3. Landing - Attempted remediation/recovery
4. Landing - Runway excursion

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Landing flare-Not attained/maintained
4. Environmental issues-Physical environment-Terrain-Sloped/uneven terrain-Contributed to outcome

Narrative

The pilot reported that, during the landing, as the nose wheel touched down, the airplane "hopped a bit" and began to veer left. He applied right rudder and brakes with no avail. He released the rudder and brakes, and the airplane exited the left side of the runway impacting a raised taxiway.

The airplane sustained substantial damage to the right wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA515 09/02/2017 1450 PDT Regis# N1701H Winnemucca, CA Apt: Winnemucca Muni WMC
Acft Mk/Mdl BELLANCA 7KCAB-NO SERIES Acft SN 454-74 Acft Dmg: SUBSTANTIAL Rpt Status: Prelim Prob Caus: Pending
Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: AMELIA REID AVIATION LLC Opr dba: Aircraft Fire: NONE

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR17LA193	08/30/2017 1000 PDT	Regis# N140X	Empire, NV	Apt: N/a
Acft Mk/Mdl CESSNA 140-G		Acft SN 11387	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-235-C1B			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: JEFFERY THOMPSON		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Events

2. Landing-flare/touchdown - Loss of control on ground

Narrative

On August 30, 2017, about 1000 Pacific daylight time, a Cessna 140, N140X, was substantially damaged during a precautionary landing on a dirt road in Empire, Nevada. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. The private pilot was not injured; the airplane sustained substantial damage. The personal cross-country flight originated from Gerlach, Nevada about 0930 with a planned destination of Bishop, California. Visual meteorological conditions prevailed, and no flight plan had been filed

The pilot stated that about 20-25 minutes after departure, he smelled a bad odor and noticed the engine's oil temperature gauge was indicating that it was hotter than normal. In an effort to avoid having the engine seize while in flight, the pilot opted to perform a precautionary landing. He selected an empty dirt road that had an uphill gradient. After touchdown, the airplane bounced and a wind gust lifted the airplane to the right of the road. As the pilot applied full power, the right main landing gear wheel contacted the edge of the road and sheared off. The airplane could not out-climb the rising terrain of the road and the remainder of the right main landing gear dug into the dirt. The airplane made 180-degree turn and came to rest with the right-wing tip on the ground. During the accident sequence, the right-wing spar sustained damage.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA15LA114 01/25/2015 1430 EST Regis# N10616 Fernandina Beac, FL Apt: Fernandina Beach Muni FHB
Acft Mk/Mdl CESSNA 150-L Acft SN 15074926 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-200-A Acft TT 8891 Fatal 0 Ser Inj 1 Flt Conducted Under: FAR 091
Opr Name: WALTER J. MCFADDEN Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The commercial pilot was returning to his home airport during a personal cross-country flight. The pilot reported that, during the flight, he experienced a pain in his right shoulder, followed by intense pain in his left shoulder. Although he had experienced pain previously in his right shoulder during long car rides, he had never experienced pain in his left shoulder before. Due to the intense pain, the pilot contacted air traffic control, declared an emergency, and requested that an ambulance wait for his arrival. He attempted to line up to the runway for landing but was unable to do so. The airplane impacted a berm and nosed over about 1/2 mile from the airport. The pilot could not recall any other details after that time. The pilot extricated himself from the inverted airplane and was subsequently taken to a hospital. A postaccident examination of the airplane revealed no preimpact mechanical failures or malfunctions that would have precluded normal operation.

During the pilot's postaccident hospital evaluation, no definitive reason for the pain was found. However, considering the pilot's recollection, the intense pain he experienced likely impaired his ability to safely control the airplane and resulted in the accident.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's physical impairment due to intense pain, which resulted in his failure to maintain airplane control.

Events

1. Enroute - Miscellaneous/other
2. Approach-VFR pattern final - Controlled flight into terr/obj (CFIT)

Findings - Cause/Factor

1. Personnel issues-Physical-Impairment/incapacitation-(general)-Pilot - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-(general)-Not attained/maintained - C
4. Environmental issues-Physical environment-Object/animal/substance-(general)-Contributed to outcome

Narrative

On January 25, 2015, about 1430 eastern standard time, a Cessna 150L, N10616, was substantially damaged when it impacted terrain while on approach to Fernandina Beach Municipal Airport (FHB), Fernandina Beach, Florida. The commercial pilot sustained serious injuries. Visual meteorological conditions prevailed and no flight plan was filed for the personal flight, which departed Lakeland Linder Regional Airport (LAL), Lakeland, Florida, at an unknown time, destined for FHB. The flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

During a postaccident interview, the pilot reported that, as was his usual procedure, he flew along the west boundary of the Jacksonville Class B airspace until he was due west of his home airport. At which time he turned the airplane east, flew along the north boundary of the Class B airspace, directly to his home base airport. The distance between the departure and destination airports was about 160 nautical miles. Shortly after making the turn to the east, he experienced a "pain" in his right shoulder, which he experienced before when on a "long" car ride. After adjusting his seating position, he reported that the pain was tolerable. About 20 miles from his home base airport an "intense pain" began in his left shoulder, which was something he had not experienced previously. He contacted air traffic control, declared an emergency, and requested that an ambulance wait for him at the airport due to the intense pain. He attempted to line up for runway 9; however, he stated that he was unable to do so. He could not recall any details after that time.

According to a Federal Aviation Administration (FAA) inspector that responded to the accident location, the airplane impacted a berm on the east edge of a retention pond, about 1/2 mile from the approach end of runway 13. The airplane left a ground scar about 200 ft in length; subsequently, the nose landing gear separated and the airplane nosed over coming to rest inverted on the top of the berm. Photographs provided by the FAA inspector revealed that the fuselage was buckled, the outboard approximate 4 ft of the left wing was impact damaged, the top of the rudder was damaged, and forward of the firewall was bent. The propeller blades exhibited blade tip curling beginning about mid-span of the blades. There were no preimpact malfunctions or abnormalities noted with the airplane, that would have precluded normal operation.

Aircraft recovery personnel reported that about 15 gallons of fuel was removed from the fuel tanks and that the fuel tanks were unbreached.

National Transportation Safety Board - Aircraft Accident/Incident Database

Aircraft maintenance records provided by the mechanic indicated that the airplane's most recent annual inspection was recorded on January 22, 2014. At the time of the inspection the airplane had 8,891.2 total hours time in service. The airplane was powered by a Continental O-200-A engine.

According to the FAA, the 90-year-old pilot's most recent medical certification examination occurred on May 15, 2014, and included the limitation for corrective lenses for both near and distant vision. The certificate was also marked "not valid for any class after May 31, 2015." He had received a special issuance medical certificate due to diabetes since 2003. At the time of the medical examination, the pilot reported 25,265.5 total hours of flight experience.

Hospital records indicated that the pilot extricated himself from the airplane after the accident. He had been admitted to the hospital for about 3 weeks, due to injuries sustained during the accident. However, postaccident hospital evaluation found no definitive reason for the reported intense pain.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA014 10/08/2016 1840 CDT Regis# N704LE Beasley, TX Apt: Wharton Regional ARM
Acft Mk/Mdl CESSNA 150M Acft SN 15078689 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-200-A Acft TT 7652 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: JAVIER CANON Opr dba: Aircraft Fire: NONE
AW Cert: STU

Summary

The student pilot reported that he was returning from a solo flight when the engine "started failing." The engine speed decreased to about 1,500 rpm with a "significant" vibration. The pilot's efforts to restore engine power were unsuccessful, and the engine ultimately lost total power. He subsequently conducted a forced landing to a plowed field, during which the airplane nosed over.

A postaccident examination of the engine revealed that the No. 2 cylinder exhaust valve was stuck in the "full open" position. Disassembly of the cylinder revealed that the exhaust valve stem exhibited carbon deposits consistent with the stuck valve condition. No other engine anomalies were noted.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The No. 2 cylinder exhaust valve being stuck in the "full open" position due to carbon deposits, which resulted in a total loss of engine power.

Events

1. Enroute-cruise - Loss of engine power (total)
2. Emergency descent - Off-field or emergency landing
3. Landing - Nose over/nose down

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Engine (reciprocating)-Recip eng cyl section-Not specified - C
2. Environmental issues-Physical environment-Runway/land/takeoff/taxi surface-Soft surface-Contributed to outcome

Narrative

On October 8, 2016, about 1840 central daylight time, a Cessna 150M airplane, N704LE, was substantially damaged during a forced landing following a loss of engine power near Beasley, Texas. The student pilot was not injured. The airplane was registered to and operated by private individuals under the provisions of 14 Code of Federal Regulations Part 91 as a solo instructional flight. Day visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The flight originated from the Wharton Regional Airport (ARM), Wharton, Texas, about 1610. The intended destination was the Sugar Land Regional Airport (SGR), Sugar Land, Texas.

The pilot stated that he departed SGR about 1530 and flew to Eagle Lake Airport (ELA) where he conducted some practice takeoffs and landings. He then flew to ARM, conducted some additional takeoffs and landings, and refueled the airplane. He reported conducting a preflight inspection at that time and observed no anomalies. After takeoff, he conducted practice maneuvers in the local area for about 30 minutes before deciding to return to SGR. The pilot stated that while cruising at 2,500 ft mean sea level en route to SGR, the engine "started failing." The engine speed decreased to about 1,500 rpm, with a "significant" vibration. His efforts to restore engine power were unsuccessful and the engine ultimately lost power completely. He executed a forced landing to a plowed agricultural field. During the landing, the airplane nosed over, resulting in damage to the vertical stabilizer, rudder, and left wing.

A postaccident examination of the engine revealed that the no. 2 cylinder exhaust valve was stuck in the full open position. Disassembly of the cylinder determined that the exhaust valve stem exhibited carbon deposits consistent with the stuck valve condition. No other anomalies with respect to the no. 2 cylinder or the remainder of the engine were observed.

Maintenance records indicated that the engine was overhauled in April 2002. At that time, the engine had accumulated 3,492 hours total time. The overhauled engine was installed on the accident airplane in May 2002, at a recording tachometer time of 3291.9 hours. According to the records, the most recent annual inspection was completed on December 18, 2015. A maintenance entry, dated February 26, 2016, noted that an exhaust valve leak on cylinder no. 4. The exhaust valve was subsequently replaced. The final entry was dated April 8, 2016, and noted that the no. 2 cylinder spark plugs were cleaned. The maintenance records did not contain any subsequent entries.

At the time of the examination, the airplane recording hour (Hobbs) meter and tachometer indicated 2373.4 hours and 4131.60 hours, respectively.

The engine manufacturer's recommended overhaul interval was 1,800 hours or 12 years. Although more than 14 years had elapsed since the overhaul, Federal Aviation Administration regulations do not require compliance with an engine manufacturer's recommended time-between-overhaul (TBO) interval.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA17CA087	01/12/2017 1450 CST	Regis# N1387D	Hayden, AL	Apt: N/a
Acft Mk/Mdl CESSNA 170-A		Acft SN 19963	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR C145 SERIES			Fatal 0 Ser Inj 1	Flt Conducted Under: FAR 091
Opr Name: FISHER JACK C		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The airplane was on the final approach leg of the traffic pattern to the turf runway. The private pilot recalled that the airplane was 800 ft above ground level (agl) and aligned with the runway, but he had no further recollection of the flight. A witness observed the airplane flying "low and slow" about 20 ft agl when the nose pitched upward, the airplane "stalled," and the left wing struck the ground. The airport owner stated that the trees at the approach end of the runway were damaged, and broken branches were found scattered at the base of the trees immediately after the accident. The fuselage and wings sustained substantial damage consistent with collision with trees and terrain. The pilot stated that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain clearance from trees during the approach.

Events

1. Approach - Controlled flight into terr/obj (CFIT)
2. Approach - Collision during takeoff/land
3. Landing-flare/touchdown - Aerodynamic stall/spin

Findings - Cause/Factor

1. Personnel issues-Psychological-Attention/monitoring-Monitoring environment-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Altitude-Not attained/maintained - C
3. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Effect on operation - C

Narrative

The airplane was on the final approach leg of the traffic pattern to the turf runway. The private pilot recalled that the airplane was at an altitude of 800 ft above ground level and aligned with the runway, but he had no further recollection of the flight. A witness observed the airplane flying "low and slow" about 20 feet above the ground when the nose pitched upward, the airplane "stalled," and the left wing struck the ground. The owner of the airport stated that the trees at the approach end of the runway were damaged, and broken branches were found scattered at the base of the trees immediately after the accident. The fuselage and wings sustained substantial damage consistent with collision with trees and terrain. The pilot stated there were no preaccident mechanical malfunctions or failures with the airplane during the flight that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ANC14CA037	06/04/2014 1730	Regis# N3442D	Fairbanks, AK	Apt: Totatlanika River 9AK
Acft Mk/Mdl CESSNA 170B-UNDESIGNAT		Acft SN 26985	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-300 SER			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: OWCZARCZAK JOHN T		Opr dba:		Aircraft Fire: NONE

Summary

The pilot said that he was departing in his airplane from the downhill-sloping (east) runway at 9AK with a slight tailwind. He said that, as the airplane tried to become airborne, the tailwind increased considerably, and the airplane would not climb. The airplane struck brush that encroached the east end of the runway area and veered left into brush and small trees. He stated that no mechanical failures or malfunctions of the airplane precluded normal operation. Damage included the separation of the right outboard elevator. Photographs of the airstrip provided by the pilot showed that 9AK was a short, narrow, rough-surfaced airstrip with brush growth encroachment.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The airplane's encounter with a tailwind during takeoff from a short, narrow airstrip, which resulted in a loss of lift and collision with brush and small trees.

Events

1. Takeoff - Loss of lift
2. Takeoff - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Climb rate-Not attained/maintained - C
2. Environmental issues-Conditions/weather/phenomena-Wind-Tailwind-Effect on operation - C
3. Environmental issues-Operating environment-Airport facilities/design-Runway/landing area length-Effect on operation
4. Environmental issues-Operating environment-Airport facilities/design-Runway/landing area condition-Effect on operation
5. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Contributed to outcome

Narrative

The pilot said that he was departing in his airplane from the downhill-sloping (east) runway at 9AK with a slight tailwind. He said that, as the airplane tried to become airborne, the tailwind increased considerably, and the airplane would not climb. The airplane struck brush that encroached the east end of the runway area and veered left into brush and small trees. He stated that no mechanical failures or malfunction of the airplane precluded normal operation. Damage included the separation of the right outboard elevator. (Note: Photographs of the airstrip provided by the pilot showed that 9AK was a short, narrow, rough-surfaced airstrip with brush growth encroachment.)

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA380	07/02/2017 1330 MST	Regis# N4482L	Tucson, AZ	Apt: Ryan Field RYN
Acft Mk/Mdl CESSNA 172-G		Acft SN 17254577	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-300 SER		Acft TT 3609	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: BARGAR, MARK W.		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot reported that, during the landing roll, the airplane pitched up and yawed to the right because of a "dust devil." He added that he applied full power but was unable to maintain level flight and that the right wing then the left wing struck the runway. The airplane touched down, the nose landing gear collapsed, and the airplane slid about 60 to 70 ft.

The airplane sustained substantial damage to the left wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

A review of recorded data from the automated weather observation station located on the airport reported that, about 40 minutes before the accident, the wind was from 300° at 9 knots, gusting to 16 knots. The same automated weather observation station reported that, about 15 minutes after the accident, the wind was from 220° at 9 knots. The airplane landed on runway 24R.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain pitch and yaw control during the landing roll in crosswind conditions.

Events

1. Landing - Loss of control on ground
2. Landing-landing roll - Attempted remediation/recovery
3. Landing-landing roll - Landing gear collapse

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Pitch control-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Yaw control-Not attained/maintained - C
4. Environmental issues-Conditions/weather/phenomena-Wind-Crosswind-Effect on operation

Narrative

The pilot reported that, during the landing roll, the airplane pitched up and yawed to the right because of a "dust devil". He added that he applied full power, but was unable to maintain level flight, and the right wing then the left wing struck the runway. The airplane touched down, collapsing the nose landing gear, and the airplane slid about 60 to 70 ft.

The airplane sustained substantial damage to the left wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

A review of recorded data from the automated weather observation station, located on the airport, reported that about 40 minutes before the accident the wind was from 300° at 9 knots, gusting 16 knots. The same automated weather observation station reported that about 15 minutes after the accident the wind was from 220° at 9 knots. The airplane landed on runway 24R.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA205	03/24/2017 1030 EDT	Regis# N13499	Baltimore, MD	Apt: Martin State Airport MTN
Acft Mk/Mdl CESSNA 172-M		Acft SN 17262796	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-360-A4M		Acft TT 3928	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: MIDDLE RIVER AVIATION LLC		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The solo student pilot reported that, as she taxied into the run-up area, the right wing impacted a parked airplane. The airplane continued and then impacted two other airplanes in the run-up area.

The airplane sustained substantial damage to both wings.

The student pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The student pilot's failure to maintain clearance from other airplanes in the run-up area.

Events

1. Taxi - Ground collision

Findings - Cause/Factor

1. Personnel issues-Psychological-Attention/monitoring-Monitoring environment-Student/instructed pilot - C
2. Environmental issues-Physical environment-Object/animal/substance-Aircraft-Effect on operation - C

Narrative

The solo student pilot reported that, as she taxied into the run-up area, the right wing impacted a parked airplane. The airplane continued and then impacted two other airplanes in the run-up area.

The airplane sustained substantial damage to both wings.

The student pilot report that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA337 06/11/2017 1150 EDT Regis# N33FM Ravenna, OH Apt: Portage County POV
Acft Mk/Mdl CESSNA 172-S Acft SN 172S11196 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO-360-L2A Acft TT 250 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: GEORGE S. REPCHICK Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The flight instructor reported that, during an instructional flight, while on short final, he told the student pilot to "pitch down" to maintain airspeed. He added that the student did not respond and that he again instructed the student to "pitch down now" while simultaneously pressing forward on the yoke. He further added that, as he pushed forward on the yoke, the student "pulled [back] with equal force on the yoke." Subsequently, the flight instructor pushed forward on the yoke "with greater force" than the previous attempt and stated, "my plane," to the student, but "continued to wrestle the controls with the student" as the airplane entered an aerodynamic stall. The airplane then impacted the runway threshold hard, the nose landing gear collapsed, and the airplane veered off the runway to the right.

The student pilot reported that this was his first flight with this flight instructor but that he had accumulated about 82 hours of dual instruction previously. He added that, during the second landing of the day, while on final approach, "the instructor had me pull the power and told me nose down." He further added that he "felt we were getting low and I told the instructor I wanted to increase power but the instructor told me to `nose down.'" The student pilot reported that the instructor again stated multiple times to "nose down," but he "did not believe there was enough room to continue nose down." The student pilot reported that the flight instructor subsequently took the flight controls and nosed the airplane down and that the airplane impacted the runway threshold hard and veered off the runway.

The fuselage and firewall sustained substantial damage.

The flight instructor and student pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

During postaccident correspondence with the National Transportation Safety Board investigator-in-charge, the flight instructor reported that he could not recall if, during preflight, he and the student pilot discussed the positive transfer of the flight controls.

Federal Aviation Administration Advisory Circular 61-115, "Positive Exchange of Flight Controls Program," dated March 10, 1995, stated, in part:

During flight training, there must always be a clear understanding between students and flight instructors of who has control of the aircraft. Prior to flight, a briefing should be conducted that includes the procedure for the exchange of flight controls. A positive three-step process in the exchange of flight controls between pilots is a proven procedure and one that is strongly recommended.

When an instructor is teaching a maneuver to a student, the instructor will normally demonstrate the maneuver first, then have the student follow along on the controls during a demonstration and, finally, the student will perform the maneuver with the instructor following along on the controls. When the flight instructor wishes the student to take control of the aircraft, he/she says to the student, "You have the flight controls." The student acknowledges immediately by saying, "I have the flight controls." The flight instructor again says, "You have the flight controls." During this procedure, a visual check is recommended to see that the other person actually has the flight controls. When returning the controls to the instructor, the student should follow the same procedure the instructor used when giving control to the student. The student should stay on the controls and keep flying the aircraft until the instructor says, "I have the flight controls."

There should never be any doubt as to who is flying the aircraft.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The flight instructor's failure to perform a go-around during final approach, which resulted in an aerodynamic stall and a hard landing. Contributing to the accident was the flight instructor's failure to brief the student pilot on the positive transfer of aircraft control during preflight.

Events

1. Prior to flight - Miscellaneous/other
2. Approach-VFR pattern final - Aerodynamic stall/spin
3. Approach-VFR pattern final - Loss of control in flight
4. Landing-flare/touchdown - Hard landing
5. Landing-landing roll - Runway excursion

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Instructor/check pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Angle of attack-Capability exceeded - C
3. Personnel issues-Action/decision-Action-Lack of action-Instructor/check pilot - C
4. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Not attained/maintained - C

National Transportation Safety Board - Aircraft Accident/Incident Database

5. Personnel issues-Action/decision-Action-Forgotten action/omission-Instructor/check pilot - F
6. Personnel issues-Task performance-Communication (personnel)-Lack of communication-Instructor/check pilot - F

Narrative

The flight instructor reported that, during an instructional flight, while on short final, he told the student pilot to "pitch down" to maintain airspeed. He added that the student did not respond and he again instructed the student to "pitch down now" while simultaneously pressing forward on the yoke. He further added that as he pushed forward on the yoke, the student "pulled [back] with equal force on the yoke." Subsequently, the flight instructor pushed forward on the yoke "with greater force" than the previous attempt and stated, "my plane" to the student, but "continued to wrestle the controls with the student" as the airplane entered an aerodynamic stall and impacted the runway threshold hard. After the airplane impacted the runway threshold, the nose gear collapsed and the airplane veered off the runway to the right.

The student pilot reported that this was his first flight ever with this flight instructor, but he had accumulated about 82 hours of dual instruction previously. He added that, during the second landing of the day, while on final approach "the instructor had me pull the power and told me nose down." He further added that he "felt we were getting low and I told the instructor I wanted to increase power but the instructor told me to "nose down." The student pilot reported that the instructor again stated multiple times to "nose down," but he "did not believe there was enough room to continue nose down." Subsequently, the student pilot reported that the flight instructor took the flight controls and nosed the airplane down, but the airplane impacted the runway threshold hard and veered off the runway.

The fuselage and firewall sustained substantial damage.

The flight instructor and student pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

During postaccident correspondence with the National Transportation Safety Board investigator-in-charge, the flight instructor reported that he could not recall during preflight that he and the student pilot discussed the positive transfer of the flight controls.

The Federal Aviation Administration Advisory Circular 61-115, Positive Exchange of Flight Controls Program, dated March 10th, 1995, stated in part:

During flight training, there must always be a clear understanding between students and flight instructors of who has control of the aircraft. Prior to flight, a briefing should be conducted that includes the procedure for the exchange of flight controls. A positive three-step process in the exchange of flight controls between pilots is a proven procedure and one that is strongly recommended.

When an instructor is teaching a maneuver to a student, the instructor will normally demonstrate the maneuver first, then have the student follow along on the controls during a demonstration and, finally, the student will perform the maneuver with the instructor following along on the controls. When the flight instructor wishes the student to take control of the aircraft, he/she says to the student, "You have the flight controls." The student acknowledges immediately by saying, "I have the flight controls." The flight instructor again says, "You have the flight controls." During this procedure, a visual check is recommended to see that the other person actually has the flight controls. When returning the controls to the instructor, the student should follow the same procedure the instructor used when giving control to the student. The student should stay on the controls and keep flying the aircraft until the instructor says, "I have the flight controls." There should never be any doubt as to who is flying the aircraft.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA090 12/28/2016 1230 CST Regis# N6941X Prairie Du Sac, WI Apt: Sauk-prairie Airport 91C
Acft Mk/Mdl CESSNA 172B-B Acft SN 17247841 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-300 SER Acft TT 6357 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: ARNOLD STEPHEN L TRUSTEE Opr dba: Aircraft Fire: NONE

Summary

The private pilot was conducting a local flight. He reported that, during the flight, the engine started to run roughly. He decided to return to the airport for a precautionary landing. About 4 miles from the airport and while lined up for landing, the pilot increased the engine throttle with no response; the airplane lost total power. He decided to land the airplane on a roadway about 1 mile from the airport. After landing on the roadway and coming to a complete stop, the pilot restarted the engine and attempted to taxi off the roadway. While he was taxiing the airplane, it struck three roadway signs and a fence, which resulted in structural damage to the left wing.

After the airplane was recovered, small amounts of water were present in the fuel from both wing sumps and the gascolator. The engine was started, ran normally, and both magnetos checked within normal limits. The loss of engine power could have resulted from water in the fuel but the definitive reason could not be determined.

Although the pilot landed the airplane successfully on the roadway after having engine power problems, his decision to taxi the airplane from the roadway and his failure to avoid the roadway signs and fence resulted in substantial damage to the airplane.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's decision to taxi the airplane from the roadway and his subsequent failure to maintain clearance from signs and a fence after a successful emergency landing following a total loss of engine power.

Events

1. Taxi - Collision with terr/obj (non-CFIT)
2. Taxi - Loss of control on ground

Findings - Cause/Factor

1. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C
2. Personnel issues-Psychological-Attention/monitoring-Monitoring environment-Pilot - C
3. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Effect on operation
4. Environmental issues-Physical environment-Object/animal/substance-Sign/marker-Effect on operation
5. Aircraft-Aircraft handling/service-Towing and taxiing-Taxiing-Incorrect use/operation - C
6. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid type
7. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid condition

Narrative

On December 28, 2016, about 1230 central standard time, a Cessna 172B single engine airplane, N6941X, registered to a private individual, sustained substantial damage after it struck roadway signs while attempting to taxi after a successful emergency landing near Prairie Du Sac, Wisconsin. The private pilot and one passenger were not injured. The flight was being conducted under the provisions of Federal Code of Regulations Part 91. Visual meteorological conditions prevailed throughout the area and a flight plan was not filed. The flight originated from the Sauk-Prairie Airport (91C), Prairie Du Sac, Wisconsin about 1130.

The pilot reported that he was flying locally at 4,500 feet after departing from 91C. The engine started to run rough and the pilot applied carburetor heat. He decided to return to the airport for a precautionary landing. About 4 miles from the airport, and lined up for landing on runway 18, the pilot increased the engine

throttle but had no response. He decided to land on a roadway about 1 mile from the airport.

After landing on the roadway and coming to a stop, the pilot started the engine and attempted to taxi off the roadway. While taxiing, the airplane struck 3 road signs and an iron fence, resulting in structural damage to the left wing.

The local Sheriff closed the highway as the airplane was loaded onto a trailer and transported to 91C where it was examined by an FAA inspector. Approximately 4-5 gallons of fuel were present in each wing tank. Small amounts of water were present in the fuel from both wing sumps and the gascolator. The engine was started, ran normally, and both magnetos checked within normal limits. The fuel appeared to be automotive fuel. The pilot confirmed that he used automotive fuel. Review of the logbooks did not disclose that the airplane was approved for the use of automotive fuel.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR17FAMS2 12/30/2016 1849 HST Regis# N174LL Open Water, HI Apt: N/a
Acft Mk/Mdl CESSNA 172M-M Acft SN 17261220 Acft Dmg: UNK Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-320-E2D Acft TT 10132 Fatal 3 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: LANI LEA SKY TOURS, LLC Opr dba: Aircraft Fire: UNK

Summary

According to a representative from the airplane rental facility, the noninstrument-rated pilot had departed on a cross-country flight. The pilot had received multiple weather reports from Lockheed Martin Flight Services, during which the weather briefer indicated that mountain obscuration and low ceilings existed along the flight route.

Flightpath data provided by the Federal Aviation Administration (FAA) indicated that, shortly after departure, the airplane flew to the northwest, directly into the area that was showing adverse weather conditions. Sometime later, radar data showed that the airplane began a descending right turn from about 2,525 ft mean sea level. The track ended less than 1 minute later over open water about 7 miles northwest of the departure airport. An alert notice was issued after an FAA air traffic control facility lost radar contact with the airplane. A search and rescue effort was initiated; however, the airplane and occupants were not found.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: Undetermined because the airplane was not located.

Events

1. Unknown - Unknown or undetermined

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot
3. Environmental issues-Conditions/weather/phenomena-Ceiling/visibility/precip-(general)-Decision related to condition

Narrative

On December 30, 2016, about 1849 Hawaiian standard time, a Cessna 172M, N174LL, impacted water near Molokai Airport (PHMK), Kaunakakai, Hawaii en route to the Honolulu Airport (HNL), Honolulu, Hawaii. Since that time, the private pilot and two passengers have not been located, and the airplane is missing. The airplane disappeared from Air Traffic Control radar after takeoff and is presumed to have crashed in the Pacific Ocean. The airplane was registered to Yamataka Kumiko and operated by Lani Lea Sky Tours, LLC under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed, and a visual flight rules flight plan was filed for the cross-country flight that departed PHMK at 1843.

A representative of the airplane rental facility reported that the pilot had rented one of their airplanes and departed HNL a few hours earlier on a recreational flight to PHMK. At the time of the accident, the flight was returning to HNL. According to Federal Aviation Administration (FAA) ATC radar data, shortly after the airplane's departure from PHMK it immediately started a shallow climb to the northwest. At 1848:28, the airplane began a descending right turn from a Mode C reported altitude of approximately 2,525 feet msl. The radar track ended at 1849:04, over open water approximately 1.5 nautical miles (nm) from the coast and about 7 nm northwest of PHMK.

On December 30, at 1913, the FAA issued an alert notice (ALNOT) for the missing airplane after FAA Air Traffic Control (ATC) lost radar contact with the airplane.

A search and rescue effort, conducted by the United States Coast Guard, began immediately after the missing airplane report was issued, but was subsequently suspended on January 2, 2017. To date, the missing airplane has not been located, and no emergency locator transmitter (ELT) signal was received during the search and rescue activities. Additionally, attempts to locate a signal from the pilot's cell phone utilizing network-based location analysis were unsuccessful.

The pilot, age 26, held a private pilot certificate with a rating for airplane single-engine land, which was issued on October 30, 2016. His most recent first-class medical certificate was issued on March 5, 2014, at which time he reported 1 total hour of flight experience. The pilot's FAA application for airman certificate indicated that he had accumulated a total of 73 flight hours, 4 instrument hours, and 14 hours of which were under the category "Night Take-Off/Landing." His personal flight logbook was not recovered.

National Transportation Safety Board - Aircraft Accident/Incident Database

According to an employee of the airplane rental facility, who also served as the pilot's flight instructor during his private pilot certificate training, the pilot reserved the accident airplane for the morning of the accident flight. Additionally, he asked if there were any "special instructions" related to the temporary flight restriction (TFR) that was active in the area. The airplane rental facility representative directed him to the instructions provided by the TFR. The following morning, the pilot sent a text message to the rental facility representative to cancel his reservation due to weather conditions, and that he would advise her if he planned to reschedule. At 1340, the pilot rescheduled his reservation to 1700, and requested life vests. After the rental facility representative reported to the pilot that he could use the airplane at approximately 1500, the pilot stated that he would "head right down." At 1515, the pilot and his girlfriend, a passenger on the accident flight, arrived at the rental facility. Again, the pilot requested instructions related to the TFR procedures from the flight school representative. The representative offered some basic requirements of the TFR contained within the NOTAMS including flight plan, radio contact, and the use of transponder codes. He subsequently filed a flight plan over the telephone with a weather briefer. A third passenger then entered the airplane rental facility and the representative retrieved an additional life vest as she was not aware of the additional passenger. At 1545, the pilot completed a preflight inspection of the airplane, and subsequently departed on their flight to PHMK.

At 1810, the pilot text messaged the airplane rental facility representative to report that they had landed "15 minutes prior." The representative interpreted the message to mean that the pilot had returned as his reservation ended at 1800. After a subsequent text message, the pilot confirmed that he was still at PHMK. She then called the pilot to refer him to a friend of hers who lived in the area that he could stay with if he was not night current. The pilot told her that he would "think about it." After their telephone conversation, the representative received a phone call from a friend who reported that Honolulu Control Facility was looking for N174LL.

A review of FAA records revealed that the airplane was manufactured in 1973 and registered to the owner on October 21, 2015. The airplane was powered by a Lycoming O-320-E2D, a normally-aspirated, direct drive, air cooled, 150 horsepower engine. The airplane owner reported that the airplane's most recent annual inspection was completed on December 28, 2016, at which time it had accumulated 10,131.5 total flight hours. At the time of the accident, the engine had accrued 815 total flight hours since the airplane's most recent overhaul. The airplane was equipped with a TSO 126 ELT, manufactured by Wulfsberg Electronics.

According to an NTSB weather study, the pilot requested multiple weather briefings from Lockheed Martin Flight Services (LMFS). He initially contacted LMFS at 1617 before he departed HNL for PHMK, but declined to receive adverse weather conditions. During his subsequent call to LMFS at 1708, the briefer discussed an AIRMET Sierra that was valid along his intended route of flight. The pilot contacted LMFS again at 1820 after he arrived at PHMK, at which time the briefer referenced AIRMET Sierra again. Additionally, the pilot received text weather briefing information at 1822 from LMFS that included an AIRMET Sierra that was still valid along his route of flight, METAR information for PHMK and HNL, TAF data for both airports, the area forecast, and winds aloft information.

An automated surface observing system (ASOS) report at PHMK (elevation 453 feet, 7 miles east-southeast of the airport) was issued 11 minutes before the pilot's departure time. It recorded wind from 010 at 11 knots with 19 knot gusts, 6 miles visibility, light rain, few clouds 900 feet, broken ceiling at 1,600 feet, an overcast ceiling at 5,500 feet, temperature 19°C, dewpoint 18°C, and an altimeter setting of 29.95 inches of mercury.

At 1854, an ASOS report from PHMK was issued, which recorded wind from 030 at 12 knots with 18 knot gusts, 6 miles visibility, light rain, mist, scattered clouds 900 feet, an overcast ceiling at 1,600 feet, temperature 19°C, dewpoint 18°C, and an altimeter setting of 29.95 inches of mercury.

Two AIRMETs for mountain obscuration that were valid at the time of the accident were issued at 1713 and 1845. The 1713 AIRMET reported mountain obscuration conditions on the north through east side of Molokai Island, and the 1845 AIRMET advised of temporary mountain obscuration above 2,000 feet due to clouds and heavy rain showers on the north through east side of Molokai Island.

An area forecast issued at 1714, which was valid at the time of the accident, forecasted few clouds above 1,000 feet mean sea level, scattered clouds at 2,000 feet, with a broken to overcast ceiling at 3,000 feet, tops at 10,000 feet, and light rain showers. The forecast reported temporary conditions with broken ceilings at 2,000 feet with tops to 12,000 feet, and visibilities between 3 and 5 miles with moderate rain showers. The area forecast further reported isolated conditions with broken ceilings at 1,500 feet with tops to 15,000 feet, and visibilities below 3 miles in heavy rain showers.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR16FAMS1 05/28/2016 1257 PDT Regis# N739ZE Avalon, CA Apt: Catalina Airport AVX
Acft Mk/Mdl CESSNA 172N Acft SN 17270930 Acft Dmg: DESTROYED Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-320 SERIES Fatal 2 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: ENCORE FLIGHT ACADEMY Opr dba: Aircraft Fire: UNK
AW Cert: STN

Summary

The flight instructor and student pilot departed for an instructional flight from an airport on an island en route back to their home airport on the mainland. A review of radar data indicated that the airplane took off with its transponder in the "off" position; therefore, no altitude information was available. The data indicated that, after taking off, the airplane flew north. The track ended 3 minutes later over open water about 5 miles north of the departure airport. After the airplane was reported missing, a search ensued. Although an oil slick consistent with drift models was present in this area, neither the airplane nor the occupants were found.

Four minutes before the airplane took off, the reported weather at the departure airport included 9 statute miles visibility and a broken cloud ceiling at 800 ft above ground level (agl); however, the remarks section reported that the ceiling varied between 600 and 1,000 ft agl. In addition, satellite imagery indicated that there was a thick marine layer just north of the airport.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: Undetermined because the airplane was not located.

Events

1. Enroute-cruise - Unknown or undetermined
2. Unknown - Unknown or undetermined

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

On May 28, 2016, about 1257 Pacific daylight time, a Cessna 172 airplane, N739ZE, is presumed to have crashed in the Pacific Ocean about 5 miles north of Avalon, California. The airplane was registered to Libra Air Inc. and operated by Encore Flight Academy as a 14 Code of Federal Regulations Part 91 instructional flight. The certified flight instructor and student pilot have not been located and the airplane is missing; presumed to be destroyed. Both pilots are presumed to be fatally injured. Both instrument and visual meteorological conditions prevailed in the area, and no flight plan had been filed. The airplane departed Catalina Airport (AVX), Avalon, California about 1254 and was destined for Van Nuys Airport (VNY), Van Nuys, California.

On May 29, 2016, a concerned family member of the student pilot contacted the Los Angeles Sheriff's Department (LASD) to report their family member missing. They reported that the student pilot went flying with an instructor the day prior, and they have not heard from him since. The LASD contacted Encore Flight Academy, who reported that the accident airplane was not at their facility, nor do they have record of it returning the day prior.

The NTSB attempted to contact the operator numerous times, but to no avail; nor did the operator submit a Pilot/Operator Aircraft Accident/Incident Report, NTSB Form 6120.1.

Review of radar data for the area revealed that the airplane took off from VNY and landed safely at AVX at 1209. At 1254, the airplane took off from AVX with its transponder in the off position and flew north. At 1257 the track ends over the water 5 miles north of AVX. An oil slick consistent with drift models was present in this area.

A weather study revealed that at the time of takeoff from VNY, the weather at AVX reported 4 miles visibility, mist, and an overcast ceiling of 300 feet agl. When the airplane arrived at AVX weather indicated 8 miles of visibility and an overcast ceiling of 500 feet agl. Four minutes prior to the airplane departing AVX, weather reported 9 miles of visibility and a broken ceiling at 800 feet agl, however, in the remarks section it reported the ceiling varied between 600 feet agl and 1000 feet agl. In addition, satellite imagery indicated a thick marine layer was just north of AVX, and in the vicinity of the presumed accident location.

The U.S. Coast Guard, Civil Air Patrol, and private entities conducted a search for the missing airplane along the apparent route of flight; however, no wreckage was found. The pilots and airplane remain missing.

National Transportation Safety Board - Aircraft Accident/Incident Database

Incident Rpt# CEN17IA155 03/20/2017 1646 Regis# N6402V Greeley, CO Apt: Greeley-weld County GXY
Acft Mk/Mdl CESSNA 172RG-NO SERIES Acft SN 172RG0664 Acft Dmg: MINOR Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O&VO-360 SER Acft TT 6490 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: NORTHERN SKIES AVIATION INC Opr dba: Aircraft Fire: NONE

Summary

At the end of a cross-country flight, the commercial pilot noted that the left main landing gear would not extend. He elected to divert to another airport and land with the gear retracted. Postaccident examination revealed that the left main landing gear actuator assembly housing was cracked across the forward attach bolt hole, which resulted in the inability to fully raise or extend the landing gear using either the normal method or the emergency hand pump. Following the incident, the Federal Aviation Administration released a Special Airworthiness Information Bulletin (SAIB) emphasizing the importance of inspecting main landing gear actuator assemblies. This SAIB recommended complying with a supplemental inspection document provided by the manufacturer that prescribed a combination of visual, fluorescent penetrant, and eddy current inspections. The SAIB also included initial and repetitive inspection intervals.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: Failure of the left main landing gear actuator assembly, which resulted in an inability to extend the left main landing gear.

Events

1. Approach - Miscellaneous/other
2. Landing - Landing gear collapse

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Landing gear system-Landing gear actuator-Failure - C

Narrative

On March 20, 2016, at 1646 mountain daylight time, a Cessna 172RG airplane, N6402V, landed gear up following a landing gear malfunction at Greeley-Weld County Airport (GXY), Greeley, Colorado. The pilot was not injured and the airplane sustained minor damage. The airplane was registered to and operated by Northern Skies Aviation Inc. under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day visual meteorological conditions existed at the time of the incident. The flight departed at 1330 without a flight plan from Gillette-Campbell County Airport (GCC), Gillette, Wyoming, with a planned destination of Colorado Plains Regional Airport (AKO), Akron, Colorado.

According to the pilot, he diverted to GXY after the left landing gear did not extend during arrival to AKO. Following unsuccessful attempts to extend the landing gear, the pilot elected to land gear up at GXY. Examination by Federal Aviation Administration (FAA) inspectors revealed the left main landing gear actuator assembly (part number 9882015-2) housing was cracked across the forward attach bolt hole. The crack allowed the actuator bore to open enough such that the piston would not engage the landing gear pivot sector sufficiently for gear extension. This failure mode resulted in the inability to fully raise or extend the landing gear, either in the normal method or with the emergency hand pump.

The airplane's main landing gear was subject to FAA airworthiness directive (AD) 2001-06-06, which required inspection for cracks in landing gear pivot assemblies. This AD was accomplished for the airplane on May 25, 2001. For this incident, a crack was observed in the landing gear actuator assembly, which mates with the landing gear pivot assembly. The failed landing gear actuator assembly was originally installed with the airplane, which had a total time of 6490.1 hours.

To address the need for initial and repetitive inspections of the landing gear actuator assembly, the FAA published maintenance alerts in prior years and Textron published service bulletins in 2001 and 2007. Following this incident, the FAA released Special Information Airworthiness Bulletin (SAIB) CE-17-16 for Cessna 172RG, R182, TR182, FR182, and 210/T210/P210-series airplanes. The SAIB emphasized the importance of inspecting main landing gear actuator assemblies and recommended complying with Textron supplemental inspection document (SID) 32-10-01, which directs a combination of visual, fluorescent penetrant, and eddy current inspections, depending on the airplane model. The SAIB included initial and repetitive inspection intervals, as well as recommending an inspection after an unplanned event, such as a hard landing.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA119	01/06/2017 1500 PST	Regis# N8148T	Lakeport, CA	Apt: Lampson Field 102
Acft Mk/Mdl CESSNA 175-B		Acft SN 17556848	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-360-A1A		Acft TT 4141	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: BASTIAN BARRY L		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot reported that he attempted to start the airplane but that "the starter did not engage the flywheel." He affirmed that he turned off the master switch and exited the airplane. He reported that he was alone when he pulled the propeller through, and the airplane started. The unoccupied airplane rolled across the tarmac and collided with the empennage of a parked airplane. Substantial damage was sustained to the left wing spar.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to secure the airplane before pulling the propeller through, which resulted in the airplane rolling and subsequently colliding with a parked airplane.

Events

1. Prior to flight - Sys/Comp malf/fail (non-power)
2. Prior to flight - Ground collision

Findings - Cause/Factor

1. Aircraft-Aircraft handling/service-Parking/securing-Tie-down/mooring-Incorrect use/operation - C
2. Personnel issues-Action/decision-Action-Lack of action-Pilot - C
3. Environmental issues-Physical environment-Object/animal/substance-Aircraft-Effect on operation - C

Narrative

The pilot reported that he attempted to start the airplane but "the starter did not engage the flywheel." He affirmed that he turned off the master switch and exited the airplane. He reported that he was alone when he pulled the propeller through and the airplane started. The unoccupied airplane rolled across the tarmac and collided with the empennage of a parked airplane. Substantial damage was sustained to the left wing spar.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA060 12/21/2016 1020 EST Regis# N8381T Millersburg, OH Apt: Holmes County 10G
Acraft Mk/Mdl CESSNA 175C-C Acft SN 17557081 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-360-A3A Acft TT 2169 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: PETER B MAPES Opr dba: Aircraft Fire: NONE

Summary

The private pilot was conducting a personal cross-country flight. The pilot reported that, after takeoff, he switched to the left fuel tank for the cruise portion of the flight. He added that, about 5 miles from the destination airport, he completed the Before Landing checklist; however, he "failed to position the fuel selector to [the] both" position at that time, which "set the stage for fuel exhaustion." The engine subsequently lost power. He checked the fuel selector, found that it was still set to the left tank, and moved it to the right tank. He subsequently executed a forced landing to an open area at the base of a hill, during which the airplane impacted a fence and sustained substantial damage to the firewall and right wing. The pilot stated that no mechanical malfunctions or failures with the airplane preceded the accident. The pilot's failure to move the fuel selector handle to the "both" position in accordance with the Before Landing checklist resulted in the loss of engine power due to fuel starvation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's improper in-flight fuel management and his failure to switch the fuel selector to the "both" position in accordance with the Before Landing checklist, which resulted in a loss of engine power due to fuel starvation.

Events

1. Approach-VFR pattern final - Loss of engine power (total)
2. Emergency descent - Off-field or emergency landing
3. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid management - C
2. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C
3. Personnel issues-Task performance-Use of equip/info-Use of checklist-Pilot - C
4. Environmental issues-Physical environment-Object/animal/substance-Fence/fence post-Contributed to outcome

Narrative

On December 21, 2016, about 1020 eastern standard time, a Cessna 175C airplane, N8381T, impacted a fence post and terrain during a forced landing following a loss of engine power on approach to the Holmes County Airport (10G), Millersburg, Ohio. The pilot sustained a minor injury and the passenger was not injured. The airplane was substantially damaged. The airplane was registered to and operated by private individuals under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The flight originated from the Davis Airport (W50), Laytonsville, Maryland, about 0700 and was destined for 10G.

The pilot reported that he conducted a "thorough preflight" inspection before takeoff from W50. The fuel samples drained from the airplane fuel system did not contain any contamination. After takeoff, the pilot switched to the left fuel tank for the cruise portion of the flight. About 5 miles from 10G, he completed the before landing checklist. However, he "failed to position the fuel selector to [the] both" position at that time, which "set the stage for fuel exhaustion." On final approach, about 1/3 of a mile from the runway about 1,600 ft mean sea level, the engine lost power. He checked the fuel selector, found it still set to the left tank and changed it to the right tank. He subsequently executed a forced landing to an open area at the base of a hill. The pilot stated that no mechanical malfunctions or failures preceded the accident.

The airplane came to rest adjacent to a wire mesh fence. The nose landing gear separated, the left main landing gear collapsed, and the engine mount and firewall were deformed during the forced landing. The right wing was partially separated from the fuselage at the aft spar attachment. The right wing also exhibited a leading edge dent consistent with impact to a fence post. The left wing was deformed upward near the wing tip consistent with ground contact due to the collapsed landing gear.

The airplane owner's manual specified that the fuel selector should be set to the "both on" position before landing.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17FA332	08/28/2017 1312 EDT	Regis# N180LP	Gaylord, MI	Apt: N/a
Acft Mk/Mdl CESSNA 180J-J		Acft SN 18052344	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl P. PONK AVIATION O-470-50			Fatal 0 Ser Inj 2	Flt Conducted Under: FAR 091
Opr Name: LUCIANO IGLIO PIEROBON		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Events

1. Maneuvering - Loss of engine power (partial)

Narrative

On August 28, 2017, about 1312 eastern daylight time, a float-equipped Cessna 180J airplane, N180LP, impacted trees and terrain during a forced landing near Gaylord, Michigan. The private pilot and his passenger were seriously injured, and the airplane sustained substantial damage. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 without a flight plan. Day visual meteorological conditions prevailed for the local flight that departed Otsego Lake, Michigan, about 1250.

The pilot reported that after departing Otsego Lake he flew north toward the Gaylord Regional Airport (GLR) to fly a practice instrument landing system approach to runway 9. After the practice approach, he flew toward his private airstrip located about 5 miles southeast of GLR. He reported that the airplane experienced a total loss of engine power and the propeller stopped rotating as he was completing a series of turns near his airstrip. The pilot stated that before the loss of engine power the airplane was at least 500 ft above ground level (agl) and the engine was operating at 2,300 rpm and 23 inches of manifold pressure. Additionally, he stated that the engine did not sputter, bang, or run rough before the loss of engine power. The pilot reported that the airplane collided with trees during the forced landing. When asked how much fuel was on-board before the flight, the pilot estimated that the main fuel tanks contained about 45 gallons total, and that both 17-gallon auxiliary fuel tanks were completely full. Additionally, the pilot stated that he does not operate the engine with carburetor heat engaged above 17 inches of manifold pressure.

The passenger reported that they circled the pilot's private airstrip a couple of times to view the property. While circling over the airstrip, the pilot and passenger observed and discussed how the fuel gauges fluctuated while the airplane was in a sustained turn with partially full fuel tanks. The passenger reported that the engine quit while the airplane was in a turn, and that the airplane collided with trees as the pilot attempted to land at the airstrip. The passenger stated that the airplane came to rest inverted, and that a first responder assisted him in getting out of the airplane.

There were no eyewitness to the accident; however, there were numerous witnesses who reported hearing the airplane's engine running rough immediately before the crash. One witness reported hearing the airplane's engine operation fluctuate between "sputtering" and "revving" before it lost total power.

An on-scene investigation established that the airplane initially collided with a 50 ft tall white pine tree, followed by a 30 ft tall birch tree, and came to rest inverted about 155 ft from the initial tree impact. The wreckage debris path was on a northeast heading. There were at least two branches that exhibited flat cuts and black paint transfer that were consistent with a propeller strike. Flight control cable continuity was confirmed from the cockpit controls to the individual flight control surfaces. The wing flaps were found fully retracted. The engine throttle control was out about 1.5 inches, the propeller control was out about 1/2 inch, and the mixture control was in the full rich position. The carburetor heat control was in the "OFF" position. The recording tachometer indicated 3,951.42 hours.

With the airplane still inverted, about 3/4 cup of fuel was drained from the supply line between the fuel flow transducer and the carburetor. The recovered fuel was blue in color and free of any contamination. Additionally, the fuel strainer assembly leaked fuel as it was opened. The fuel strainer screen was clear of debris. The inverted carburetor was removed from the engine and its accelerator pump discharged fuel when actuated. The carburetor fuel bowl contained several ounces of fuel. No anomalies were observed with the carburetor floats, needle valve, venturi, or inlet fuel screen. When the airplane was recovered to an upright position, fuel was observed to drain from the fractured fuel lines located in the aft door posts. Recovered fuel samples were blue in color and free of any contamination. The fuel selector was found in the "BOTH" position, and a functional test revealed no anomalies with the fuel selector. The airplane was equipped with an electronic fuel flow indicator, which displayed 69.2 gallons remaining and 24.8 gallons had been used since the device was last reset. The electronic fuel flow indicator was configured to use 60 gallons for the combined capacity of the main fuel tanks and 34 gallons for the auxiliary tanks, for a total fuel capacity of 94 gallons.

The engine remained partially attached to the firewall by control cables, electrical wires, and oil lines. Mechanical continuity was confirmed from the engine components to their respective cockpit engine 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. A boroscope inspection did not reveal any anomalies with the cylinders, pistons, valves, or valve seats. The 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 two-blade constant speed propeller remained attached to the crankshaft flange. The propeller exhibited minor burnishing on the cambered-side of both blades. One blade appeared straight. The other propeller blade exhibited a slight twist toward low pitch near the blade tip, and the blade tip was bent slightly forward. The postaccident examination revealed no evidence of a mechanical malfunction or failure that would have precluded normal engine operation. The engine was retained for an operational test at the manufacturer.

At 1253, the automated surface observing system located at Gaylord Regional Airport (GLR) reported: variable wind direction at 4 knots; a broken ceiling at 1,700 ft above ground level (agl) and an overcast ceiling at 9,000 ft agl; 10 miles surface visibility; temperature 18°C; dew point 14°C; and an altimeter setting of 30.13 inches of mercury.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA133	01/22/2017 1525 CST	Regis# N3828D	Sebring, OH	Apt: Tri-city 3G6
Acft Mk/Mdl CESSNA 182-A		Acft SN 34528	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL O-470-L		Acft TT 4720	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: WARNER THOMAS E		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot in the tricycle-gear-equipped airplane reported that he landed about 4 ft short of the asphalt runway. The nose landing gear struck the 6-inch-high asphalt perimeter and separated from the airplane. The pilot aborted the landing, the airplane bounced, and the pilot established a climb. He completed one traffic pattern and an approach. During the second landing, the pilot chose to land on the turf safety area parallel to the runway. When the airplane's main landing gear touched down on the turf surface, the airplane nosed over. The airplane sustained substantial damage to the firewall, fuselage, left wing, and empennage.

Per the National Transportation Safety Board Pilot Aircraft Accident Report, the pilot reported that the accident could have been prevented by being more diligent in observing the touchdown point on the runway.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain the proper glidepath during landing, which resulted in the airplane landing short of the runway, the nose landing gear separating, and the airplane nosing over during a second landing.

Events

1. Landing-flare/touchdown - Abnormal runway contact
2. Landing-flare/touchdown - Landing gear collapse
3. Landing-flare/touchdown - Nose over/nose down
4. Landing-flare/touchdown - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent/approach/glide path-Not attained/maintained - C

Narrative

The pilot in the tri-cycle gear equipped airplane reported that he landed about 4 ft short of the asphalt runway. The nose landing gear struck the 6-inch high asphalt perimeter and separated from the airplane. The pilot aborted the landing and the airplane bounced and the pilot was able to establish a climb. He completed one traffic pattern and an approach. During the second landing, the pilot elected to land on the turf safety area parallel to the runway. When the airplane's main landing gear touched down on the turf surface, the airplane nosed over. The airplane sustained substantial damage to the firewall, fuselage, left wing and the empennage.

Per the National Transportation Safety Board Pilot Aircraft Accident Report, the pilot reported that the accident could have been prevented by being more diligent in observing the touchdown point on the runway.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA320	06/02/2017 1000	Regis# N5011D	Elk City, ID	Apt: N/a
Acft Mk/Mdl CESSNA 182-A		Acft SN 51111	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-470-L35B		Acft TT 8730	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: KENRICK THOMAS		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot reported that, during the landing, while over the threshold of the airstrip, he aerodynamically stalled the airplane. He added that the airplane touched down and bounced and then drifted left and bounced again while exiting the airstrip. Subsequently, the left wing hit a tree, and the airplane came to rest nose down.

The airplane sustained substantial damage to the fuselage and left wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain adequate airspeed and his exceedance of the wing's angle of attack while on short final, which resulted in an aerodynamic stall.

Events

1. Landing - Aerodynamic stall/spin
2. Landing - Hard landing
3. Landing - Abnormal runway contact
4. Landing - Runway excursion
5. Landing - Collision with terr/obj (non-CFIT)
6. Landing - Nose over/nose down

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Angle of attack-Capability exceeded - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Not attained/maintained - C
4. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Contributed to outcome
5. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained

Narrative

The pilot reported that, during the landing, while over the threshold of the airstrip, he aerodynamically stalled the airplane. He added that the airplane touched down and bounced, then drifted left and bounced again while exiting the airstrip. Subsequently, the left wing hit a tree and the airplane came to rest nose down.

The airplane sustained substantial damage to the fuselage and left wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA367 06/24/2017 1715 PDT Regis# N524BF San Martin, CA Apt: San Martin E16
Acft Mk/Mdl CESSNA 182-A Acft SN 34331 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-470 SERIES Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: SAN JOSE SKYDIVING CENTER Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The pilot reported that he departed for a parachute jump flight with 12 gallons of fuel onboard. He added that, after the parachute jumpers exited the airplane about 10,500 ft mean sea level (msl), he initiated a left spiraling descent back to the airport. He further added that he "heard and felt the engine start [to] quiet down as if it was shutting down." He then began to make right descending turns and verified that the fuel selector was in the "both" position. He added that the cylinder head temperature was decreasing, so he switched back to left descending turns and that the "fuel starvation due to banking happened two more times."

The pilot reported that he entered left downwind about 4,000 ft msl, pushed the throttle and mixture controls full forward, and determined that the "engine wasn't producing much power." He added that, during short final, he realized the airplane was too low, so he landed the airplane on a highway "on-ramp." During the forced landing, the airplane impacted a guard rail and a post.

The airplane sustained substantial damage to the fuselage and both wings.

The pilot reported that he "suspected engine power loss due to fuel exhaustion."

During a postaccident examination, the Federal Aviation Administration inspector drained about 12 gallons of fuel from both wing tanks and the gascolator. In the Description section of the Cessna 182A Owner's Manual, it states that there are 1.5 gallons of unusable fuel per fuel tank (3 gallons) and that, when not in level flight, there are an additional 3.5 gallons of unusable fuel per fuel tank (10 gallons).

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to attain a proper glidepath on approach for landing, which resulted in an impact with a guard rail and post. Contributing to the accident was the pilot's failure to ensure that sufficient fuel was onboard for nonlevel flight, which resulted in fuel starvation.

Events

1. Enroute-descent - Fuel starvation
2. Emergency descent - Landing area undershoot
3. Emergency descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent/approach/glide path-Attain/maintain not possible - C
3. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid level - F
4. Personnel issues-Task performance-Planning/preparation-Fuel planning-Pilot - F
5. Environmental issues-Physical environment-Object/animal/substance-Fence/fence post-Contributed to outcome

Narrative

The pilot reported that he departed for a parachute jump flight with 12 gallons of fuel. He added that after the parachute jumpers exited the airplane about 10,500 ft. mean sea level (MSL), he initiated a left spiraling descent back to the airport. He further added that he "heard and felt the engine start [to] quiet down as if it was shutting down". He then began to make right descending turns and verified that the fuel selector was in the "both" position. He added that the cylinder head temperature was decreasing, so he switched back to left descending turns and the "fuel starvation due to banking happened two more times".

The pilot reported that he entered left downwind about 4,000 ft. MSL, pushed the throttle and mixture controls full forward, and determined that the "engine wasn't producing much power". He added that during short final he realized the airplane was too low, so he landed the airplane on a highway "on-ramp". During the forced landing, the airplane impacted a guard rail and a post.

The airplane sustained substantial damage to the fuselage and both wings.

The pilot reported that he "suspected engine power loss due to fuel exhaustion".

National Transportation Safety Board - Aircraft Accident/Incident Database

During a postaccident examination, the Federal Aviation Administration (FAA) inspector drained about 12 gallons of fuel from both wing tanks and the gascolator.

In the Description section of the Cessna 182A Owner's Manual, it states that there are 1.5 gallons of unusable fuel per fuel tank (3 gallons) and that there are an additional 3.5 gallons of unusable fuel per fuel tank (10 gallons) when not in level flight.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN16LA235	06/26/2016 1545 CDT	Regis# N5792B	Kankakee, IL	Apt: Greater Kankakee IKK
Acft Mk/Mdl CESSNA 182-F		Acft SN 33792	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR O-470 SERIES		Acft TT 7900	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: JACQUIN AVIATION INC		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The commercial pilot reported that, after dropping off skydivers, he made a rapid spiraling descent back to the airport. The pilot added that, because the wind had changed such that it resulted in a tailwind, he initiated a go-around during the landing approach; however, when he advanced the throttle, the engine initially surged and then lost power. The pilot made a forced landing in a corn field near the end of the runway.

After the accident, the pilot drained about 7 gallons of fuel from the airplane. Fuel was present in the carburetor, but the gascolator bowl was empty. No other anomalies were noted. It is likely that the low level of fuel unported during the rapid spiraling descent, which led to the subsequent fuel starvation to the engine.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: Aa total loss of engine power due to fuel starvation, which resulted from the low level of fuel unporting during a rapid spiraling descent.

Events

1. Initial climb - Fuel starvation
2. Landing-flare/touchdown - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid level - C

Narrative

On June 26, 2016, about 1545 central daylight time, a Cessna 182, N5792B, collided with the terrain during a forced landing in a corn field south of the Greater Kankakee Airport (IKK), Kankakee, Illinois. The pilot was not injured. The airplane received substantial damage to the left wing. The aircraft was registered to and operated by Jacquin Aviation, Inc., as a skydiving flight under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the flight, which not operated on a flight plan. The flight originated from IKK about 1515.

The pilot reported the accident occurred on the 4th flight of the day. He dropped the skydivers and returned to the airport lining up to land on runway 16, which he had previously used. During the approach, the pilot noticed the wind direction had changed and he now had a tailwind. The pilot initiated a go-around from an altitude of about 200 ft above ground level. He raised the flaps to 30° and advanced the throttle. He reported there was an initial surge in power, then the engine stopped developing power. The pilot made a right turn and landed the airplane in a corn field on the south side of the airport.

A Federal Aviation Administration (FAA) inspector arrived on scene as the pilot was draining the fuel from the airplane. The pilot drained about 7 gallons of fuel from the airplane. The FAA inspector stated there was some fuel in the carburetor bowl when he removed the plug, but the gascolator was empty. No other anomalies were noted which would have resulted in a loss of engine power. The pilot reported he used the carburetor heat during the landing approach and turned it off when he initiated the go-around.

The pilot speculated that the low level of fuel most likely unported during his rapid spiraling descent after dropping the skydivers which resulted in fuel starvation to the engine.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA362 06/23/2017 1620 PDT Regis# N4356R Henderson, NV Apt: Henderson Executive HND
Acraft Mk/Mdl CESSNA A185-F Acft SN 18502939 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL IO-520-D-22 Acft TT 647 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: AAB CAPITAL LLC Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The pilot reported that, during the landing as the tailwheel began to settle, a "massive and unexpected gust of wind" lifted the left wing. He immediately attempted to recover by adding rudder inputs; however, the wind shifted to a "quartering tailwind," and the rear of the airplane whipped rapidly to the right. He applied the brakes as the airplane encountered a downhill slope on the left side of the runway, and it then came to rest inverted.

The airplane sustained substantial damage to the empennage.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

The automated weather observation system located on the airport reported that, about the time of the accident, the wind was from 360° at 12 knots, gusting to 17 knots. The pilot landed on runway 35L.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain directional control during the landing roll in gusting wind conditions.

Events

1. Landing - Loss of control on ground
2. Landing - Attempted remediation/recovery
3. Landing - Runway excursion
4. Landing - Nose over/nose down

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Environmental issues-Conditions/weather/phenomena-Wind-Gusts-Effect on operation
4. Environmental issues-Physical environment-Terrain-Sloped/uneven terrain-Contributed to outcome

Narrative

The pilot reported that, during the landing as the tailwheel began to settle, a "massive and unexpected gust of wind" lifted the left wing. He immediately attempted to recover by adding rudder inputs, however the wind shifted to a "quartering tailwind", and the rear of the airplane whipped rapidly to the right. He applied the brakes as the airplane encountered a downhill slope on the left side of the runway, and came to rest inverted.

The airplane sustained substantial damage to the empennage.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

The automated weather observation system located on the accident airport, about the time of the accident, reported the wind from 360° at 12 knots, gusting to 17 knots. The pilot landed on runway 35L.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA15FA312	08/15/2015 1002 EDT	Regis# N63TV	West Caldwell, NJ	Apt: Essex County CDW
Acft Mk/Mdl CESSNA T206H		Acft SN T20608925	Acft Dmg: DESTROYED	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING TIO-540-AJ1A		Acft TT 1155	Fatal 1 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: STALACTITE LLC		Opr dba:		Aircraft Fire: GRD
				AW Cert: STN

Events

1. Prior to flight - Powerplant sys/comp malf/fail

Narrative

HISTORY OF FLIGHT

On August 15, 2015, at 1002 eastern daylight time, a Cessna T206H, N63TV, impacted trees and terrain after a loss of engine power during initial climb at Essex County Airport (CDW), Caldwell, New Jersey. The commercial pilot was fatally injured, and the airplane was destroyed. The airplane was registered to Stalactite, LLC, and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the positioning flight, destined for Teterboro Airport (TEB), Teterboro, New Jersey.

According to a friend of the pilot, the pilot planned to fly to TEB, pick up the owner of the airplane and fly with him to South Hampton, where the owner had a residence. The friend owned a Cessna 182 and was interested in purchasing a Cessna 206 like the one the pilot was flying, so the pilot invited him to come to CDW before the flight and see the airplane.

The friend arrived at the airport about 0930 and noticed that the pilot had already completed the preflight inspection of the airplane. The pilot appeared to be "fine, his usual self, and doing good that morning." The pilot's friend was in the fixed base operator's (FBO) lobby when he heard the airplane's engine start. The airplane stayed on the ramp for a few minutes and then taxied out. About 10 minutes later, the pilot's friend saw the airplane as it passed by a window in the FBO. The airplane seemed quieter than it should have to him, and he thought that it did not seem to be moving very fast. About 10 minutes later, a line service agent entered the FBO and said that there had been an airplane accident.

According to information provided by the Federal Aviation Administration (FAA), the pilot contacted the CDW air traffic control tower, requested to taxi, and advised the controller that he had the current weather that was being transmitted by CDW's automatic terminal information service. The controller subsequently instructed the pilot to taxi to runway 22 and to hold short of the runway at intersection "November," which was normally used for airplanes departing on runway 22. The airplane taxied to the designated location and remained there for about 5 minutes. According to FAA inspectors, during the time that the airplane remained stationary, a student pilot heard the airplane's engine go from near idle to full power about five times and reported that the engine did not "sound right."

The air traffic controller cleared the pilot for takeoff with a left turnout. Shortly after becoming airborne, the pilot advised that he had a "problem," declared an emergency, and requested to "return to the field immediately." The controller cleared the pilot to land on any runway, and the pilot reported that he was unable to maintain engine power. There were no other communications from the pilot.

Review of security camera video revealed that, during the takeoff, the airplane appeared to accelerate slowly and rotated about 1,800 ft. after the pilot initiated the takeoff roll." Once airborne, the airplane began to pitch slightly up and down while remaining in ground effect and then slowly climbed. The airplane momentarily reached an altitude that was just above the trees that surrounded the airport, then began to lose altitude, and turned left about 90°. The airplane disappeared from view of the camera, and a smoke cloud then rose from behind a tree line.

According to witnesses who saw the airplane just before impact, the airplane was at the same height as the trees and appeared to be gliding toward the ground. One witness stated that the airplane appeared to be "in slow motion;" it then banked sharply to the left and pitched steeply down. Another witness reported that the airplane made "a hard-left turn, went into a nose dive, and exploded when it hit the ground." Three additional witnesses reported similar observations. The witnesses heard no noise coming from the airplane before the impact.

PERSONNEL INFORMATION

According to FAA and pilot records, the pilot held a commercial pilot certificate with ratings for airplane single-engine land and instrument airplane, a flight

National Transportation Safety Board - Aircraft Accident/Incident Database

instructor certificate with a rating for airplane single-engine, and a ground instructor certificate with an advanced ground instructor rating. His most recent FAA third-class medical certificate was issued on March 30, 2015. He had accrued about 1,941 total hours of flight experience, 16 hours of which were in the accident airplane make and model.

AIRCRAFT INFORMATION

The airplane was a 6-place, single-engine, high-wing monoplane of conventional metal construction. It was equipped with fixed-tricycle-type landing gear and was powered by a turbocharged, 310-horsepower, Lycoming TIO-540-AJ1A engine, driving a three-blade, McCauley, controllable pitch propeller.

According to FAA and maintenance records, the airplane was manufactured in 2009. Its most recent annual inspection was completed on April 17, 2015. At the time of the inspection, the airplane and engine had accrued 1,155.4 total hours of operation.

According to the maintenance provider who had maintained the airplane since December 2011, anything that bothered the owner about the airplane would get fixed. Most of the items that were addressed by the maintenance provider were cosmetic or routine maintenance, such as oil and filter changes, gauges, starter replacement, lights, accessories, battery replacement, and compliance with airworthiness directives and service bulletins. The maintenance provider reported that the owner's landings could be a little rough, so they had also replaced some tires as he had experienced a few flat tires, and, as a result, the owner would keep a spare set in the airplane in case he blew a tire on landing.

Review of maintenance records revealed that the airplane's engine had been receiving regular oil changes since new as well as spectrometric oil analysis. Review of oil analysis reports provided by the maintenance repair organization indicated that a sample of the engine's oil that was taken on March 5, 2012, contained elevated levels of iron, nickel and chromium. Another sample taken on December 19, 2013, contained elevated levels of aluminum, chromium, iron, and nickel. In a report dated March 9, 2015, the laboratory commented about an oil sample that had been taken on March 4, 2015, stating that:

"These numbers are a lot easier to take than the high aluminum, chrome, iron, and nickel we saw last time. The shorter oil run obviously helped, but most of the metals are lower on a ppm/hour basis too, meaning that the engine really did wear better. If anything, nickel could still stand to be lower. 13 ppm is almost high enough to get a mark, so that's one we'll be monitoring next time. There's a trace of fuel to report this time, but that's not anything to worry about. It's likely just from normal use. Much better at 1,151.6 hours S[ince]New."

In a report dated August 12, 2015, for an oil sample that was taken on August 4, 2015 (11 days before the accident), the laboratory commented that:

"Steady as she goes for this sample out of N63TV. If we're being picky you could say that iron should have come down as a result of the shorter oil run, but 39 ppm isn't bad at all for one of these engines after 20 hours on the oil. Everything else is in good shape, so we'd be surprised if the extra iron on a per-hour basis turned out to be an issue. No problems with the oil itself were found, making for a very nice report overall."

Maintenance records indicated that two repairs requiring replacement of major components of the engine had been accomplished. The first repair followed a report from the owner that the engine was experiencing high oil consumption. According to a maintenance entry dated January 21, 2013, and the associated work order, this resulted in the maintenance provider inspecting for the cause of the oil leaks by first washing down the engine, and then after a test flight, tightening loose rocker box return line coupling clamps, replacing a cracked air/oil separator, replacing leaking oil dipstick gaskets, and replacing a leaking fitting on the turbocharger wastegate actuator. During this inspection and maintenance action, maintenance personnel noticed oil on the inlet scroll of the turbocharger and oil on the belly of the airplane, so they replaced the turbocharger "due to oil leaking past shaft seal intake system."

The second repair occurred about 4 months later, when the owner again reported high oil consumption. According to a maintenance entry dated May 22, 2013, and the associated work order, this resulted in the maintenance provider checking the compressions and borescoping the cylinders.

During this inspection and maintenance action, maintenance personnel found pooled oil in the Nos. 3, 5, and 6 cylinders. Per guidance from a Lycoming representative, they attached an airspeed indicator to a modified oil dipstick cap and then ran the engine. No excessive crankcase pressure was found. Next, they ran the engine to get the temperature up and shut down the engine at 1,300 rpm. Then they borescoped the cylinders again and found that all of the pistons were damp, all of the spark plugs were dry, and there was pooled oil in the Nos. 3, 5, and 6 cylinders. After these tests, maintenance personnel removed the Nos. 3, 5, and 6 cylinders and found the oil control rings stuck in the pistons. They installed new Nos. 3, 5, and 6, cylinder assemblies.

National Transportation Safety Board - Aircraft Accident/Incident Database

The maintenance records did not indicate that the check valve on the turbocharger oil supply line was cleaned or replaced following either of these engine repairs.

Turbocharger System Information

The airplane was equipped with a turbocharging system manufactured by Hartzell Engine Technologies (HET) that forced air into the engine's combustion chamber, allowing the engine to maintain sea-level manifold pressure as altitude increased. The turbocharging system consisted of a turbocharger, controller, wastegate, and pressure relief valve.

The turbocharger converted wasted energy, in the form of hot exhaust gases from the engine exhaust, into increased manifold pressure to increase power available from the engine. After air and fuel were burned in the cylinders, the exhaust gases from combustion were used to spin a turbine wheel at high speeds. The turbine wheel was connected to a compressor wheel that compressed induction air supplied through an opening in the lower cowl, that was ducted through a filter and into the compressor, increasing its density. The pressurized induction air would then pass through the throttle body and induction manifold into the engine cylinders, completing the cycle.

The controller sensed manifold pressure to maintain sea level horsepower at altitude, without over-speeding the turbocharger or over-boosting the aircraft's engine. It did this by controlling pressurized engine oil to hydraulically actuate the wastegate. The wastegate (exhaust bypass valve), used speed or compressor discharge pressure (boost) during certain conditions of a flight. Managed through the controller, the wastegate opened to allow exhaust gas to bypass the turbocharger, limiting speed and boost.

The pressure relief valve acted as a supplementary safety device in the airplane turbocharger system. The valve was set to open at a pressure slightly above the maximum turbocharger discharge pressure, should the controller or wastegate not adequately limit the boost pressure.

According to HET, the turbocharger operates at speeds over 100,000 rpm and at temperatures exceeding 1,650°F, and oil is required at the correct flow rate and pressure to lubricate the bearings, stabilize the rotating shaft and bearings, and act as a coolant. The system's lubricating oil comes directly from the engine's oil system, so shutting down the engine immediately stops the flow of oil to the turbocharger. If the turbocharger is still turning at a high rate of speed when oil flow is cut off, the turbocharger bearings can be damaged. In addition, any stagnant oil remaining around the extremely hot turbine shaft will overheat and "coke" or burn.

The controller and the wastegate also use engine oil and pressure for operation and control of the turbocharger. If either one is contaminated by oil, does not receive the correct oil flow rate, or lacks sufficient oil pressure to function, system performance is compromised. In the event of malfunction of a turbocharged engine, HETs experience is that maintenance personnel assume that the turbocharger is at fault and replace it. Frequently the replacement unit fails, which prompts an investigation into the real cause of the initial failure. According to HET, the major cause of turbocharger failures is faulty lubrication systems.

The accident airplane was equipped with a check valve on the turbocharger oil supply line, which was located upstream from the turbocharger and regulated the supply of oil that it received. HET does not require the use of check valves, and the check valve installed on the airplane was supplied by the engine manufacturer. The check valve was used to prevent oil from draining into the turbocharger after shutdown and pooling in the turbocharger body. According to HET, this pooling can result in stagnant oil remaining around the extremely hot turbine shaft and coking or burning. Along with coking, bearing damage can occur that causes the bearings to orbit instead of spin, which can lead to turbine and/or compressor rub, wear, and failure.

If a check valve sticks in an open or partially open position, this allows the turbocharger's center body to fill with oil; the oil then leaks past the seals because the oil cannot drain and is not being scavenged. The absence of turbo air pressure (both in the compressor and turbine housings) also does not assist in preventing oil leakage past the piston rings, which can result in the presence of oil in the compressor/induction system (evidence of oil in the combustion chambers) and/or the turbine/exhaust system (resulting in smoking during engine start).

METEOROLOGICAL INFORMATION

The recorded weather at CDW, at 1012, about 10 minutes after the accident, included: variable winds at 3 knots, 10 miles visibility, clear skies, temperature 28°C, dew point -17°C, and an altimeter setting of 30.13 inches of mercury.

National Transportation Safety Board - Aircraft Accident/Incident Database

AIRPORT INFORMATION

CDW was owned by the Essex County Improvement Authority and was located 2 miles north of Caldwell, New Jersey. It was classified by the FAA as a publicly owned, tower controlled, public use airport.

The airport elevation was 172 ft above mean sea level and was oriented in a 10/28 and 4/22 runway configuration. Runway 22 was asphalt, in good condition, and measured 4,552 ft long by 80 ft wide with a 0.2% gradient. The threshold was displaced 134 ft. The runway was equipped with high intensity runway edge lights and runway end identifier lights and was marked with nonprecision markings in good condition.

WRECKAGE AND IMPACT INFORMATION

The accident site was located in a wooded area about 0.3 nautical mile from the departure end of runway 22 on a magnetic heading of 156°. Examination of the accident site revealed that the airplane impacted terrain on a 20° magnetic heading after striking several trees. Further examination revealed that the airplane impacted in a nose-down, inverted attitude. During the impact sequence, the engine separated from its mounting location. The empennage was displaced about 20° to the left of the fuselage centerline and was partially separated from the aft fuselage. The wings were separated from their mounting locations. The fuselage came to rest upright on a 100° magnetic heading against the base of a tree. The majority of the fuselage was consumed by a postimpact fire.

The wing flaps were found in the up position. The elevator trim was near neutral. The fuel selector valve was in the "BOTH" position, and there was no evidence of fuel blockage. Control continuity was established from the ailerons, elevator, and rudder to the flight controls in the cockpit. There was no evidence of any inflight structural failure.

Examination of the propeller revealed that one of the three blades separated during the impact sequence and came to rest about 30 ft from the rest of the propeller assembly. The propeller blades did not display evidence of propeller rotation during the impact sequence.

Examination of the engine revealed that the rear of the engine had been heavily damaged by the postcrash fire, and the magnesium oil sump was destroyed by fire.

The engine's fuel system was heavily damaged by the postcrash fire. The engine-driven fuel pump was destroyed by the postcrash fire. The fuel servo inlet fuel screen was free of contaminants, and the diaphragm displayed thermal damage. The fuel flow divider was thermally damaged.

The left magneto's internal windings were found in the molten metal beneath the engine. The right magneto was found loosely attached to the rear accessory housing and was thermally damaged.

Attempts to rotate the engine drive train by hand were unsuccessful. There was no evidence of any type of blockage in the intake or exhaust systems. The spark plug electrodes displayed evidence of black sooty deposits indicative of carbon fouling. A portion of the No. 3 piston's skirt was missing; metal fragments were present in the crankcase, and metal was found extruded from the edges of the No. 3 main engine bearing.

The turbocharger system was partially destroyed by the postimpact fire; a majority of the damage was to the compressor housing and compressor wheel. The turbine housing exhaust port did not display evidence of turbine wheel rotation during the impact sequence. The turbocharger was secured to its mount with the exhaust pipes separated from the exhaust bypass valve on both ends. The slope controller and the pressure relief valve were destroyed by the post impact fire, and the exhaust bypass valve was partially destroyed but remained attached to the turbocharger.

MEDICAL AND PATHOLOGICAL INFORMATION

The Office of the State Medical Examiner, State of New Jersey, performed an autopsy on the pilot. The listed cause of death was blunt impact injuries.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma conducted toxicological testing of the pilot. The specimens were negative for carbon monoxide.

Carvedilol, which is used to treat high blood pressure, was detected in urine and blood, and quinapril, which is used to treat hypertension, was detected in urine. Use of these two non-impairing drugs was previously reported by the pilot to the FAA. Salicylate (aspirin) was detected in urine.

Review of FAA medical certificates and supporting documentation indicated that the pilot had a history of high blood pressure and a myocardial infarction with stent placement in 2007. Based on clinical reports, his conditions were stable, and no significant conditions were identified during his FAA physical examinations.

TESTS AND RESEARCH

At the request of the NTSB, Lycoming analyzed the metal fragments found in the engine crankcase and the metal extruded from the No. 3 main bearing. Lycoming determined that the metal fragments found in the engine crankcase were cast aluminum material. Chips recovered from the sludge in the crankcase were also made of the same material. The material was not from the No.3 piston and was most likely from the crankcase or other housing. The metal that was bulged or extruded out from the edges of the No. 3 main bearing (both halves) was made primarily of lead, with some tin and copper, indicating that it came from the bearing overlay material. It also indicated that the bearings experienced some localized melting and flow of the overlay material from the postcrash fire.

The turbocharger and wastegate were examined at Lycoming Engines by HET under the supervision of the NTSB. Examination of the turbocharger revealed that the compressor housing and mounting surfaces had been consumed by fire. The compressor wheel had been heavily damaged by fire. The compressor wheel nut was tight, and the compressor oil film journal bearing's radial holes were clear.

The compressor thrust collar radial holes were clear; there was no evidence of scratches, scoring, or galling of the end surfaces and no evidence of rubbing on the compressor backplate seal bore. There was no scoring or worn face areas on the compressor inboard thrust bearing.

The compressor back plate was corroded from heat and water exposure. No damage was observed to the attachment surfaces, and the seal bore inside diameter spacer was not damaged or scored. The compressor back plate oil squirt holes were also clear.

The turbocharger's turbine wheel could not be turned by hand. The turbine oil film journal bearing's radial holes were clear. No evidence of turbine wheel rub was present, and clearance existed between the turbine wheel blades and the turbine housing. The turbine wheel did not display evidence of foreign object damage or bent blades.

Examination of the center bearing housing revealed that there was no evidence of residual oil, and extreme corrosion was present. The oil squirt holes were clear, and no evidence of the outlet port being restricted by coking was discovered. The outlet and inlet gaskets were heat damaged.

The anti-rotation pins were of the split type, and they were secure and properly oriented.

The wastegate valve was free and could move through its full range of motion. The wastegate actuator body had been completely consumed by the postcrash fire; only the valve housing assembly, actuator shaft assembly, springs and retainer remained

At the request of the NTSB, Lycoming radiographically inspected the oil supply line check valve, which was located upstream from the turbocharger and regulated the supply of oil that it received. Review of the low-resolution x-ray images by Lycoming personnel indicated that the internal components appeared to be in sound condition, there was no obvious foreign object damage, and the ball was resting on the seat. The x-ray film also showed that the internal spring was slightly cocked about 5°.

The check valve assembly was then tested by installing it in a flow testing fixture, and the oil pressure was monitored while observing the check valve for flow. The engineering drawing specified the performance as follows: "No leakage allowed below 8 [pounds per square inch] psi; and check valve must open at 13 psi ±2 psi oil pressure". Leakage was observed from the check valve exit hole before 1 psi of pressure was reached. The oil stream flowing from the check valve steadily increased, and the vertical level of the stream rose higher until about 5 to 6 psi pressure was reached. At that point, the stream was nearly a straight jet of oil.

The turbocharger and oil supply line check valve were submitted to the NTSB Materials Laboratory for further examination. Examination of the turbocharger components revealed that they exhibited surface oxidation (rusting) and evidence of coking with soot residue. These conditions were consistent with exposure to fire, as well as exposure to water. The center bearing housing of the turbocharger had rusted to a degree that the iron oxide was starting to spall. No other visible damage, such as distortion, wear, or cracking, was present on the component exterior. The center housing was radiographed and inspected using computed tomography (CT) scanning. There were no discernable features noted on the center housing using these techniques.

The center housing was sectioned using a band saw with a water-based emulsion-coolant. The location of the sectioning was along the position of the turbine wheel. The housing bearing on the turbine side exhibited longitudinal score marks that were consistent with removal of the shaft, which had partially fused to the bearing. It also displayed circumferential wear, with relatively less rust and other surface contamination compared to the bearing on the compressor side. Gouging was also present on the interior surface of the turbine side bearing. There was no evidence of damage to, or blockage of, the oil holes.

The center housing bearing on the compressor side exhibited primarily circumferential wear. The longitudinal marks on the bearing were consistent with machine marks or sliding. There was internal surface rusting on this bearing. There was no evidence of blockage or damage to the oil holes or channels in this section of the housing. No other indications of internal mechanical malfunctions were found inside the center housing.

The turbine wheel blade fins did not exhibit any mechanical damage consistent with foreign object impacts, overheating, or distortion. There was no chipping or cracking observed.

The tapered stub shaft of the compressor side had fractured away from the threaded portions of the shaft during removal for examination. The features on the fracture surface had been entirely obliterated by smearing, consistent with post-fracture damage, and the area adjacent to fracture exhibited a jog on one side, with a general flat surface. This pattern was consistent with overstress failure in shear of a ductile material.

Gouge marks were present on the hexagonal cap on the turbine side of the wheel and most probably occurred during removal. These marks were consistent with an impact with an adjacent component or tool, in a clockwise rotation. The turbine side bearing surface of the turbine wheel also exhibited longitudinal gouging marks, in addition to the circumferential wear marks. These gouge marks matched those of the bearing surface of the sectioned center housing. These marks were consistent with the wheel assembly shifting forward while positioned in the housing.

The turbocharger oil supply line check valve and an exemplar check valve were inspected by radiography and CT scanning. The accident check valve exhibited a small gap between the ball and the internal channel along the neck. The spring that held the ball was angled. Neither the ball nor the spring in the exemplar check valve exhibited the features noted in the accident valve.

Sectioning of the accident check valve revealed the presence of contamination in the internal channel on the upstream (inlet) side of the check valve and the presence of foreign material between the ball and the internal channel along the neck. Fourier transform infrared spectroscopy revealed that the spectra of the foreign material was similar to lubricating oil.

ADDITIONAL INFORMATION

Lycoming Maintenance Guidance

A review of Lycoming's maintenance guidance revealed that the direct drive engine overhaul manual did not explicitly address the turbocharger system, nor was there guidance for checking or replacing the check valve, flushing of any reused oil lines, or flushing of other components such as the turbocharger, controller, wastegate, or air-oil separator. Further review also revealed that for maintenance personnel to maintain, repair, or replace the turbocharging system on the TIO-540-AJ1A model engine, a mechanic would have to rely on multiple documents including the Illustrated Parts Manual for the parts needed, the Service Table of Limits for applicable torques, and Service Bulletins, Service Letters, and Service Instructions applicable to that model or individual component for replacement.

Pilot Operating Handbook

Review of the Cessna T206H Pilot Operating Handbook (POH) short field takeoff performance charts revealed that when configured to a 20-degree flap setting, and assuming a 30°C temperature at sea level, the airplane's expected ground roll would be between 670 and 1015 feet, at a gross weight of 3,000 and 3,600

pounds respectively. The short field landing distance performance chart showed that under similar conditions, and a gross weight of 3,600 pounds, the airplane's expected ground roll was 775 feet.

Further review of the POH also revealed that it did not list emergency procedures for turbocharger failures, under "ENGINE FAILURES," in Section 3 (Emergency Procedures). Under "ENGINE FAILURE DURING FLIGHT (Restart Procedures), in the POH, it also called for advancing the mixture control to the rich position if restart does not occur.

Cessna's "Pilot Safety and Warning Supplements," which was reissued in 1998 to incorporate turbocharger failures, stated, in part: "A failure of the turbocharger system will cause either an overboost condition or some degree of power loss. An overboost can be determined on the manifold pressure instrument and can be controlled by a throttle reduction. If turbocharger failure results in power loss, it may be further complicated by an overly rich mixture. This rich mixture condition may be so severe as to cause a total power failure. Leaning the mixture may restore partial power. Partial or total power loss could also be caused by an exhaust leak. A landing should be made as soon as practical for either an overboost or partial/total power loss."

Continental TSIO-520-C Engine

Some earlier models of the Cessna 206 were equipped with a turbocharged Continental TSIO-520-C engine, which was rated at 300 horsepower. Both the Continental TSIO-520-C and the Lycoming TSIO-540-AJ1A engines use turbochargers manufactured by HET. Review of system information for the Continental TSIO-520-C revealed that it also used a spring-loaded check valve to control oil flow through the turbocharging system and prevent oil flow from the engine oil cooler to the turbocharger when the engine was shut down.

Published guidance was issued by Continental Motors in a service bulletin (Service Bulletin SB16-3), which advised that if the check valve did not close properly or became blocked with foreign matter, the check valve may remain open, allowing oil to continuously flow to the turbocharger (after the engine is shut down and the oil scavenger pump is no longer actively returning oil to the engine oil sump).

The service bulletin also advised that characteristic symptoms associated with a blocked check valve are turbocharger oil leakage and oil leakage through the tailpipe or induction system.

It also included the following statement: "NOTE: Do not assume an oil leak from the turbocharger is simply an incorrectly operating check valve - thoroughly troubleshoot for causes of all turbocharger oil leaks."

The service bulletin also required that the check valve be checked:

- At each 50-hour inspection.
- Whenever a turbocharger oil leak was detected.
- Immediately following an engine test run after cylinder(s) replacement.
- After replacing lubrication system components.

NTSB Recommendation A-94-81

On April 11, 1994, the NTSB issued Safety Recommendation A-94-81 as a result of its investigation of a January 13, 1992, accident (NTSB Case No. LAX92FA092) involving a Cessna T210L, N22592, that occurred at the Temple Bar Airport, Temple Bar, Arizona, as the pilot attempted to execute an emergency landing. Two of the five persons aboard were killed, and three were seriously injured when the airplane struck the ground short of the runway. The pilot reported that the airplane had sustained a partial loss of engine power during cruise, but that he could not determine the nature of the problem. While descending to the airport, he turned the fuel boost pump on, and the engine lost additional power. Just before arriving over the airport, the cockpit and cabin areas filled with smoke, and the pilot secured the engine.

The NTSB determined that the probable causes of this accident were fatigue failure of the turbocharger's turbine shaft due to inadequate maintenance and the pilot's improper in-flight planning/decision after experiencing a turbocharger failure. Additionally, the lack of written instructions or an emergency procedure in the Cessna T210L Pilot's Operating Handbook (POH) relating to turbocharger malfunctions or failures contributed to the accident.

National Transportation Safety Board - Aircraft Accident/Incident Database

The NTSB's safety recommendation letter stated, in part:

From January 1, 1988, to May 4, 1993, there were 88 accidents and incidents involving aircraft engine turbochargers, resulting in 6 fatalities and 35 injuries. Many of these occurrences, in both single and twin-engine airplanes, involved loss of engine power, fire in flight, or smoke in the cockpit. Moreover, from January 1, 1986, to May 4, 1993, the Federal Aviation Administration (FAA) received 580 Service Difficulty Reports (SDRs) regarding aircraft turbocharging systems. The reports contained detailed system malfunctions that, in many cases, were attributed to inadequate installation, inspection, maintenance, service, or overhaul. The Safety Board noted, in connection with a significant number of the accidents, that improper pilot remedial actions following the turbocharger malfunction or failure may have contributed to these occurrences. For example, because compressed air to the engine normally produced by the turbocharger was no longer available, use of the boost pump, as evidenced in the accident with N22592, aggravated an already overly rich fuel mixture condition. This resulted in a further reduction in engine power and subsequent inability to sustain flight. Other inappropriate pilot actions or responses cited in accident reports that may also have exacerbated the loss of engine power or caused an in-flight fire because of turbocharger failure include the following: use of an inadequate emergency procedure, improper adjustment of the fuel mixture, improper use of the throttle control, and operating with known deficiencies in equipment."

Safety Recommendation A-94-81 asked the FAA to "require the amendment of pilot operating handbooks and airplane flight manuals applicable to aircraft equipped with engine turbochargers by including in the "Emergency Procedures" section information regarding turbocharger failure. The information should include procedures to minimize potential hazards relating to fire in flight and/or loss of engine power."

In a July 3, 1995, response, the FAA stated that it agreed with the intent of Safety Recommendation A-94-81 but did not believe that there was sufficient basis to issue an airworthiness directive applicable to all aircraft flight manuals (AFMs) or POHs with turbocharger installations. The FAA indicated, however, that it would take the following actions: 1) revise the AFM policy regarding minimum safe operating procedures following turbocharger failures during the next revision of Advisory Circular (AC) 23-8A "Flight Test Guide for Certification of Part 23 Airplanes;" 2) provide copies of Safety Recommendation A-94-81 to all aircraft certification offices and direct each office to provide the recommendation to each holder of a type certificate or supplemental type certificate having a turbocharged engine installation; 3) request type certificate or supplemental type certificate holders to revise their AFMs, POHs, or AFM supplements, as appropriate, to comply with Safety Recommendation A-94-81; and 4) provide the Safety Board a copy of the revised General Aviation Manufacturers Association (GAMA) Specification No. 1, "Specification for Pilots Operating Handbook," to address safe operating procedures following turbocharger failures.

Until the next revision to AC 23-8A was accomplished, the FAA issued a policy letter dated February 16, 1995, which added turbocharger failure procedures to the established list of systems that should be considered when evaluating the emergency procedures section of the AFM. In an August 15, 1997, response, the NTSB classified Safety Recommendation A-94-81 "Closed-Acceptable Alternate Action" based on the FAA's issuance of the policy letter, as well as the FAA's agreement to revise AC 23-8A.

NTSB Recommendation A-08-21

On May 13, 2008, the NTSB issued Safety Recommendation A-08-21 as a result of its investigation of a May 28, 2004, accident (NTSB Case No. CHI04GA130) involving a Cessna T206H, N9548D, that impacted terrain following a loss of engine power during cruise flight near Homer Glen, Illinois. The pilot was fatally injured, and the airplane was destroyed. Witnesses reported that they heard several attempted engine restarts as the airplane descended, and a witness reported that black smoke emanated from the airplane during each start attempt. The black smoke was indicative of a mixture that was too rich. Postcrash examination revealed that the turbocharger had seized. The oil supply line check valve was tested, and it would not hold 8 psi of oil pressure. Oil and debris were seen being expelled from the check valve assembly when it was placed under oil pressure. Examination of the airplane's POH revealed that the in-flight emergency procedures lacked information to assess the difference between an engine and a turbocharger failure and did not provide any clear guidance or instructions on how to handle a turbocharger failure once a pilot identified the problem.

The NTSB determined that the probable causes of this accident were:

The seized turbocharger, the altitude/clearance not maintained/obtained during approach to a forced landing on an agricultural field, and the unsuitable landing area encountered by the pilot. Contributing factors were the inadequate emergency procedures by the manufacturer, the trees, and the residential area.

The NTSB's safety recommendation letter stated, in part:

The Safety Board notes, however, that the intent of Safety Recommendation A-94-81 has still not been fully realized. In connection with its investigation of the

May 28, 2004, accident in Homer Glen, Illinois, the Safety Board also reviewed a representative sampling of POHs for other airplane makes and models and determined that procedures addressing turbocharger failures have either not been incorporated in the emergency procedures section or, if included, are incomplete, potentially leading to an incorrect identification and response to a turbocharger failure that could result in a total loss of engine power. A query of the Safety Board's accident database revealed that from May 1, 1993, to the present, 23 accident/incidents have occurred involving aircraft engine turbochargers, resulting in 23 fatalities and 3 injuries; 15 of these accidents/incidents have occurred (resulting in 9 fatalities) since 1997, when Safety Recommendation A-94-81 was closed.

Safety Recommendation A-08-21 asked the FAA to "require manufacturers of aircraft equipped with engine turbochargers to amend their pilot operating handbooks and airplane flight manuals to include in the "Emergency Procedures" section information regarding turbocharger failure and, specifically, procedures to minimize potential hazards relating to fire in flight and/or loss of engine power."

On June 11, 2012, the NTSB classified Safety Recommendation A-08-21 "Closed-Unacceptable Action" based on the FAA's decision not to take the recommended action. In its classification letter, the NTSB stated it "remains concerned that, without the establishment of an FAA requirement, manufacturers of aircraft equipped with turbochargers still have not voluntarily included emergency procedures for turbocharger failures, and as a result, accidents and incidents continue to occur."

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN16LA251 07/06/2016 830 CDT Regis# N9891B Placedo, TX Apt: N/a
Acft Mk/Mdl CHAMPION 7EC Acft SN 211 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL O-200-A Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: LARRY D REESE Opr dba: Aircraft Fire: NONE

Summary

The airline transport pilot was conducting the first flight in the airplane after an extended period of inactivity. The pilot reported that, about 10-15 minutes after takeoff, the engine sputtered. He applied carburetor heat and checked the position of the fuel selector and the magnetos. The engine operation smoothed out; however, a short time later, the engine experienced a total loss of power. The pilot conducted a forced landing in a corn field, which resulted in substantial damage to the airframe. A postaccident examination of the airplane revealed the fuel line between the fuel strainer and the carburetor was deteriorated and leaking fuel, and the fuel selector was rigged in such a way that it would only open about 25%, which limited the amount of fuel flowing to the engine. The mechanic who signed off the airplane's most recent annual inspection, which was completed the month before the accident, reported that the airplane's owner assisted with the inspection, and that he did not verify the owner's work before endorsing the annual inspection.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The inadequate annual inspection of the fuel system that failed to detect a deteriorated fuel line and a misrigged fuel selector, which resulted in fuel starvation and a subsequent total loss of engine power. Contributing to the accident was the mechanic's failure to verify the work completed by the owner before endorsing the annual inspection.

Events

1. Enroute - Fuel starvation
2. Landing-flare/touchdown - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Incorrect service/maintenance - C
2. Aircraft-Aircraft systems-Fuel system-Fuel distribution-Inadequate inspection - C
3. Personnel issues-Task performance-Maintenance-Scheduled/routine maintenance-Maintenance personnel - C
4. Personnel issues-Task performance-Inspection-Post maintenance inspection-Maintenance personnel - F

Narrative

On July 6, 2016, at 0830 central daylight time, a Champion 7EC, N9891B, landed in a corn field in Placedo, Texas, following a loss of engine power. The airline transport rated pilot was not injured. The airplane was substantially damaged. The airplane was registered to and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, and no flight plan was filed. The flight originated from Tanners Airport (9TE4), Port Lavaca, Texas, about 0820, with an intended destination of the Victoria Regional Airport (VCT), Victoria, Texas.

The pilot reported the airplane had not been flown for some time while the wings were removed and reskinned, and an annual inspection was completed. The pilot stated he was flying the airplane to VCT so a new weight and balance could be calculated.

The airplane was fueled with 20 gallons of fuel about 1 « weeks prior to the accident and it had about 1 hour of ground run time since the refueling. The pilot reported he ran the engine for about 10 minutes prior to takeoff and it operated normally. He also checked the magneto and carburetor heat operation during the engine run-up. The takeoff, climb, and initial cruise were normal. About 10 to 15 minutes into the flight, the engine sputtered. He applied carburetor heat, and checked the position of the fuel selector and the magnetos. The engine operation smoothed out and a short time later, the engine lost power.

The pilot stated that due to his low altitude, he didn't have a lot of choices on where to land, so he chose a corn field. During the forced landing, the right main landing gear was buckled, which resulted in damage to the airframe structural tubing.

A postaccident examination of the airplane was conducted by an inspector from the San Antonio Flight Standards District Office. The inspector reported the airplane had been in storage since 1996. The examination revealed the fuel line between the fuel strainer and the carburetor was deteriorated and leaking fuel. The fuel selector was rigged in such a way that it would only open about 25% of the way. Air pressure was applied to the fuel line from the fuel tanks and back pressure was noted. The fuel selector valve was manually opened by by-passing the fuel selector handle, the air flowed through to the fuel line. An old gasket was on the fuel strainer and debris was found in the fuel bowl. In addition, there was a large insect nest in engine compartment.

The airframe and powerplant mechanic with inspection authority who signed off on the last annual inspection reported the airplane owner assisted with the annual inspection in June 2016, and the mechanic did not verify the work.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ANC16FA057 08/13/2016 1330 AKD Regis# N9541S Chugiak, AK Apt: Birchwood BCV
Acft Mk/Mdl CHAMPION 7ECA Acft SN 406 Acft Dmg: DESTROYED Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING ENGINES O-235-C2C Acft TT 1914 Fatal 1 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: WILLIAM L. ROWE Opr dba: Aircraft Fire: GRD
AW Cert: STA

Summary

According to multiple witnesses at the airport, they observed the airplane perform several touch-and-go landings throughout the late morning and early afternoon on the day of the accident. They added that the pilot then landed and taxied to a local fuel vendor's facility and refueled. The pilot then departed. Two witnesses who were near the departure runway reported that, after the airplane departed, they heard the engine making a "pop pop" sound and that it then appeared to lose power. Another witness near the runway reported hearing the engine "sputtering" and added that the airplane appeared to stall. All the witnesses reported that they observed the airplane turn right steeply, that its right wing and nose dropped abruptly, and that it then descended in a steep, nose-down attitude, consistent with an aerodynamic stall. A postimpact fire immediately ensued, which destroyed the airplane.

A postaccident examination of the airframe and engine revealed no mechanical malfunctions that would have precluded normal operation. The witnesses reported hearing noises consistent with an engine misfiring and it was likely losing power; however, the reason for the loss of engine power could not be determined based on the postaccident examination. After the loss of engine power, the pilot attempted a steep turn at low altitude, during which he failed to maintain proper airspeed and exceeded the airplane's critical angle of attack, which resulted in an aerodynamic stall and a loss of control at too low of an altitude to recover.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain proper airspeed and his exceedance of the airplane's critical angle of attack during a steep low-altitude turn following a loss of engine power, which resulted in an aerodynamic stall and subsequent loss of control at too low of an altitude to recover. The reason for the loss of engine power could not be determined because postaccident examination revealed no mechanical malfunctions that would have precluded normal operation.

Events

1. Initial climb - Loss of engine power (total)
2. Emergency descent - Loss of control in flight
3. Emergency descent - Aerodynamic stall/spin
4. Uncontrolled descent - Collision with terr/obj (non-CFIT)
5. Post-impact - Fire/smoke (post-impact)

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Not attained/maintained - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Angle of attack-Not attained/maintained - C
4. Aircraft-Aircraft power plant-Engine (reciprocating)-(general)-Inoperative - C
5. Not determined-Not determined-(general)-(general)-Unknown/Not determined

Narrative

On August 13, 2016, about 1330 Alaska daylight time, a Champion 7ECA (Citabria) airplane, N9541S, impacted terrain following a loss of engine power just after takeoff from Birchwood Airport, Chugiak, Alaska. The private pilot sustained fatal injuries, and the airplane was destroyed. The airplane was registered to the pilot and a co-owner and operated by the pilot as a 14 Code of Federal Regulations Part 91 visual flight rules personal flight. Visual meteorological conditions existed near the accident site at the time of the accident, and no flight plan was filed for the intended local flight.

According to multiple witnesses at Birchwood Airport, they observed the airplane perform several touch-and-go landings throughout the late morning and early afternoon on the day of the accident. They said that, just after 1300, the pilot made a full-stop landing and then taxied to a local fuel vendor's facility.

During a postaccident interview, one of the witnesses stated that the accident airplane had been for sale and that the accident pilot had met him and a friend at Birchwood Airport about 1315 to show the potential buyer the airplane. The potential buyer reported that he "walked around the airplane" and noticed no mechanical problems and that the pilot told him that there were no mechanical problems with the airframe and engine. The pilot asked the potential buyer if he would like to go for a ride in the airplane, and the potential buyer declined and said he would only go for a ride if he offered to purchase the airplane. The pilot then started the airplane and departed from runway 2R, which was 2,200 ft long and 50 ft wide. The potential buyer said he watched the airplane as it departed

National Transportation Safety Board - Aircraft Accident/Incident Database

and that, as it neared the departure end of the runway, it turned "steeply to the right about 90 degrees," followed by a nose-and-right-wing-low descent. The airplane subsequently descended behind a stand of trees and hangars and out of view.

Two other witnesses, who were located near the departure end of runway 2R, reported that, after the airplane departed, they heard the engine making a "pop pop" sound and that it then appeared to lose power. Another witness reported hearing the engine "sputtering" and stated that the airplane appeared to stall. All the witnesses reported that they saw the airplane turn steeply to the right, the airplane's right wing and nose drop abruptly, and the airplane continue to descend nose down behind several hangars and impact terrain. A postimpact fire ensued, and the airplane was destroyed.

A witness who was flying a helicopter about 1/2 mile east of Birchwood Airport before the accident reported hearing a male voice on the airport's common traffic advisory frequency (CTAF) stating that he was taking off from runway 2R and would make a right turnout. The helicopter pilot reported that he saw the accident airplane and that it appeared "lower than what I would expect." The airplane began an early right crosswind turn near the airport. The helicopter pilot noticed that the bank of the right turn appeared steep considering the low altitude of the airplane. The helicopter pilot reported that, about 90° into the right turn, he heard a male voice transmit on the CTAF, "oh [expletive]." Immediately after the radio transmission, the airplane "appeared to stall and enter a very nose down attitude." The helicopter pilot saw the airplane descend until it disappeared below the tree line.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with an airplane single-engine land rating. His most recent Federal Aviation Administration (FAA) third-class medical certificate was issued on June 1, 2015, and contained no limitations. On the medical certificate application, the pilot reported a total time of 206 hours, with 0 hours in the last 6 months.

A review of the pilot's personal logbook revealed that he had a total of 194.2 flight hours, all of which were in single-engine airplanes.

AIRCRAFT INFORMATION

The two-seat, tailwheel-equipped airplane was equipped with a 115-horsepower Lycoming O-235-C2C engine. The engine was equipped with a two-bladed McCauley metal propeller.

According to the airplane's maintenance logbook, the engine was installed on June 14, 1974. The last annual inspection of the airframe and engine was performed on April 2, 2016, at which time the engine total time was 1,313.02 hours, including 383.8 hours since its last major overhaul, and the airframe total time was 1,913.8 flight hours, including 383.8 hours since the last major overhaul.

METEOROLOGICAL INFORMATION

The official weather observation station located at the Birchwood Airport was not reporting full METAR data at the time of the accident. The closest official weather observation station was located at the Wasilla Airport, Wasilla, Alaska, about 9 miles north of the accident site. At 1336, a METAR reported, in part, wind 090° at 5 knots; visibility 10 statute miles; clouds and sky condition, few clouds at 8,000 ft; temperature 64°F; dew point 48°F; altimeter setting 29.56 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The accident site was about 1,725 ft northeast of the departure end of runway 2R on the north side of a "T" intersection of Birchwood Spur Road and Stoltze Drive (A terrain image of the accident site location in relation to the departure runway is available in the public docket for this accident). The accident site was bordered on the north side by a wooded area and was about 260 ft east of airport hangars. The initial impact point was on about a 351° heading, and the airplane was resting upright on sloping terrain (about 45°), with the left wing closest to Birchwood Spur Road, and the right wing closest to the bottom of the sloping terrain at the "T" intersection. No wreckage path was present at the accident site. Ground scarring was limited to the planform area of the airplane. The wreckage was recovered and transported to a secure facility for examination.

The airplane exhibited about a 45°-nose-down crushing of its firewall with the vertical stabilizer displaced left about 10°. The airplane was destroyed by postimpact fire. The responding firefighting personnel reported that foam was used to extinguish the fire. All of the major airplane components were found at the

accident site.

The fuselage was twisted, and the empennage was displaced forward and to the left near the left wing. Various tube attachment points were separated due to impact forces. The majority of the airplane's fabric was melted by the postimpact fire except for several feet on the left wing's outboard section.

All the windscreens were missing. The cockpit and instrument gauges were consumed by the postimpact fire, and no readings/positions could be determined. The cockpit structure was crushed from downward impact forces. Flight control continuity was established from the control surfaces to the cockpit.

The propeller was separated from the crankshaft flange at the mechanical attachment point on the hub. All the propeller bolts were in place within the propeller hub. Neither of the propeller exhibited S-shaped bending and/or chordwise gouging/scratching.

The engine's top spark plugs were removed, and the engine was rotated by hand. During the rotation, air was drawn in and expelled through each top spark plug hole. Engine and valve train continuity was confirmed. Borescope inspection of the cylinders revealed no mechanical anomalies.

No liquid was found in the fuel system due to impact damage and the postimpact fire. The fuel selector was in the "on" position, and the selector manifold and selector valve did not contain debris upon disassembly. The carburetor heat was found in the "off" position. The throttle was found in the "full forward" position.

The carburetor was found displaced from the engine, and the throttle/mixture controls were attached to their respective control arms of the carburetor. The fuel inlet screen did not contain debris. The carburetor fuel hose was consumed by the postimpact fire. The carburetor was opened, and the fuel bowl had no visible contaminants. The float assembly hinge remained secure at the mounting and was not damaged. The float pontoon and float arm were consumed by postimpact fire.

During the engine examination, no evidence of anomalies, contamination, or malfunctions were found in any of the engine accessories, including the magnetos, ignition harness, induction system, spark plugs, oil pump, oil cooler, and oil filter. The cylinders, pistons, valve train, crankshaft, and other internal components showed no evidence of anomalies or malfunctions.

MEDICAL AND PATHOLOGICAL INFORMATION

The Alaska State Medical Examiner, Anchorage, Alaska, performed an autopsy of the pilot. The autopsy report attributed the pilot's cause of death to multiple blunt force injuries with a contributing cause of thermal injuries.

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology tests on the pilot's specimens. The results were negative for carbon monoxide, cyanide, ethanol, and drugs.

TESTS AND RESEARCH

Fuel Testing

The pilot purchased 10.45 gallons of 100 low-lead fuel at 1316. A fuel sample from the fuel facility was tested by the owner with the National Transportation Safety Board investigator-in-charge present, and no fuel contamination was found. There were no reports of fuel contamination or operating anomalies from pilots of other airplanes that were fueled before or after the accident from the fuel pump at the airport.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA073	01/07/2017 1000 MST	Regis# N5VK	Meeker, CO	Apt: N/a
Acft Mk/Mdl CIRRUS SR22		Acft SN 0544	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL IO-550-N7		Acft TT 1400	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: RUSSELL H. FORD		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The private pilot stated that, shortly after reaching cruise altitude on the cross-country flight, engine cylinder head and exhaust gas temperatures displayed on the multifunction display (MFD) became erratic. Since the pilot had previously experienced trouble with the MFD sensory input unit, he reverted to monitoring the analog gauges, which were registering normal temperatures. Shortly thereafter, the engine backfired and the pilot sensed a partial loss of engine power, followed by a further decrease in power. Unable to maintain altitude and realizing he would be unable to reach any nearby airports, the pilot made a forced landing on a snow-covered plateau, resulting in substantial damage.

Postaccident examination of the airframe revealed large quantities of water in the wing tanks, which likely accumulated during the time the airplane was on the mountain before recovery and during storage. The airframe fuel gascolator contained a large amount of debris and rust. The gascolator was replaced with a surrogate unit, and a subsequent test run of the engine revealed no anomalies. It is likely that the loss of engine power was the result of fuel contamination; however, the source of the contaminants could not be determined, because fuel samples from the departure airport contained no contaminants.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A partial loss of engine power due to fuel contamination from an undetermined source.

Events

1. Enroute-cruise - Fuel related
2. Emergency descent - Off-field or emergency landing
3. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid condition - C

Narrative

On January 7, 2017, about 0951:32 mountain standard time, a Cirrus SR22, N5VK, made a forced landing on a snow-covered plateau near Meeker, Colorado, after the engine lost power. The pilot and his passenger were not injured. The airplane was substantially damaged. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident, and no flight plan had been filed. The local flight originated from Provo (PVU), Utah, at 0821:35 and was en route to Meadow Lake Airport (FLY), Colorado Springs, Colorado.

According to the pilot's accident report, the airplane was fueled to capacity at PVU and both pre-flight and pre-takeoff checks were normal and completed. Shortly after reaching cruise altitude, the pilot noticed the cylinder head (CHT) and exhaust gas temperatures (EGT) on the multifunction display (MFD) were erratic and changed rapidly. The pilot reported he had had previous trouble with the sensory input unit (SIU), so he reverted to monitoring the analog gauges, which were registering normal temperatures. Shortly thereafter, the engine backfired and the pilot sensed he had lost some power. Because of the high terrain ahead, the pilot started a climb. Passing through 12,600 feet, the engine lost more power. Unable to maintain altitude, the pilot began a shallow descent. Realizing he would be unable to reach any nearby airports, he began looking for a suitable area on which to make a forced landing. Because of the rough terrain, he elected not to deploy the Cirrus airframe parachute system (CAPS). He saw a plateau ahead and landed gear-up in deep snow. The pilot ascertained the emergency locator transmitter (ELT) had activated and he tried communicating on the emergency frequency 121.5 megahertz (MHz). He received no reply. About 90 minutes later, an airplane circled overhead and rocked its wings. Another airplane arrived and circled for about an hour before departing. Shortly thereafter, two rescue helicopters landed and transported the pilot and his wife to a hospital. The pilot said they sustained no injuries because they were both wearing 4-point restraint systems.

The airplane was removed from the plateau and transported to the facilities of Air Transport, Phoenix, Arizona, about two months after the accident. The wings were removed to facilitate transport. It was noted the wing tanks were breached during the accident and had been transported and stored upside down with the fuel fitting exposed. On March 7, 2017. The wreckage was examined and the engine functionally tested under the auspices of a Federal Aviation Administration (FAA) inspector. Representatives from Cirrus Design and Continental Motors were also present. The FAA inspector noted that there was no shearing of the fuel

pump spline, each cylinder had compression, and all spark plugs provided spark. The airframe fuel gascolator contained a large amount of debris and rust, and a large quantity of water flowed from the wings when they were moved for examination. A surrogate gascolator was installed and an external fuel supply line was plumbed to the left wing root fuel line. A two-bladed test club propeller was installed, and the engine was started. Engine power was set at 2,300 rpm and 10 inches of manifold pressure. All engine instruments were in the normal range. During the examination, damage to the propeller governor cable was noted. The end of the cable conduit had come loose from the rubber boot and was pushed forward, exposing the damaged cable. Examination could not determine if the damage to the governor cable occurred before or after impact.

The primary flight display (PFD) from the Garmin GNS430 global positioning system (GPS) navigator and the multifunction display (MFD) engine log data were sent to Avidyne for download. Avidyne reported that the takeoff roll commenced at 0821:35 from PVU's runway 13 and the airplane lifted off at 0821:52. The landing occurred about 0951:32. Data recorded between these times and on previous flights were truncated and of questionable validity.

Fuel samples taken from both PVU and FLY airports were analyzed. No contaminants were noted, and there were no reports of power losses from other pilots who had been refueled at those locations.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA17CA162	04/20/2017 1300 EDT	Regis# N749KY	Leonardtown, MD	Apt: St Mary's County Rgnl 2W6
Acft Mk/Mdl CUB CRAFTERS INC CC11 100-NO SERIES	Acft SN CC11-00288	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual	Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL O-200A	Acft TT 154	Fatal 0	Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: FORD RICHARD L	Opr dba:	Aircraft Fire: NONE	AW Cert: STN	

Summary

The private pilot, who was also the owner of the tailwheel-equipped airplane, was landing after a local flight. The pilot stated that the airplane bounced during touchdown and that he attempted a go-around, but the airplane veered to the left, which resulted in a ground loop. During the ground loop, the airplane's right wing impacted runway lighting and sustained substantial damage. The pilot reported that there were no preaccident mechanical anomalies with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's improper landing flare, which resulted in a bounced landing, and his subsequent failure to maintain directional control when he initiated a go-around.

Events

1. Landing-flare/touchdown - Abnormal runway contact
2. Landing-aborted after touchdown - Loss of control on ground
3. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent/approach/glide path-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
4. Environmental issues-Physical environment-Object/animal/substance-Runway/taxi/approach light-Contributed to outcome

Narrative

The private pilot, who was also the owner of the tailwheel-equipped airplane was landing after a local flight. The pilot stated that the airplane bounced during touchdown and he attempted a go-around, but the airplane veered to the left, resulting in a ground loop. During the ground loop, airplane's the right wing impacted runway lighting and sustained substantial damage. The pilot reported that there were no preaccident mechanical anomalies with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR15LA034 11/05/2014 1145 PST Regis# N369XT Las Vegas, NV Apt: Henderson Executive Airport KHND
Acft Mk/Mdl EXTRA FLUGZEUGPRODUKTIONS-UND Acft SN 1315 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING AEIO-580-B1A Acft TT 3016 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: SKY COMBAT ACE Opr dba: Aircraft Fire: NONE

Summary

The commercial pilot reported that, while at 3,000 ft above ground level and on a long final to the runway, he advanced the propeller condition lever to full forward and that he then felt a loss of engine power. He checked that the mixture was full rich and that he had the center fuel tank selected. The propeller continued to windmill while he unsuccessfully attempted to restart the engine twice. He decided not to feather the propeller. The pilot realized that the airplane was not going to reach the runway and made a sudden left turn in an attempt to land on a road that paralleled the airport fence line. During the off-field landing, the right wing and landing gear sustained structural damage.

Examination of the airplane revealed that fuel was present in the center and left wing fuel tanks but that the right wing fuel tank was empty. Examination of the propeller governor, engine, and airframe revealed no anomalies that would have precluded normal operation. A sound spectrum study of audio recorded by a GoPro camera onboard the airplane verified that, about 1 minute before the accident, the engine rpm began fluctuating and that it then steadily dropped off to about half the normal engine operating rpm by the time of impact.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A partial loss of engine power during cruise flight for reasons that could not be determined because postaccident examination of the engine did not reveal any anomalies that would have precluded normal operation.

Events

1. Approach-VFR pattern final - Loss of engine power (partial)

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

On November 5, 2014, at 1145 Pacific standard time, an Extra Flugzeugproduktions-UND, EA-300/L, N369XT, experienced a loss of engine power while on final approach to runway 35L, Henderson Executive Airport, Las Vegas, Nevada, and collided with terrain short of the runway. The airplane's right wing was substantially damaged; the commercial pilot and single passenger were uninjured. The airplane was registered to Unmanned Systems, Inc., and operated by Sky Combat Ace as a 14 Code of Federal Regulations Part 91 instructional flight. Visual meteorological conditions prevailed for the flight, which originated from Henderson Executive Airport at 1100.

The pilot stated that while on long final to runway 35L, and was about 3,000 feet above ground level (agl) when he advanced the propeller condition lever to full forward. He then felt a loss of engine power. He checked that the mixture was full rich, and that he had the acro tank (center fuel tank) selected. The propeller continued to windmill while he attempted to restart the engine twice unsuccessfully. He did not feather the propeller. The pilot realized that he was not going to make the runway, and made a sudden left turn in an attempt to land on a road that parallels the airport fence line. The right wing and landing gear sustained structural damage during the off field landing. The pilot stated that the center fuel tank was 3/4 full (17 gal capacity), and the wing tanks were empty.

A Federal Aviation Administration (FAA) Inspector examined the airplane at the scene of the accident and reported that the right wing fuel tank was empty, the left wing fuel tank had about 2 inches of fuel in it, the center acro tank had about 14 inches of fuel, and the fuel selector was in the OFF position.

On November 7, 2014, a FAA inspector examined the engine and the attached propeller governor. The inspector found that the propeller control linkage was connected and functioned properly, positive rotation between the governor drive spline and the engine was verified, and positive oil flow was observed within the propeller governor oil ports.

On November 6, 2015, an NTSB investigator examined the airplane and engine. No preaccident anomalies with the engine, engine controls, or fuel system were identified.

The accident was captured on a GoPro camera that was mounted in the cockpit of the airplane and faced aft, viewing the occupants. The NTSB Vehicle Recorders Division performed a Sound Spectrum Study on the audio portion of the recording. The study stated that the strongest tone was steady while in cruise flight, which equates to engine speed of 2,360 rpm. About 1 minute before terrain impact the blade passage frequency oscillated over the next 12

seconds, and then the engine rpm steadily decreased to 1,205 at the time of terrain impact.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA16CA493	02/25/2017 1232 MST	Regis# N75EP	Weiser, ID	Apt: Weiser Municipal KS87
Acft Mk/Mdl GRUMMAN ACFT ENG COR-SCHWEIZER	Acft SN 1394	Acft Dmg: DESTROYED	Fatal 0	Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-320 E3D		Ser Inj 0	Flt Conducted Under: FAR 091	
Opr Name: PANIERE ERIC W	Opr dba:		Aircraft Fire: GRD	
			AW Cert: STN	

Summary

The student pilot in the tricycle-gear-equipped airplane reported that he was flying a solo cross-country flight and landed on the 60-ft-wide asphalt runway. He recalled that there were 4-ft-high snow berm that paralleled the edges of the runway. When he touched down, he applied the brakes, and the airplane yawed to the left. In fear of striking the snow berm, he initiated a go around and rotated about 65 kts. The airplane climbed about 2 ft above the runway, but the left main landing gear wheel struck the snow berm on the left side of the runway. The left tire and brake assembly separated from the airplane, and the airplane came to rest in the snow-covered safety area left of the runway. The airplane sustained substantial damage to the left wing ribs and aileron.

The student reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The student pilot's failure to maintain directional control and to maintain clearance from a snow berm during the aborted landing.

Events

1. Landing-aborted after touchdown - Collision during takeoff/land

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
2. Environmental issues-Physical environment-Object/animal/substance-Snow/ice-Effect on equipment - C
3. Personnel issues-Task performance-Use of equip/info-Aircraft control-Student/instructed pilot - C

Narrative

The student pilot in the tricycle gear-equipped airplane reported that he was flying a solo cross-country flight and landed on the 60-foot wide asphalt runway. He recalled that there were 4-foot high snow berm that paralleled the edges of the runway. When he touched down, he applied the brakes and the airplane yawed to the left. In fear of striking the snow berm, he initiated a go around and rotated about 65 kts. The airplane climbed about two feet above the runway but the left main landing gear wheel struck the snow berm on the left side of the runway. The left tire and brake assembly separated from the airplane, and the airplane came to rest in the snow-covered safety area left of the runway. The airplane sustained substantial damage to the left wing ribs and aileron.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ANC16LA071 09/25/2016 1600 AKD Regis# N68857 Delta Junction, AK Apt: N/a
Acft Mk/Mdl HELIO H-295 Acft SN 1463 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING GO-480-G1D6 Acft TT 3090 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 135
Opr Name: WRIGHT AIR SERVICE Opr dba: WRIGHT AIR SERVICE Aircraft Fire: NONE
AW Cert: SPR

Summary

The airline transport pilot was departing from an 800-ft-long remote, unimproved airstrip that had accumulated between 1 and 2 inches of wet snow. He stated that the airplane seemed to accelerate normally but that it failed to become airborne at his established go/no-go decision point (about 400 ft down the airstrip). With about one-third of the airstrip remaining, he realized that, if he rejected the takeoff, he would be unable to stop the airplane on the remaining airstrip due to the wet snow. So, the pilot chose to continue the takeoff through the low brush at the end of the airstrip. The airplane became airborne, settled back to the ground, and then became airborne again. The main landing gear impacted brush on a small embankment, and the airplane then began to settle. The pilot saw a clear area ahead of the airstrip that led into a creek bed; he reduced the power to idle and held full-aft pressure on the control yoke. The airplane settled to the surface in a three-point attitude and came to rest in the creek bed, which resulted in substantial damage to the vertical stabilizer.

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

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's decision to take off from a wet, snowy airstrip and his delayed decision to abort the takeoff, which resulted in a runway excursion.

Events

1. Takeoff - Miscellaneous/other
2. Takeoff - Runway excursion
3. Takeoff - Collision during takeoff/land

Findings - Cause/Factor

1. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Aircraft capability-Takeoff distance-Capability exceeded - C
3. Environmental issues-Physical environment-Runway/land/takeoff/taxi surface-Snow/slush/ice covered surface-Effect on personnel - C
4. Environmental issues-Conditions/weather/phenomena-Ceiling/visibility/precip-Snow-Effect on operation - C
5. Personnel issues-Action/decision-Action-Delayed action-Pilot - C
6. Environmental issues-Physical environment-Object/animal/substance-(general)-Contributed to outcome

Narrative

On September 25, 2016, about 1600 Alaska daylight time, a tundra tire-equipped Helio Courier H-295 airplane, N68857, sustained substantial damage following a runway excursion during takeoff from a remote, unimproved airstrip about 35 miles southwest of Delta Junction, Alaska. The certificated airline transport pilot, the sole occupant of the airplane, sustained no injury. The airplane was registered to Bursiel Equipment, Inc., Fairbanks, Alaska, and was being operated by Wright Air Service, Fairbanks, as a visual flight rules (VFR) on-demand commercial flight under the provisions of 14 Code of Federal Regulations (CFR) Part 135. Visual meteorological conditions prevailed at the time of the accident, and a VFR flight plan had been filed. The flight originated from the Fairbanks International Airport, Fairbanks, about 1500.

During a telephone interview with the National Transportation Safety Board (NTSB) investigator-in-charge on September 26, the pilot stated that airplane landed at the 800-foot gravel airstrip near the East Fork of the Little Delta River about 1540 to transport moose meat for a customer to Fairbanks. The moose meat was weighed at 625 pounds before being loaded into the airplane. The pilot reported on the NTSB Form 6120.1 Pilot/Operator Aircraft Accident/Incident Report that about 1-2 inches of wet snow had accumulated on the gravel airstrip and winds originated from the north/northeast estimated at 7 knots. Additionally, marginal visual flight rules conditions were reported by the pilot as 5 statute miles with light snow. He reported he calculated his takeoff weight at 3400 pounds with a "middle center of gravity location."

The pilot stated that after conducting a pre-takeoff contamination check of the airplane, the flaps were set to 30 degrees, the trim set for takeoff, and the before takeoff checklist was completed. He positioned the airplane for a departure to the north, prior to locking the tail wheel, confirming the flaps and trim were set, and selecting a go/no-go point about 400 feet down the airstrip. The pilot began the takeoff sequence and reported that the initial indications were for a normal takeoff through the selected go/no-go decision point. With about one third of the airstrip remaining, the pilot realized the airplane would not become airborne at the designated go/no-go decision point and that he would be unable to stop in the remaining distance if he rejected the takeoff due to the snow on the airstrip. He elected to continue the takeoff through the low brush at the end of the airstrip in an attempt to gain more airspeed. He reported that the airplane became

National Transportation Safety Board - Aircraft Accident/Incident Database

airborne, settled back to the surface, before becoming airborne again. The main landing gear impacted brush on a small embankment and the airplane began to settle. The pilot observed a clear area ahead of the airstrip that lead into a creek bed; he reduced the power to idle, and held full aft pressure on the control yoke. The airplane settled to the surface in a three-point attitude, and came to rest in the creek bed with a left wing low attitude. Upon exiting the airplane in the creek bed, the pilot noted that the wind had become calm and the snow fall had stopped.

The airplane sustained substantial damage to the vertical stabilizer.

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

METEOROLOGICAL INFORMATION

The closest weather reporting facility was the Allen Army Airfield, Fort Greely, Alaska, about 35 miles northeast of the accident site. At 1559, an Aviation Routine Weather Report (METAR) was reporting in part: wind, calm; visibility 10 statute miles; sky condition, scattered clouds 1,300 feet, broken clouds 3,200 feet; temperature 37 degrees F; dew point 36 degrees F; altimeter 29.93 inHg.

TESTS AND RESEARCH

Helio H-295 Airplane Flight Manual

The Helio H-295 Airplane Flight Manual includes various performance charts for determining the values for takeoff ground run and takeoff distance to clear a 50-foot obstacle. The performance chart for determining the values for the takeoff ground run has correction factors for wet grass and soft turf, but not for wet snow. The performance chart for determining the values for the takeoff distance to clear a 50-foot obstacle does not incorporate any correction factors for the pilot to utilize.

ADDITIONAL INFORMATION

Soft Field Operations

The Federal Aviation Administration has published FAA-H-8083-3A Airplane Flying Handbook (2004). This document discusses takeoff considerations from soft fields and states in part:

Takeoffs and climbs from soft fields require the use of operational techniques for getting the airplane airborne as quickly as possible to eliminate the drag caused by tall grass, soft sand, mud, and snow, and may or may not require climbing over an obstacle. The technique makes judicious use of ground effect and requires a feel for the airplane and fine control touch. Soft surfaces or long, wet grass usually reduces the airplane's acceleration during the takeoff roll so much that adequate takeoff speed might not be attained if normal takeoff techniques were employed.

Takeoff and Obstacle Clearance Considerations

The Civil Aviation Authority of New Zealand has published Takeoff and Landing Performance (2011). This document discusses takeoff and obstacle clearance considerations and states in part:

Grass, soft ground or snow increase the rolling resistance and therefore the takeoff ground run will be longer than on a sealed or paved runway.

Plan to clear obstacles on the climb out path by at least 50 feet. Consider what your aircraft's climb gradient is likely to be as part of your takeoff performance calculations - especially if terrain, wires, and the possibility of downdraughts are factors in the climb out path.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR17LA192	08/24/2017 950 PDT	Regis# N6447M	Klamath Falls, OR	Apt: LMT
Acft Mk/Mdl MAULE M 7-235C-235C		Acft SN 25072C	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO-540 SER			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: ERVIN REX H		Opr dba:		Aircraft Fire: NONE

Events

1. Landing-landing roll - Loss of control on ground

Narrative

On August 24, 2017, about 0950 Pacific daylight time, a Maule M-7-235C, N6447M, was substantially damaged when it ground looped during a landing attempt at Crater Lake-Klamath Regional Airport (LMT), Klamath Falls, Oregon. The commercial pilot was not injured. The helicopter was registered and operated by a private individual as a personal flight, conducted under the provision of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and a flight plan was not filed for the local flight that departed a private strip about 0940.

According to the accident pilot, the taxi and takeoff from his private strip located about 5 nm from LMT were uneventful. During the traffic pattern entry, the pilot interpreted the wind sock to show calm winds and subsequently configured the airplane to land on runway 32. The airplane touched down in a three-point attitude and began a hard left turn. The pilot attempted to counter the uncommanded movement with right rudder and right break, but the airplane nosed over and came to rest inverted.

An airport representative reported that when they attempted to move the airplane, it pivoted on the left main landing gear while the right main landing gear and nose landing gear turned freely. He further remarked that he had to disengage the parking break before they could move the airplane.

A postaccident examination of the airplane by the Federal Aviation Administration revealed substantial damage to the firewall.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN16LA275	07/19/2016 1900 CDT	Regis# N229RS	Huron, SD	Apt: N/a
Acft Mk/Mdl MEYERS 200-B		Acft SN 280	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL IO-550		Acft TT 3487	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: BRUCE MAYES		Opr dba:		Aircraft Fire: NONE

Summary

The pilot and passenger were on a cross-country personal flight when the pilot noticed oil on the airplane's windshield. The pilot subsequently landed and had maintenance personnel inspect the airplane. Maintenance personnel noted that the crankshaft seal was leaking and identified several other discrepancies. The pilot chose to have the repairs completed. During the repairs, maintenance personnel noticed that the bolt holding the throttle cable bracket was loose, worn, and not safety wired. The maintenance facility did not have an exact replacement bolt, so the mechanic found a similar bolt, drilled a hole in the bolt head for the safety wire, and installed the bolt. The mechanic installed the safety wire through the throttle bolt and then down to the mixture control bolt. The pilot periodically inspected or observed the work as maintenance personnel finished the repairs on the airplane. The pilot also took a photo of the throttle linkage area, which showed that the safety wire was installed.

After the repairs were completed, the pilot conducted a local test flight. No problems were noted, and the pilot and passenger continued their flight. After an en route fuel stop, the airplane departed and reached 2,300 ft, at which point the engine lost power. Although the engine remained at idle, it would not respond to the pilot's throttle inputs. The pilot subsequently conducted a forced landing to a field. Following the forced landing, the pilot re-entered the airplane to ensure that the electrical power and fuel and were off and that there was no fire. He then removed the engine cowling and found the throttle linkage "disconnected or broken."

A postcrash examination of the airplane, revealed that the bolt holding the throttle cable bracket was missing, which had allowed the throttle cable to "float," meaning that manipulating the throttle control from the cabin would not govern the engine's throttle position. The examination also revealed that the mixture control bolt was in place. However, the throttle cable bolt and associated safety wire were not found.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The partial loss of engine power due an unsecured throttle cable. Contributing to the unsecured throttle cable was the missing bolt and associated safety wire; the reason for the missing bolt and safety wire could not be determined.

Events

1. Enroute-climb to cruise - Miscellaneous/other
2. Enroute-climb to cruise - Loss of engine power (partial)
3. Emergency descent - Off-field or emergency landing

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Misc hardware-Fasteners-Not specified - C
2. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

On July 19, 2016, about 1900 central daylight time, a Meyers 200B airplane, N229RS, conducted a forced landing to a field near Huron, South Dakota. The airline transport rated pilot was not injured and passenger received minor injuries. The airplane was substantially damaged during the landing. The airplane was registered to and operated by a private individual, under the provisions of 14 Code of Federal Regulations Part 91 as a cross country flight. Visual meteorological conditions prevailed at the time.

The pilot reported the cross-county flight had an en route stop at the Wendover Airport (KENV), Wendover, Utah, on July 17, 2016. During flight, he noted oil on the windshield, so he stopped in Casper, Wyoming, for maintenance personnel to look at the airplane. The pilot reported that maintenance personnel identified several discrepancies; the crankshaft seal was leaking, the propeller bolts did not have enough threads showing through the crankshaft flange, the throttle linkage connecting the landing gear warning horn was loose, and the fuel distributor drain fitting did not have an overboard line.

In addition, maintenance personnel also noted that a bolt holding the throttle cable bracket was loose. The bolt was worn and not safetied to the mixture control bolt. Since the maintenance facility did not have an exact replacement bolt, the mechanic selected a bolt, absent holes in the bolt head intended for safety wire. He then drilled a hole in the bolt head for the safety wire, and installed the bolt. The mechanic added that he installed the safety wire through the throttle bolt head, then down to the mixture control bolt.

During the maintenance work, the airplane pilot/owner periodically inspected or observed work as noted by maintenance personnel and security camera footage provided by the maintenance facility. After the accident, the pilot provided the Federal Aviation Administration (FAA) inspector a photo of the throttle linkage area, and the photo confirmed that the safety wire was in place during that maintenance.

On July 19, 2016, after maintenance personnel completed work on the airplane, the pilot started the engine and completed an engine run-up. The pilot then took the airplane on a test flight around the traffic pattern, and after landing, the airplane was checked for leaks.

The pilot and passenger then continued their flight, stopping for fuel about 1830 at the Huron Regional Airport, (KHON), Huron, South Dakota. After departing and reaching an altitude of 2,300 ft, the pilot reduced the throttle, and the engine lost power. The engine then continued to run at idle power. The pilot manipulated the throttle; however, the engine only responded with momentary increases in rpms. Subsequently, the pilot conducted a forced landing in a field, and the airplane came to rest upright. Substantial damage was noted to the airplane's fuselage.

Following the forced landing, the pilot added that after a period of time, he re-entered the airplane to ensure the electrical power and fuel and were off and there was no fire. In addition, he removed the engine cowling and found the throttle linkage was "disconnected or broken."

A post-crash examination of the airplane by an FAA inspector, noted that the bolt holding the throttle cable was missing. This was the bolt that the maintenance personnel reportedly installed with the safety wire earlier that day. The absence of the bolt allowed the throttle cable to "float", meaning, manipulating the throttle control from the cabin, would not govern the engine's throttle position. The throttle bolt was not located. The mixture control bolt was in place; however, the safety wire which ran from the mixture control bolt to the throttle bracket bolt was also missing and not recovered.

The airplane was recovered to the salvage yard located at Beegles Aircraft Service, Greeley, Colorado. During an inspection there, Beegles personnel reported that after removing the top cowling, they found a bolt, laying in a bottom area of the cowling. The bolt; however, had manufactured holes in the head, not new in appearance, and was not the missing bolt.

A review of FAA records revealed that the airplane's original Continental IO-470 engine was replaced with a Continental IO-550 engine under a field approval. The last annual inspection was completed on May 2, 2016, and the airplane had accumulated 10.44 hours, since the annual inspection.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA16CA246	06/18/2016 1328 CDT	Regis# N3877H	Clifton, TN	Apt: N/a
Acft Mk/Mdl MOONEY M20-J		Acft SN 24-0972	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO360 SER A&C		Acft TT 7548	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: EAGLES FLYERS INC		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot stated that he was conducting a cross-country flight and flying in instrument meteorological conditions at 7,000 ft mean sea level (msl) when the airplane encountered turbulence. While climbing to a higher altitude, he encountered extreme turbulence at 8,500 ft msl. The pilot lost control of the airplane, which entered an uncontrolled dive, and descended to 5,600 ft msl before he was able to regain control. The pilot subsequently landed without further incident. A postflight inspection of the airplane revealed substantial damage to the right wing spar. The pilot reported no preexisting mechanical malfunctions or failures with the airplane that would have precluded normal operation; however, he stated that he may have overstressed the airplane during the recovery from the uncontrolled descent. A review of weather data revealed that there were no SIGMETs or AIRMETs for turbulence issued for the area of the accident around the time of the accident.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The flight's encounter with unforecast extreme turbulence, which resulted in a loss of airplane control and structural damage.

Events

1. Enroute-change of cruise level - Turbulence encounter
2. Enroute-change of cruise level - Loss of control in flight

Findings - Cause/Factor

1. Environmental issues-Conditions/weather/phenomena-Turbulence-(general)-Effect on operation - C

Narrative

The pilot stated that he was conducting a cross-country flight and flying in instrument meteorological conditions at an altitude of 7,000 ft mean sea level (msl) when the airplane encountered turbulence. While climbing to a higher altitude, he encountered extreme turbulence at 8,500 ft msl. The pilot lost control of the airplane, which entered an uncontrolled dive, and descended to 5,600 ft msl before he was able to regain control. The pilot subsequently landed without further incident. A post-flight inspection of the airplane revealed substantial damage to the right wing spar. The pilot reported no preexisting mechanical malfunctions or failures with the airplane that would have precluded normal operation; however, he stated that he may have overstressed the airplane during the recovery from the uncontrolled descent. A review of weather data revealed that there were no SIGMETs or AIRMETs for turbulence issued for the area of the accident, around the time of the accident.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA101 02/02/2017 1955 CST Regis# N9149V Ellendale, MN Apt: N/a
Acft Mk/Mdl MOONEY M20C Acft SN 690026 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O&VO-360 SER Acft TT 3081 Fatal 0 Ser Inj 1 Flt Conducted Under: FAR 091
Opr Name: BASS DANIEL J Opr dba: Aircraft Fire: NONE

Summary

The accident occurred during the commercial pilot's third flight of the day in the accident airplane. The pilot reported that he used the airplane's heater throughout the day. The pilot reported having a headache and experiencing "butterflies" in his stomach during the end of first flight. The headache subsided after the flight, and he felt fine during the second flight, but the headache returned after he landed. Before the third flight, the pilot expedited his time on the ground because he was concerned about getting the engine started in the cold weather. The pilot started the engine and sat in the airplane while he filed his flight plan and got organized for the flight. The pilot added that, while taxiing to the runway, he still had the headache, and he experienced another episode of "butterflies." He stated that the symptoms were more intense at that time than they had been in the morning but that they subsided by time he reached the runway, and he felt "good" but became "hyper focused." He performed an engine run-up and repeated the takeoff checklist three or four times until the controller asked if he was ready to take off, which "snapped" him out of repeating the takeoff checklist. The pilot was in the airplane with the engine running for about 12 minutes before takeoff. The pilot remembered being cleared to a heading of 240° and setting the autopilot heading bug before taking off. He stated that, while climbing out, he experienced another case of the "butterflies." He added that he began a turn and activated the autopilot during the turn. The last thing he remembered was being cleared to 6,000 ft on a heading of 240°. After the pilot attempted to check in twice with departure control (he was still on the tower control frequency), air traffic controllers repeatedly attempted to contact the pilot without success. Radar data showed that the airplane climbed higher than 12,000 ft and was off course. The airplane continued to fly until it ran out of fuel and crashed in an open field. The pilot was not conscious until after the airplane impacted the field. He stated he was very confused and had loud ringing in his ears at this point. The pilot freed his legs from the wreckage and exited the airplane. He stated he was very weak and had difficulty with his balance and ability to walk as he made his way to a nearby house. A postaccident examination revealed that the both fuel tanks were empty. The cabin heat was found on, and the cabin vent control was found off. The exhaust muffler had several cracks, one of which contained soot/exhaust deposits on the fractured surfaces, indicating it existed before impact. The crack would have allowed exhaust gases to enter the cockpit/cabin. The pilot reported that the airplane was not equipped with a carbon monoxide (CO) detector. A review of maintenance records showed that a new exhaust system was installed on the airplane on January 25, 2007, at a tachometer time of 2,343 hours. The last annual inspection was conducted on February 2, 2016, at a tachometer time of 2998.0 hours. The tachometer time at the time of the accident was 3,081 hours. The pilot's CO level, when tested over 4 1/2 hours after the accident, was 13.8%. Given the half-life of CO in the blood stream over 4 to 5 hours while breathing ambient air, the pilot's CO level at the time of the accident was at least 28% and likely significantly higher because oxygen was administered in varying amounts during the first few hours of his postaccident medical care. The pilot's high CO level led to his incapacitation due to CO poisoning and the airplane's continued flight until it ran out of fuel and impacted terrain.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's incapacitation from carbon monoxide poisoning in flight due to cracks in the exhaust muffler, which resulted in the airplane's continued flight until it ran out of fuel and its subsequent collision with terrain.

Events

1. Enroute - Miscellaneous/other
2. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Engine exhaust-(general)-Fatigue/wear/corrosion - C
2. Personnel issues-Physical-Impairment/incapacitation-Carbon monoxide-Pilot - C

Narrative

On February 2, 2017, about 1955 central standard time, N9149V, a Mooney M20C, collided with a field in Ellendale, Minnesota, after the pilot became incapacitated during the flight. The pilot was seriously injured and the airplane was substantially damaged. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a business flight. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed. The flight originated from the Duluth International Airport (DLH), Duluth, Minnesota, at 1808, with an intended destination of the Winona Municipal Airport (ONA), Winona, Minnesota.

Earlier on the day of the accident the pilot flew the airplane from ONA to Thunder Bay (CYQT), Ontario (CYQT). The weather was cold so he had the airplane heater on for the entire trip. The pilot stated he had a slight headache during the last 10 to 15 minutes of the 2 hour 30-minute flight. After landing, while in the

National Transportation Safety Board - Aircraft Accident/Incident Database

fixed base operator, the headache remained and he felt "butterflies" in his stomach which he likened to a feeling of anxiety. The pilot attributed his headache to not having any caffeine in the morning and having possibly picked up an illness from a family member and he attributed the anxiety to his concern about following proper customs procedures.

The pilot stated the headache continued during the morning until he drank coffee which seemed to help. The pilot had the airplane preheated and departed CYQT about 1600 for the 1 hour 20-minute flight to DLH. The pilot reported he did not have a headache during the flight, but the headache returned after he landed at DLH. The pilot expedited his time on the ground at DLH because he was concerned about getting the engine started in the cold weather. He stated he started the airplane and sat in it while he filed his flight plan and "took my time getting the cockpit organized for the flight." The pilot received his IFR clearance to fly as filed to ONA at 6,000 ft above mean sea level (msl) and to expect a clearance to 9,000 ft msl, 10 minutes after takeoff. The pilot read back the clearance and requested to taxi.

The pilot still had a headache and experienced another episode of "butterflies" while taxiing to the runway. He stated the symptoms were more intense than they were in the morning. He stated the symptoms subsided by time he reached the runway, and he felt "good" but became "hyper focused." He performed an engine runup and performed the takeoff checklist 3 or 4 times and repeatedly checked the avionics and instruments, which was not his normal routine. The airport tower controller asked him if he was ready to takeoff, which he stated "snapped" him out of repeating the takeoff checklist. Air traffic control (ATC) recordings show the pilot was in the airplane with it running for at least 12 minutes prior to taking off.

The pilot stated he remembers being cleared to a heading of 240° and setting the autopilot heading bug prior to taking off. While climbing out, he experienced another case of the "butterflies". He stated he began the turn and activated the autopilot during the turn. The last thing he remembers is being cleared to 6,000 ft msl on a heading of 240°. ATC transcripts recordings show the pilot communicated with ATC for the first four minutes of the flight. About three minutes after takeoff, the DLH tower controller instructed the pilot to contact departure control. The pilot acknowledged the instruction and attempted to check in with departure control while still on the tower control frequency. The controller informed the pilot that he was still on the tower frequency. At 1812:18, the pilot once again attempted to contact departure control without having changed the frequency. This was the last communication from the pilot.

Both the DLH controller and controllers in the Minneapolis Air Route Traffic Center made numerous attempts to contact the pilot, including having other pilots attempt to make radio contact. Radar data showed the airplane flew a ground track of 190 to 200 degrees at altitudes that exceeded 12,000 ft msl. The last radar contact was at 1952:47 at an altitude of 2,300 ft msl about 1 mile north-northeast of the accident site, which was about 80 miles west of ONA.

The pilot remained unresponsive until after the airplane impacted a field in a relatively level attitude. The pilot recalled waking up and thinking that he fell asleep for a few minutes. He stated he keyed the microphone to let air traffic control know that he was alright and noticed that the windscreen was "clear." He reached his hand out the hole in the windscreen which is when he realized that he was no longer flying. He stated he was very confused and had loud ringing in his ears at this point. The pilot freed his legs from the wreckage and he exited the airplane. He stated he was very weak and had difficulty with his balance and ability to walk. The pilot eventually made his way to a house about 500 ft from the accident site. It is unknown how long the pilot was unconscious after the impact. However, the last radar contact was at 1955 and the 911 call from the house was placed at 2107.

A postaccident examination of the airplane revealed that both the left and right fuel tanks were empty. The cabin heat control was full out (on) and the cabin vent control was full in (off). The exhaust muffler contained several cracks, one of which contained soot/exhaust deposits on the fractured surfaces. The inside of the exhaust shroud contained sooting as did the scat tubing leading from the muffler. The pilot reported he had the heater "full-on" during all three of the flights on the day of the accident and he did not have a CO detector in the airplane.

A review of maintenance records showed a new exhaust system was installed on the airplane on January 25, 2007, at a tachometer time of 2,343 hours. The last annual inspection was conducted February 2, 2016, at a tachometer time of 2998.0 hours. The tachometer time at the time of the accident was 3,081 hours.

The pilot provided his postaccident medical records for the National Transportation Safety Board (NTSB). The NTSB Chief Medical Officer reviewed the records and reported the pilot was treated for injuries sustained during the accident and for frostbite. At 0018, on the morning following the accident, the pilot's blood was drawn for tests which included carbon monoxide (CO) levels. At that time, the CO level was 13.8%.

Carbon monoxide is an odorless, tasteless, colorless, nonirritating gas formed by hydrocarbon combustion. CO binds to hemoglobin with much greater affinity than oxygen, forming carboxyhemoglobin; elevated levels result in impaired oxygen transport and utilization. Nonsmokers may normally have up to 3%

carboxyhemoglobin in their blood; heavy smokers may have levels of 10 to 15%. The pilot was a nonsmoker.

The degree of carboxyhemoglobinemia is primarily related to the relative amounts of CO and oxygen in the environment and the duration of exposure. Once exposure to the CO decreases or ends, oxygen molecules batter the receptor and slowly knock the CO off so it can be exhaled. This process is more efficient when there are more oxygen molecules in the blood. The half-life (the time it takes to get rid of « the CO) of CO with a patient breathing ambient air at sea level (21% oxygen) is about 4 - 5 hours; once the person is breathing high flow oxygen, the half-life of CO drops to about 90 minutes. Given the half-life of 4 - 5 hours while breathing ambient air, the pilot's CO level at the time of the accident was at least 28% and most likely significantly higher because oxygen was administered in varying amounts during the first few hours of his postaccident medical care.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA198 05/28/2017 1200 CDT Regis# N211ZN Lakeway, TX Apt: Lakeway Airpark 3R9
Acft Mk/Mdl MOONEY M20J Acft SN 24-1535 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR IO-550-A4B Acft TT 2302 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: PILOT Opr dba: Aircraft Fire: NONE

Summary

The private pilot stated that, during the flight, the right lens fell out of his eyeglasses. Aware of powerlines at the approach end of the runway, and with his vision impaired, he flew a higher than normal landing approach to ensure obstacle clearance. The airplane subsequently landed long, exited the end of the runway, and impacted a stone mailbox, resulting in substantial damage. The pilot reported there were no mechanical malfunctions or anomalies with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to attain a proper touchdown point during landing, which resulted in a runway excursion. Contributing to the accident was the pilot's impaired vision due to his broken eyeglasses.

Events

1. Enroute - Miscellaneous/other
2. Landing-landing roll - Runway excursion

Findings - Cause/Factor

1. Personnel issues-Physical-Sensory ability/limitation-Visual function-Pilot - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent/approach/glide path-Not attained/maintained - C
4. Personnel issues-Experience/knowledge-Experience/qualifications-Qualification/certification-Pilot
5. Environmental issues-Physical environment-Object/animal/substance-(general)-Contributed to outcome

Narrative

On May 28, 2017, about 1200 central daylight time, a Mooney M20J airplane, N211ZN, impacted ground objects during a runway excursion on runway 34 at the Lakeway Airpark (3R9), near Lakeway, Texas. The pilot was uninjured. The airplane sustained substantial wing damage. The airplane was registered to Yarbrough Southwest Corp. and was operated by the pilot as a 14 Code of Federal Regulations Part 91 personal 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 flight originated from the Tierra Linda Ranch Airport, near Kerrville, Texas, about 1139 and was destined for 3R9.

According to the pilot, his glasses broke during the flight. The right lens screw fell out, which caused the lens to separate from the frame and fall out away from his reach. Aware of power lines at the south end of the field, the pilot elected to fly a higher glidepath than normal and proceed into the landing sequence higher than was normal due to his now restricted vision, so as to assure clearance of the power lines. The airplane landed long. The pilot subsequently recognized that the airplane was long of the desired touchdown point and elected not to go around due to concern of obstacles in the area. Due to the long landing, the airplane continued off the runway and its left wing impacted a stone mailbox.

The pilot's report indicated that there were no airplane mechanical malfunctions.

The pilot's report indicated "unknown" for his medical certificate. Federal Aviation Administration records revealed that the pilot's last medical certificate was dated December 18, 2007.

The pilot's safety recommendation was "to purchase corrective lenses with frames that will not allow a lens to fall out" and to "bring an additional set of glasses when flying."

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR15LA052	12/02/2014 1630 MST	Regis# N4350D	Mesa, AZ	Apt: Falcon Field Airport KFFZ
Acft Mk/Mdl NANCHANG CJ-6-A		Acft SN 2232013	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl VEDENEYEV M-14P		Acft TT 3908	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: LANG AVIATION SUPPORT SERVICES		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

The airline transport pilot was performing touch-and-go landings. The preflight, run-up, and takeoff were all normal. The pilot reported that, after the first landing, she added power to take off, and once there was no usable runway remaining, she raised the landing gear. At 100 ft above ground level, the engine went silent. The pilot picked a clear area to fly toward and lowered the landing gear. Witnesses stated that the airplane landed hard, bounced, and then landed again. The airplane subsequently impacted a trailer and a large pole and then came to rest inverted. During the accident sequence, the right wing was separated from the fuselage. Postaccident examination of the airframe and engine did not reveal any anomalies that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The total loss of engine power during takeoff following a touch-and-go landing for reasons that could not be determined because postaccident examination of the engine did not reveal any anomalies that would have precluded normal operation.

Events

1. Takeoff - Loss of engine power (total)

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Environmental issues-Physical environment-Object/animal/substance-(general)-Contributed to outcome

Narrative

On December 2, 2014, at 1630 mountain standard time, a Nanchang CJ-6A, N4350D, lost engine power and landed hard at Falcon Field Airport, Mesa, Arizona. The airplane was registered to Lang Aviation Support Services, LLC, and was operated as a 14 Code of Federal Regulations Part 91 local personal flight. The airline transport pilot and single passenger received minor injuries, and the airplane sustained substantial damage. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot stated that she intended to perform touch-and-goes in the landing pattern. The preflight, run up, and takeoff were all normal. After the first landing, she added power to takeoff, and once there was no usable runway remaining, she raised the landing gear. At 100 feet above ground level, the engine went silent. The pilot picked a clear area to fly towards and lowered the landing gear. Witnesses stated that the airplane landed hard, bounced, landed a second time, impacted a trailer, a large pole, and then came to rest inverted. During the accident sequence the right wing was separated from the fuselage. First responders shut off the fuel and magneto switches.

On December 16, 2014, a Federal Aviation Administration (FAA) inspector and a certified airframe and power plant mechanic examined the airplane and engine. The engine crankshaft was rotated, and the carburetor, fuel pump, and spark plugs were examined. The fuel pump and carburetor contained fuel. Nothing that would have precluded normal engine operation was identified.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR16FA112 05/17/2016 1842 MST Regis# N3198G Mesa, AZ Apt: Falcon Fld FFZ
Acft Mk/Mdl NORTH AMERICAN AT 6 Acft SN 84-7721 Acft Dmg: DESTROYED Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl P&W R1340 SERIES Acft TT 8693 Fatal 2 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: CHURCHILL DALE L Opr dba: Aircraft Fire: GRD

Events

1. Maneuvering-low-alt flying - Loss of control in flight

Narrative

HISTORY OF FLIGHT

On May 17, 2016, about 1842 mountain standard time, a North American AT-6, N3198G, was destroyed when it impacted terrain shortly after departure from Falcon Field Airport (FFZ), Mesa, Arizona. The airline transport pilot and the passenger were fatally injured. The airplane was registered to Wings of Flight Foundation and operated by the pilot as a 14 Code of Federal Regulations Part 91 air tour flight. Visual meteorological conditions prevailed in the area and no flight plan was filed for the local flight, which originated from FFZ about 1840.

Company personnel reported that the accident airplane was in the trail position behind another company airplane of the same make. The purpose of the flight was to depart FFZ and conduct a tour of the area north of the airport before returning. Witnesses located at the airport saw the airplane depart runway 22L and heard the engine producing "popping" sounds then a loud "bang." One of the witnesses stated that it appeared as though the engine was either not producing any power or not producing enough power. The witnesses further reported that they saw the airplane turning to the right and slowing down. The airplane subsequently impacted the ground and a postcrash fire ensued.

Review of recorded radio transmissions from the air traffic control tower at FFZ revealed that, about 2 minutes after the flight of two was cleared for takeoff, the accident pilot transmitted "Dash 2 Mayday." The pilot did not state the nature of the emergency.

PERSONNEL INFORMATION

The pilot, age 43, held an airline transport pilot certificate with airplane single-engine land and multi-engine land ratings. The pilot was issued a first-class Federal Aviation Administration (FAA) medical certificate on July 22, 2015, with no limitations. On the application for that medical certificate, the pilot reported 11,950 total hours of flight experience of which 465 hours were in the previous six months. The pilot's digital logbook, with entries from January 1, 2013, through April 24, 2016, revealed that during that period, the pilot accumulated a total of 2,744.1 flight hours. The pilot had about 50 hours of flight experience in the accident airplane make and model, including about 11 hours in the accident airplane.

AIRCRAFT INFORMATION

The two-seat, single-engine, low-wing, retractable landing gear airplane, serial number 84-7721, was manufactured in 1942. It was powered by a Pratt & Whitney R1340-AN, 550-hp, reciprocating engine, serial number 2D700, which drove a Hamilton Standard two-bladed, controllable pitch propeller. A review of maintenance records showed that the most recent annual inspection was completed February 13, 2016, at a total aircraft time of 8,746.9 hours.

METEOROLOGICAL CONDITIONS

The nearest automated weather report was from Phoenix-Mesa Gateway Airport (IWA), located 10 miles south of the accident site. The 1859 observation included wind from 290° at 9 knots, 20 statute miles visibility, scattered clouds at 12,000 ft above ground level (agl), ceiling broken at 15,000 ft, temperature 29°C, dew point 4°C, and an altimeter setting of 29.77 inches of mercury (inHg).

The 1851 observation at Sky Harbor International Airport (PHX), located 14 miles from the accident site, included wind from 310° degrees at 26 knots gusting to 37 knots, 9 miles visibility, scattered clouds at 2,100 ft and 11,000 ft, ceiling broken at 21,000 ft and 25,000 feet, temperature 27°C, dew point 6°C, and an altimeter setting of 29.75 inHg. A peak wind of 320° at 37 knots was recorded at 1844.

The complete weather report is appended to this accident in the public docket.

AIRPORT INFORMATION

FFZ is a tower-controlled airport located at an elevation of 1,394 ft mean sea level (msl). The airport is equipped with two asphalt runways: 4R/22L, which is 5,101 ft long, and 4L/22R, which is 3,799 ft long.

WRECKAGE AND IMPACT INFORMATION

The accident site was located about 1,400 ft from the departure end of runway 22L. The airplane impacted terrain and came to rest on a road on a heading about 37ø degrees magnetic. All major structural components of the airplane were located within the wreckage debris path. The wreckage path was oriented on a heading about 12ø magnetic and was about 380 ft in length. The first identified point of contact (FIPC) was a 15-ft-tall orange tree. About 20 ft from the tree strike was a section of disturbed ground, about 12 ft in length and 1 ft in width, consistent with a wing strike. The left wing separated from the fuselage and was inverted. The left wing tank, near the inboard separation, was visible and exhibited impact signatures. The remaining debris was contained on the road, with the exception of a separated propeller blade tip. The left aileron and wing tip were separated from the wing and found on the east side of the debris field. About 100 ft to the south-west of the debris field was the separated oil cooler. The oil cooler had impact damage and was surrounded by a pool of oil.

The main wreckage was about 170 ft from the FIPC and consisted of the fuselage, empennage, right wing, and engine. The right wing remained attached to the airplane by one control cable. The right wing came to rest upright on a heading about 120ø. The wing was mostly consumed by post impact fire. The fuselage came to rest on its left side on a heading about 310ø. The fuselage sustained thermal damage to the lower and left side, revealing the internal structure. The instrument panels for both positions had minor damage. The pilot's seatbelt buckle was secured and thermally damaged; the passenger seat restraint was not located. The engine separated from the airframe and exhibited impact damage to the propeller assembly. The engine mounting structure exhibited impact damage. The oil sump remained attached to the firewall and was leaking oil. The empennage exhibited thermal and impact damage and came to rest on its right side. A fracture-separated propeller blade tip was located about 210 feet from the FIPC.

The top portion of the forward crew station instrument panel was mostly intact. The bottom portion of the instrument panel, which included all switches, circuit breakers, and radios, exhibited thermal damage. The throttle, mixture, and propeller quadrant was separated with the linkages intact and disconnected from the aft seat controls, consistent with impact. The aft crew station instrument panel exhibited thermal damage and the instruments were charred and unreadable. Both canopies were found in the open position. The fuel selector handle in the forward crew station rotated freely and its position at the time of impact could not be determined. The fuel selector handle in the aft crew station was found detached from the airframe. Both fuel selectors were placarded with "Left", "Right", and "Off" positions. The fuel selector valve was found separated from the center section and subsequently disassembled. The valve was observed in a position consistent with the reserve fuel port, which was capped off with a blanking cap. Both left and right fuel line ports contained melted nylon from the fuel selector valve cone.

Flight control cable continuity was confirmed from each cockpit control to the associated flight control surface through either tension overload separations or cable cuts made during recovery.

All engine accessories remained attached to the engine via their respective mounts, except for the generator and hydraulic pump. The forward spark plugs exhibited normal operational signatures. The propeller was manually rotated and rotational continuity was established throughout the engine to the rear accessory case. Thumb compression and suction was obtained on all cylinders with the exception of the No. 6 cylinder, which exhibited impact damage. The carburetor was disassembled and examined. Both floats remained intact and undamaged. The needle valve was intact. No debris was noted on the fuel screen or in the float bowl.

The propeller remained attached to the crankshaft flange. Both propeller blades were found secure within the propeller hub. The counterweights were found intact and undamaged. One propeller blade exhibited "S" bending with leading edge gouging and chordwise striations on the forward side of the propeller blade. The opposing propeller blade was curled aft from about mid span, and the outboard tip was separated. The forward side of the propeller blade exhibited chordwise striations.

The engine driven fuel pump was removed and examined. The fuel pump remained intact and the drive shaft rotated freely by hand. A hand drill was attached to the drive shaft and the fuel inlet line was submerged in water. When the hand drill was actuated, water flowed throughout the fuel pump and was observed expelling from the fuel outlet line.

Both magnetos were removed for further examination and tested on August 8, 2016 at the facility of Precision Engines LLC., Everett, WA. Bench testing on both magnetos was successful. For further information, see Bendix Magneto Bench Test Report within the public docket for this accident.

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

For further information, see the Accident Site Summary Report, and Engine and Airframe Exam Summary Report appended to this accident in the public docket.

MEDICAL AND PATHOLOGICAL INFORMATION

The Maricopa County Office of the Medical Examiner, Phoenix, Arizona, performed an autopsy of the pilot. The cause of death was determined to be "multiple blunt force injuries."

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on specimens from the pilot. Specimens tested negative for carbon monoxide in blood and ethanol in urine. No presence of amphetamines, opiates, marijuana, cocaine, phencyclidine, benzodiazepines, barbiturates, antidepressants, or antihistamines was detected in urine.

ADDITIONAL INFORMATION

An entry in the aircraft maintenance records indicated that the airplane was completed by North American Aviation on December 15, 1942, under Type Certificate A-2-575, and shipped directly to the South African Air Force (SAAF). The airplane was originally equipped with left- and right-wing fuel tanks, as well as a reserve tank located within the left tank. The SAAF modified the fuel system as outlined in the supplemental type certificate (STC) SA00636CH (The STC is in the public docket). The modification allowed fuel in the right fuel tank to flow directly to the left fuel tank (from which the reserve fuel tank had been removed) through an interconnecting fuel pipe between the two tanks, and then from the left tank through an "ON/OFF" valve to the engine, thus making fuel tank selection during flight unnecessary.

No maintenance records were recovered for the period between 1989 and 1995. In 1996, the airplane returned to and was registered in the United States. On April 11, 1997, the airplane was issued a Special Airworthiness Certificate in the experimental category. On May 3, 1997, a Standard Airworthiness Certificate was issued, which indicated that the airplane conformed to Type Certificate Data Sheet (TCDS) A-2-575 Revision 13. However, a postaccident review of the TCDS indicated that, based on its S/N, the accident airplane was not eligible for a standard type certification.

The airplane's fuel system was reconfigured at an unknown time and no entries in the maintenance records were found regarding the fuel system modification. The postaccident examination of the fuel system indicated that the interconnecting fuel pipe between the left and right tanks had been removed and that the reserve port on the fuel selector valve was capped. The left fuel tank reserve port stand pipe was also removed. The fuel selector valve face displayed four quadrants, one each for the Left, Right, and Off positions, and a blank quadrant where the Reserve position had previously been located. Although the Reserve position was not marked, the selector could still be moved to that position and would result in a loss of fuel flow to the engine since that port had been capped. During the wreckage examination, the fuel selector valve was found in a position consistent with the Reserve position; however, the position of the valve at the time of the accident could not be determined.

In an interview with an FAA inspector, the operator stated that the fuel selector was made of cork and that excessive manipulation of it could lead to damage or internal wear. The fuel selector was rarely moved and normally stayed on the left tank position, as most flights were short and did not necessitate the use of both fuel tanks. The selector would only be moved during flights of extended duration or if the pilot perceived a fuel-related issue. The operator indicated that the last time the airplane flew before the day of the accident was on the weekend of April 12, 2016 from FFZ to Phoenix-Mesa Gateway Airport (IWA), Mesa, Arizona, and back, which was about 20-minute flight each way. The airplane was topped off at IWA. The operator stated that the accident flight was the second flight of the day; the first flight lasted about 30 minutes or less. The FAA inspector estimated that the airplane would have flown about 50 minutes to an hour since it was refueled on the left fuel tank. When the FAA inspector queried the operator regarding their leaning procedures, they stated that on most of their flights, which were 20-30 minutes in length around the area, they would lean very little if at all. However, they would lean on the rare longer cross-country flights or if it was at a high-altitude airport.

National Transportation Safety Board - Aircraft Accident/Incident Database

The FAA inspector also interviewed a few T-6 pilots, and the common practice amongst them was that, in case of a fuel interruption, a pilot should select a "reserve" position for those airplanes that were equipped with the reserve position.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA093	01/30/2017 1548 CST	Regis# N7039H	Brenham, TX	Apt: Brenham Muni 11R
Acft Mk/Mdl PIPER J3C		Acft SN 4601	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR A75-8F(C)8		Acft TT 6749	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: JOHN J. BAWDUNIAK		Opr dba:		Aircraft Fire: NONE

Summary

The student pilot and flight instructor were conducting a personal flight. The flight instructor reported that the pretakeoff checks were "normal" but that, during the takeoff, the engine felt "weak" and that the engine lost power during the initial climb. The flight instructor conducted a forced landing to a field, during which the airplane impacted the top of a tree and then the ground.

Examination of the airplane revealed that the exhaust valve for the No. 4 cylinder was stuck in the "open" position possibly due to excessive deposits from the combustion process. It is likely that the stuck exhaust valve resulted in the partial loss of engine power reported by the flight instructor.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The reciprocating engine's exhaust valve being stuck in the "open" position, which resulted in a partial loss of engine power during initial climb.

Events

1. Initial climb - Loss of engine power (partial)
2. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Engine (reciprocating)-Recip engine power section-Not specified - C
2. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Contributed to outcome

Narrative

On January 30, 2017, about 1538 central standard time, a Piper J3C airplane, N7039H, sustained substantial damage during a forced landing following a partial loss of engine power during initial climb after takeoff near Brenham, Texas. The student pilot and flight instructor were not injured. The airplane's fuselage and wings were damaged during the forced landing. The aircraft was registered to and operated by the student pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which was not on a flight plan. The flight was originating at the time of the accident for an unconfirmed destination.

The flight instructor reported that pre-takeoff engine checks were normal. He noted that during the takeoff he and the student pilot noticed that the engine felt "weak" but thought it was due to being unaccustomed to the airplane. The flight instructor said that he verified that the magneto switch was in the both position, the primer was locked, and the carburetor heat was off. By this time the remaining usable runway had been exhausted and the airplane was sinking with full throttle applied. He selected a field in which to execute a landing but the airplane impacted the top of a tree and then the ground during the forced landing.

Examination of the airplane by a Federal Aviation Administration Inspector revealed that the exhaust valve for the No. 4 cylinder was stuck in the open position due to excessive deposits from the combustion process.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA519 08/27/2017 1700 UTC Regis# N30897 Springfield, VT Apt: Hartness State (springfield) VSF
Acft Mk/Mdl PIPER J5A-UNDESIGNAT Acft SN 5-279 Acft Dmg: SUBSTANTIAL Rpt Status: Prelim Prob Caus: Pending
Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: JONES RALPH E Opr dba: Aircraft Fire: NONE

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA348	06/18/2017 1430 EDT	Regis# N5896H	Palatka, FL	Apt: Palatka Muni - Lt Kay Larkin F 28J
Acft Mk/Mdl PIPER PA 16-NO SERIES		Acft SN 16-514	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-320		Acft TT 3405	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: RUTH SHERIN PAUL		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot of the tailwheel-equipped airplane reported that, after flying a stable approach, the airplane ground looped to the right during the landing. The airplane sustained substantial damage to the right wing and fuselage. The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain directional control during the landing.

Events

1. Landing - Loss of control on ground
2. Landing - Runway excursion
3. Landing - Nose over/nose down

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C

Narrative

The pilot of the tailwheel-equipped airplane reported that, after flying a stable approach, the airplane ground looped to the right on rollout.

The airplane sustained substantial damage to the right wing and fuselage.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ANC14CA031 05/28/2014 1309 AKD Regis# N8929L Cordova, AK Apt: N/a
Acraft Mk/Mdl PIPER PA 18-150 Acft SN 18-7409127 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-320 SERIES Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: STAMPER BRUCE JR Opr dba: Aircraft Fire: NONE

Summary

The pilot said that he made low passes over the flat, tundra site to assess its suitability for landing. He said that, on the second pass, he touched the airplane's wheels down to verify that the surface was firm and then returned for landing. He said that, both visually and during the test-touch, the surface appeared to be "100 percent hard-surface tundra," and the vegetation appeared dry; however, during the end of the landing roll, when the airplane was traveling about 10 mph, the wheels sank into unexpectedly "mushy" ground, and the airplane slowly nosed over. The pilot reported that there were no mechanical malfunctions that would have precluded normal operation. The rudder, strut, and wing rib sustained damage. The airplane was equipped with tundra tires. Photographs of the airplane at the accident site showed it inverted in a broad area of flat, grassy tundra, consistent with the pilot's description.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's inadequate remedial action during landing on soft terrain, which resulted in a nose-over.

Events

1. Landing-landing roll - Nose over/nose down

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Environmental issues-Physical environment-Runway/land/takeoff/taxi surface-Soft surface-Response/compensation - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-(general)-Not attained/maintained - C
4. Environmental issues-Physical environment-Runway/land/takeoff/taxi surface-Soft surface-Effect on operation

Narrative

The pilot said that he made low passes over the flat, tundra site to assess its suitability for landing. He said that, on the second pass, he touched the airplane's wheels down to verify that the surface was firm and then returned for landing. He said that both visually and during the test-touch, the surface appeared to be "100 percent hard-surface tundra," and the vegetation appeared dry; however, during the end of the landing roll, when the airplane was traveling about 10 mph, the wheels sank into unexpectedly "mushy" ground, and the airplane slowly nosed over. The pilot reported no mechanical malfunction that would have precluded normal operation. Damage to the airplane included rudder, strut, and wing rib damage. The airplane was equipped with tundra tires. Photographs of the airplane at the accident site showed it inverted in a broad area of flat, grassy tundra, consistent with the pilot's description.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA324	08/18/2017 1145 CDT	Regis# N82912	Sweetwater, TX	Apt: Avenger Field Airport SWW
Acft Mk/Mdl PIPER PA 18-150		Acft SN 18-7709195	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-360-C4P		Acft TT 10624	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR PUBU
Opr Name: USDA-APHIS-WS		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Events

1. Landing-flare/touchdown - Landing gear collapse

Narrative

On August 18, 2017, about 1145 central daylight time, a Piper PA-18-150 airplane, N82912, was substantially damaged while landing at Avenger Field Airport (SWW), Sweetwater, Texas. The commercial pilot and his passenger were not 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 positioning flight, which departed Winston Field Airport (SNK), Snyder, Texas, about 1120.

The pilot reported that the right main landing gear collapsed as he made a crosswind wheels-landing on runway 17 (5,840 ft by 100 ft, asphalt). He stated that he felt a "little bump" shortly after the airplane touched down on the right main landing gear, and the airplane began to swerve to the left. The pilot reported that he was unable to regain directional control with full right rudder and right brake inputs. The airplane continued to swerve left, departed the left side of the runway, and encountered soft terrain where the right main landing gear collapsed. The airplane sustained substantial damage to the right wing, main wing spars, and right elevator.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA157	02/25/2017 1232 MST	Regis# N4404T	Weiser, ID	Apt: Weiser Municipal KS87
Acft Mk/Mdl PIPER PA 28-140-140		Acft SN 28-7225165	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-320 E3D			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: THOMPSON AVIATION SERVICES LLC	Opr dba:			Aircraft Fire: NONE
				AW Cert: STN

Summary

The student pilot in the tricycle-gear-equipped airplane reported that he was flying a solo cross-country flight and landed on the 60-ft-wide asphalt runway. He recalled that there were 4-ft-high snow berm that paralleled the edges of the runway. When he touched down, he applied the brakes, and the airplane yawed to the left. In fear of striking the snow berm, he initiated a go around and rotated about 65 kts. The airplane climbed about 2 ft above the runway, but the left main landing gear wheel struck the snow berm on the left side of the runway. The left tire and brake assembly separated from the airplane, and the airplane came to rest in the snow-covered safety area left of the runway. The airplane sustained substantial damage to the left wing ribs and aileron.

The student reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The student pilot's failure to maintain directional control and to maintain clearance from a snow berm during the aborted landing.

Events

1. Landing-aborted after touchdown - Collision during takeoff/land

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
2. Environmental issues-Physical environment-Object/animal/substance-Snow/ice-Effect on equipment - C
3. Personnel issues-Task performance-Use of equip/info-Aircraft control-Student/instructed pilot - C

Narrative

The student pilot in the tricycle gear-equipped airplane reported that he was flying a solo cross-country flight and landed on the 60-foot wide asphalt runway. He recalled that there were 4-foot high snow berm that paralleled the edges of the runway. When he touched down, he applied the brakes and the airplane yawed to the left. In fear of striking the snow berm, he initiated a go around and rotated about 65 kts. The airplane climbed about two feet above the runway but the left main landing gear wheel struck the snow berm on the left side of the runway. The left tire and brake assembly separated from the airplane, and the airplane came to rest in the snow-covered safety area left of the runway. The airplane sustained substantial damage to the left wing ribs and aileron.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR15LA137 03/01/2015 940 PST Regis# N9133G Redmond, OR Apt: Roberts Field Airport KRDM
Acft Mk/Mdl PIPER PA 46-310P Acft SN 4608111 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR TSIO-520 SER Acft TT 3208 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: MALSTROM ROBERT Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The private pilot reported that, about 30 minutes into the private, cross-country flight and while the airplane was cruising at 23,000 ft mean sea level, the engine started running roughly. The pilot noticed that the No. 5 cylinder head temperature (CHT) was lower than normal. He cycled the magnetos and noticed that the engine ran rougher than normal when the left magneto was selected. He then enriched the mixture, and the engine smoothed out. He continued to monitor the engine and adjust the mixture. About 30 minutes later, the engine lost power. The pilot diverted to a nearby airport and attempted to line up for a runway but did not have sufficient altitude. He performed a forced landing to the airport infield, which resulted in the nose landing gear collapsing and structural damage to the wing spar.

Postaccident examination of the engine did not reveal any anomalies that would have precluded normal operation. During an engine test run up to full power, the only anomaly noted was that the No. 5 CHT was 50 to 70° lower than all the other cylinders. However, the lower CHT likely would not cause a loss of engine power.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A loss of engine power during cruise flight for reasons that could not be determined because postaccident examination of the engine did not reveal any anomalies that would have precluded normal operation.

Events

1. Enroute-cruise - Loss of engine power (total)
2. Landing-landing roll - Runway excursion

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

On March 1, 2015, at 0940 Pacific standard time, a Piper PA-46-310P, N9133G, executed a forced landing into Roberts Field Airport, Redmond, Oregon, after a loss of engine power. The airplane was registered to, and operated by, the private pilot under the provisions of 14 Code of Federal Regulations, Part 91. The pilot was not injured, and the airplane sustained substantial damage to both wings. Visual meteorological conditions prevailed, and an instrument flight plan had been filed. The flight originated from Oak Harbor, Washington, at 0800.

The pilot reported that he was cruising at 23,000 feet mean sea level (msl) when he noticed the engine running a bit rough as he passed Portland, Oregon. He noticed that the number 5 cylinder head temperature (cht) was lower than normal. The pilot cycled the magnetos and noticed that the engine ran rougher than normal when the left magneto was selected. The engine smoothed out when he enriched the mixture. He continued to monitor the engine and adjusting the mixture. About 30 minutes later engine power completely dropped off. The pilot diverted to Roberts Field, Redmond, Oregon, using his GPS for navigation. About 2 miles out he acquired the airport visually, and attempted to line up for a runway but did not have enough altitude. He performed a forced landing into the airport infield. The landing resulted in a collapsed nose landing gear, and wing spar damage at both main landing gear mounts.

On March 3, 2015, an airframe and power plants (A&P) mechanic examined the airplane under the supervision of a Federal Aviation Administration (FAA) inspector. He reported on the airframe structural damage, and that he found no obvious reason for the loss of engine power. The airplane was then relocated to a facility in Greeley, Colorado, for further examination.

The airplane was equipped with a EDM 930 engine data monitoring system. On April 14 the data from the EDM 930 was downloaded and sent to the NTSB Investigator-in-Charge (IIC). The data showed that about 25 minutes before the loss of engine power the number 5 cylinder head temperature (cht) started to trend about 50°F below its previous steady temperature (300°F), and then fluctuate twice between 300°F - 250°F during the last 12 minutes. The exhaust gas temperature (egt) remained steady for cylinder number 5 throughout the record. All the remaining cylinders exhibited steady egt and cht values.

On May 13, 2015, the NTSB IIC, and a technical representative from the engine manufacturer examined the airplane. A fuel sample was taken from the fuel strainer. The fuel sample was light green in color and tested negative for water or kerosene/jet fuel contamination. Results of a chemical analysis confirmed that the sample was chemically consistent with 100LL avgas. The engine was examined externally, the cylinders bore scoped, sparkplugs inspected, internal

magneto timing verified, and internal continuity confirmed by rotating the propeller/crankshaft. The number 5 cylinder fuel injection nozzle was removed, examined, and found to be in good condition with no blockages. An external fuel tank was plumbed into the right-wing fuel outlet and an external priming pump placed inline. The engine started on the first attempt, ran smoothly at idle, magneto checked performed, and the engine was run up to red line producing full power. No anomalies were noted during the engine run other than that the number 5 cylinder head temperature was notably 50ø-70øF cooler than all the other cylinders.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA322	05/27/2017 1300 EDT	Regis# N5544J	Gilbert, SC	Apt: Whiteplains SC99
Acft Mk/Mdl PIPER PA28-140		Acft SN 28-22075	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-320-E2A		Acft TT 2865	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: CJ BONACUM JR.		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot reported that, during the final approach to land, the airplane encountered a "swirling wind due to [the] high trees on final approach." Subsequently, the airplane impacted terrain about 10 to 12 ft short of the runway threshold, the nosewheel collapsed, and the airplane skidded to a stop as it continued forward onto the runway.

The engine mount sustained substantial damage.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

An automated weather observation station, about 12 nautical miles from the accident airport, recorded wind from 130ø at 7 knots. The pilot reported that the landing was on runway 27.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's improper glidepath in variable wind conditions, which resulted in the airplane impacting terrain short of the runway threshold.

Events

1. Approach-VFR pattern final - Other weather encounter
2. Approach-VFR pattern final - Loss of control in flight
3. Approach-VFR pattern final - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent/approach/glide path-Incorrect use/operation - C
3. Environmental issues-Conditions/weather/phenomena-Wind-Variable wind-Effect on operation

Narrative

The pilot reported that, during the final approach to land, the airplane encountered a "swirling wind due to [the] high trees on final approach." Subsequently, the airplane impacted terrain about 10 to 12 ft. short of the runway threshold, the nose wheel collapsed, and the airplane skidded to a stop as it continued forward onto the runway.

The engine mount sustained substantial damage.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

An automated weather observation station, about 12 nautical miles from the accident airport, recorded wind from 130ø at 7 knots. The pilot reported that the landing was on runway 27.

National Transportation Safety Board - Aircraft Accident/Incident Database

Incident Rpt# WPR16IA100 04/29/2016 1535 PDT Regis# N200KR San Carlos, CA Apt: San Carlos SQL
Acft Mk/Mdl PIPER PA28-200 Acft SN 28R-7635176 Acft Dmg: NONE Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO-360 Acft TT 9238 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: SAN CARLOS FLIGHT CENTER Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The flight instructor reported that he and the pilot receiving instruction departed normally and climbed to an altitude of 1,000 ft above ground level. The pilot completed the after-takeoff checklist and attempted to reduce engine power to a climb power setting; however, the engine was unresponsive to throttle inputs. The pilots returned to the airport, pulled the mixture control to the idle cut-off position when the airplane was over the runway threshold, and landed uneventfully. Examination of the throttle control revealed that the cable had broken.

Metallurgical examination showed that the cable was fractured due to fatigue near the input end. Fatigue regions on the wires covered about half the cross-section, consistent with a relatively high stress load on the cable. An elastomeric boot covers the swivel joints at each end of the cable assembly; however, examination revealed that the boot at the input end swivel joint had displaced onto the swivel tube. The boot at the input end lacked the same deformation as the boot at the output end, which indicated that the input end boot had not been installed on the swivel joint for some time before the event. As this boot is used to dampen vibrational loads on the cable assembly, it is likely that the cable fractured from fatigue cracks that initiated and grew due to the excessive vibrations that resulted from the missing boot on the swivel joint.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The failure of maintenance personnel to properly install and secure the input swivel boot on the swivel joint, which resulted in excessive vibration that led to fatigue cracks and failure of the throttle cable.

Events

1. Initial climb - Sys/Comp malf/fail (non-power)
2. Emergency descent - Sys/Comp malf/fail (non-power)
3. Landing-flare/touchdown - Engine shutdown

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Engine controls-Power lever-Not installed/available - C
2. Aircraft-Aircraft power plant-Engine controls-Power lever-Fatigue/wear/corrosion - C
3. Personnel issues-Task performance-Maintenance-Installation-Maintenance personnel - C

Narrative

On April 29, 2016, about 1535 Pacific daylight time, a Piper PA-28-200, N200KR, completed a precautionary landing at the San Carlos Airport (SQL), San Carlos, California following a power control failure. The certified flight instructor (CFI) and the pilot receiving instruction were not injured, and the airplane was not damaged. Visual meteorological conditions prevailed for the instructional flight, which was being conducted in accordance with 14 Code of Federal Regulations Part 91, and a flight plan was not filed. According to the CFI, the intended destination was Byron, California.

In a telephone interview with the National Transportation Safety Board (NTSB) investigator-in-charge, the CFI reported that he attempted to reduce power during the initial climb following departure from runway 30 at SQL, but he was only able to make a slight reduction in power. After he determined that no further power reduction was possible, the pilot then flew a right-hand traffic pattern back to runway 30, and on final approach over the runway threshold he fully retarded the mixture control to stop the engine. After landing, the airplane completed its landing roll with sufficient momentum to exit the runway at an intersecting taxiway. A subsequent inspection of the throttle control revealed that the cable had broken. The cable was subsequently recovered by a Federal Aviation Administration aviation safety inspector for further examination by the NTSB.

The throttle cable was sent to the National Transportation Safety Board's Materials Laboratory in Washington, D.C., for examination and analysis. Subsequent to the examination, a Senior NTSB Materials Engineer reported the following:

The cable was fractured near the input end. Damage to the conduit revealed two areas of wear contact. The smallest wear contact was located in the lower area and had a flat wear pattern, which corresponded to contact with a smooth surface. The larger of the two areas had a ridged pattern, which indicated that the area made contact with another cable. Individual cable wires were fractured at locations within approximately one-half of a lay length. Portions of the fracture surface on each of the outer wires had relatively smooth fracture features oriented perpendicular to the outer surface with curving boundaries, which are features consistent with fatigue. The fatigue origin for each individual wire was located at the same side relative to the overall cable, and the fatigue region

extended across approximately half the diameter in each wire. The core wire fracture features appeared rubbed.

The wall of the sleeve was deformed into an oblong shape. Additionally, the overall features of the swivel joint were consistent with bending deformation. A curving deformation mark was observed on one side of the swivel tube, which corresponded to contact with the wall of the sleeve under bending loads on the joint. The axis of the conduit was angled (bent) relative to the axis of the sleeve. Adjacent to the sleeve, the blue outer sheath of the conduit was depressed inward at the outside of the bend. The depression in the outer sheath of the conduit was also visible in a radiograph of the part. Another radiograph of the conduit and sleeve revealed that the sleeve was crimped onto the conduit, and that the inner diameter of the coil and the spacing between coils varied along the length of the sleeve.

As assembled, an elastomeric boot covers the swivel joints at each end of the cable assembly. As received, the boot at the input end swivel joint was displaced onto the swivel tube. In comparison, the boot at the output end was received covering the joint, and a hose clamp was in place on the boot. No hose clamp was observed at the input end. During the examination, the hose clamp was removed from the boot at the output end swivel joint, and the boot was displaced onto the output swivel tube. The portion of the boot that covered the swivel joint was flared outward relative to the other end of the boot, and an impression was observed where the hose clamp had been installed. More than two months after the hose clamp was removed, the hose-clamp impression remained visible on the surface, and a slight flare was present at the end that had been covering the swivel joint. In comparison, the boot for the input swivel joint had a uniform outer diameter with no evidence of a flared end or hose clamp impression. Additionally, the input swivel tube had a date stamp 6 days after the accident, which revealed similar features for the boot with no evidence of a hose-clamp impression or flared end. According to the cable manufacturer, the swivel joint boot is an important component to prevent contamination and dampen vibration loads on the cable assembly.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA354	06/04/2017 1320 PDT	Regis# N9238W	Big Bear, CA	Apt: Big Bear City L35
Acft Mk/Mdl PIPER PA28-235		Acft SN 28-10908	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING TIO-540 SER		Acft TT 4410	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: FRANK P. ARMELLINI		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The pilot reported that, during the landing flare, the airplane encountered a "sudden massive gust of wind" that pitched the nose up. He pushed the yoke forward, but the wind shifted to a tailwind, and the airplane "slammed" onto the runway. Subsequently, the left main landing gear collapsed, the airplane veered right off the runway, and it then came to rest nose down.

The airplane sustained substantial damage to the left wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

The automated weather observation system at the airport reported that, about the time of the accident, the wind was from 260ø at 4 knots. The pilot landed on runway 26.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's improper landing flare, which resulted in a hard landing and a subsequent loss of directional control.

Events

1. Landing - Hard landing
2. Landing - Landing gear collapse
3. Landing - Runway excursion
4. Landing - Nose over/nose down

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Landing flare-Not attained/maintained - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C

Narrative

The pilot reported that, during the landing flare the airplane encountered a "sudden massive gust of wind" that pitched the nose up. He pushed the yoke forward, but the wind shifted to a tailwind and the airplane "slammed" onto the runway. Subsequently, the left main landing gear collapsed, the airplane veered right off the runway and came to rest nose down.

The airplane sustained substantial damage to the left wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

The automated weather observation system at the accident airport reported, about the time of the accident, the wind was from 260ø at 4 knots. The pilot landed on runway 26.

Note: The accident airport is at an elevation of about 6752 ft., with a calculated density altitude about the time of the accident of 9211 feet.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR15LA111	02/22/2015 1405 PST	Regis# CGVZW	Spokane, WA	Apt: Felts Field SFF
Acft Mk/Mdl PIPER PA46 - 350P		Acft SN 4636281	Acft Dmg: DESTROYED	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL MOTORS INC.		Acft TT 2389	Fatal 1 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: MICHAEL CLEMENTS		Opr dba:		Aircraft Fire: NONE

Summary

The pilot was conducting a cross-country flight from Canada to California and had landed to clear customs into the United States and to refuel his airplane. The pilot then departed to continue the flight. During the initial climb after takeoff, the engine experienced a total loss of power, and the pilot attempted to make an off-airport forced landing. The right wing struck railroad tracks at the top of a hill, and the airplane continued down an embankment, where it came to rest adjacent to the bottom of a railroad bridge.

Postaccident interviews revealed that, when requesting fuel from the fixed-base operator (FBO), the pilot did not specify a grade of fuel to be used to service the airplane. The refueler mistakenly identified the airplane as requiring Jet A fuel, even though the fuel filler ports were placarded "AVGAS (aviation gasoline) ONLY." The fueler subsequently fueled the airplane with Jet A instead of aviation gasoline. Additionally, the fueling nozzle installed on the fuel truck at the time of the refueling was not the proper type of nozzle. Jet A and AvGas fueling nozzles are different designs in order to prevent fueling an airplane with the wrong type of fuel.

Following the fueling, the pilot returned to the FBO and signed a receipt, which indicated that the airplane had been serviced with Jet A. There were no witnesses to the pilot's preflight activities, and it is unknown if the pilot visually inspected or obtained a fuel sample before takeoff; however, had the pilot done this, it would have been apparent that the airplane had been improperly fueled.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A total loss of engine power due to the refueler's incorrect refueling of the airplane. Contributing to the accident was the fixed-base operator's improper fueling nozzle, which facilitated the use of an incorrect fuel, and the pilot's inadequate preflight inspection.

Events

1. Takeoff - Fuel contamination
2. Emergency descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Incorrect service/maintenance - C
2. Personnel issues-Task performance-Inspection-Preflight inspection-Pilot - F

Narrative

HISTORY OF FLIGHT

On February 22, 2015, at 1405 Pacific standard time, a Piper Aircraft, Inc., PA-46-350P airplane, Canadian registration C-GVZW, was destroyed during a forced landing following a total loss of engine power after takeoff from Felts Field Airport (SFF), Spokane, Washington. The pilot, was fatally injured. Visual meteorological conditions prevailed for the instrument flight rules (IFR) flight, which was originating at the time of the accident. The flight was destined for the Stockton Metropolitan Airport (SCK), Stockton, California.

According to family members, the pilot was traveling to SCK from Canada to participate in recurrent flight training. He had called his wife prior to departure from SFF; he said that his flight to SFF was great, and that he was in good spirits. She could hear the engine in the background as she spoke to her husband, and nothing sounded abnormal.

Air traffic control voice communication information proved by the Federal Aviation Administration (FAA) indicated that the airplane was cleared for takeoff from runway 22R, and the pilot was instructed to turn to a heading of 190° after takeoff. When the controller observed on radar that the airplane had not turned to the 190° heading, he queried the pilot. The pilot responded that he was having engine trouble. The controller cleared the pilot to return to the airport and land on any runway. The pilot stated that he was not going to make it back to the runway, and asked if the controller had any suggestions for an alternate landing site. No further radio transmissions were received from the pilot.

One set of witnesses heard the airplane engine sputtering. They saw the left-wing drop, and the nose pitch up, the right wing dropped, and they lost sight of the airplane as it passed behind a building. The second set of witnesses reported that the right wing struck a railroad track at the top of a hill and subsequently

National Transportation Safety Board - Aircraft Accident/Incident Database

traveled down an embankment. The airplane slid across a road and came to rest inverted adjacent to the bottom of a railroad bridge.

WITNESS INFORMATION

The fixed-base operator (FBO) employee who serviced the airplane with fuel stated that the pilot contacted him on the day of the accident and requested to have his airplane fueled. The pilot did not specify what type of fuel was required, but only that he had cleared customs; he also told the fueler where his airplane was located. The fueler stated that the pilot was not present when he arrived to fuel the airplane. He stated that the majority of the Piper Malibu airplanes that he had serviced required Jet A fuel, so he fueled the accident airplane with Jet A. Once the fueling was complete, he returned to the FBO, and waited for the pilot to return to pay for the fuel. Both the written receipt and credit card receipt provided to the pilot specified that the airplane had been serviced with Jet A. The pilot paid for the fuel and left.

There were no witnesses to the pilot's preflight activities, and it is unknown if the pilot visually inspected or sumped the fuel before departing. Following the accident, an FAA inspector obtained the fueling log from the FBO; the log indicated that the accident airplane had been fueled with 52 gallons of Jet A.

PERSONNEL INFORMATION

The pilot held a Transport Canada single-engine and multiengine land certificate with night ratings. He held a third-class medical with the limitation that glasses must be worn. The pilot had received training in the accident make/model airplane, and was endorsed for proficiency in its operation in March 2012.

AIRCRAFT INFORMATION

The airplane was powered by a Lycoming TIO-540-AE2A 350-horsepower, turbocharged, reciprocating engine. According to the journey record (aircraft logbook), the last annual inspection was performed on July 23, 2014, at an airframe total time of 2,324.0 hours. The last maintenance performed included an oil and filter change on January 15, 2015, at a total airframe time of 2,388.9 hours. There were no recorded flights between January 15, and February 22, 2015.

WRECKAGE AND IMPACT INFORMATION

The airplane crashed in a commercial area near a railroad yard.

The majority of the airplane came to rest at the accident site, with additional wreckage strewn throughout the debris path. Both wings had separated from the airplane fuselage; however, they remained near the main wreckage. The fuel tanks had been ruptured during the accident sequence; however, a strong smell of Jet A fuel was present at the accident site. As a result of the ruptured fuel tanks, a fuel sample was not obtained.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed by the Spokane County Office of the Medical Examiner. The cause of death was determined to be blunt impact to the head, and the manner of death was an accident.

The FAA Bioaeronautical Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on specimens from the pilot. The results were negative for volatiles. The pilot initially survived the accident; as a result, there was positive test results for drugs that were administered to the pilot while he was in the hospital, including ephedrine detected in urine, but not detected in blood, and etomidate, lidocaine, pseudoephedrine, and salicylate detected in blood.

TEST AND RESEARCH

The airplane was equipped with its original fuel equipment, and was appropriately marked with an "AVGAS (aviation gasoline) ONLY" placard at each wings fuel port, which indicated that the airplane operated on aviation gasoline. Both fuel ports were checked by an FAA inspector, and identified as having the appropriately-sized fuel collar for AVGAS.

There were no other malfunctions that would have precluded normal operation of the airplane.

Inspection of the fuel truck after the accident revealed that the fuel hose nozzle was the round type, typically used to service helicopters with smaller fuel filler

ports. When the FAA returned the next day to inspect the truck, the smaller rounder fuel nozzle that had been on the fuel truck the night before had been replaced with a flat duck-bill fuel nozzle. When the owner of the FBO was questioned about the switch, he stated that it was for safety reasons, and that he was making sure the appropriate nozzle was attached.

ADDITIONAL INFORMATION

According to the airplane's pilot operating handbook, while performing the preflight checklist, one of the items called out is for the pilot to do a visual check of the fuel supply for both wings, and assure that the fuel cap is secured.

Located at the airport is an FBO that performs turbine conversions on the accident make and model airplane.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR16LA060 01/31/2016 1459 PST Regis# N777PG Burns, OR Apt: Burns Muni BNO
Acft Mk/Mdl PIPER PA46-310P Acft SN 46-08063 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl TELEDYNE CONTINENTAL TSIO-550-C14BAcft TT 432 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: GREG ZASER Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The private pilot reported that, about 90 minutes after takeoff and about 19,000 ft, the engine of the high-performance pressurized airplane lost total power. Although the loss of power happened at high altitude, for the next 11 minutes, the pilot did not perform any troubleshooting steps, which were limited in scope and would not have taken long to complete, and instead diverted directly to an airport.

After arriving at the diversion airport with altitude remaining, the pilot performed a circling descent maneuver over the runway. During the landing approach, he moved the landing gear selection lever to the "down" position, but the gear did not extend, so the pilot chose to land the airplane on snow adjacent to the runway. Just before touchdown, the main landing gear extended, but the nose landing gear remained retracted. Upon touchdown, the airplane's nose dug into the snow. The airplane then abruptly stopped, sustaining substantial damage to the forward fuselage and both wings. Examination of the engine and landing gear did not reveal any anomalies that would have precluded normal operation, and the engine performed normally during a subsequent test run. Given the engine ran normally during the test run, it is possible that, if the pilot had attempted to troubleshoot the problem, engine power could have been restored. The reason for the loss of engine power could not be determined. According to the owner, there was a previously undiagnosed landing gear problem that, on two previous occasions, had resulted in the delayed deployment of the landing gear after flying at high altitudes in cold weather. Given the airplane was flying at high altitude in cold weather when the event occurred, a reoccurrence of the landing gear anomaly could not be ruled out.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The total loss of engine power for reasons that could not be determined because postaccident examination revealed no evidence of an anomaly that would have precluded normal operation. Contributing to the accident was a preexisting landing gear anomaly that prevented the landing gear from completely extending after flight at high altitude in cold weather during landing.

Events

1. Enroute-cruise - Loss of engine power (total)
2. Emergency descent - Off-field or emergency landing
3. Landing - Sys/Comp malf/fail (non-power)
4. Landing-landing roll - Landing gear collapse

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Aircraft-Aircraft systems-Landing gear system-Gear extension and retract sys-Malfunction - F
3. Aircraft-Aircraft systems-Landing gear system-Gear extension and retract sys-Not inspected - F
4. Personnel issues-Action/decision-Action-Lack of action-Pilot
5. Personnel issues-Task performance-Use of equip/info-(general)-Pilot

Narrative

HISTORY OF FLIGHT

On January 31, 2016, at 1459 Pacific standard time, a Piper PA46-310P, N777PG, performed a forced landing at Burns Municipal Airport, Burns, Oregon, following a total loss of engine power during cruise. The airplane was registered to and operated by the pilot as a 14 Code of Federal Regulations Part 91 personal flight. The private pilot, who was the sole occupant, was not injured, and the airplane sustained substantial damage during the landing roll. The cross-country flight departed Boeing Field/King County International Airport, Seattle, Washington, at 1318, with a planned destination of Scottsdale Airport, Scottsdale, Arizona. Visual meteorological conditions prevailed throughout the flight, and an instrument flight rules (IFR) flight plan had been filed.

The pilot reported that about 90 minutes after departure while cruising at 19,000 ft, the engine "tone" decreased, accompanied by a drop in manifold pressure from 29 to 15 inches. He kept the throttle in the cruise power position, and elected to divert towards Burns, after reporting to air traffic control personnel that he had an engine emergency. He stated that the engine did not regain power during the descent, and he did not perform any troubleshooting procedures. He eventually arrived over the airfield with altitude remaining, and began a circling descent. During the landing approach, he moved the gear selection lever to the DOWN position, but did not hear or feel any indication that the gear had deployed, nor did he see three green lights on the instrument panel indicating the gear was down and locked. He did not have time to perform the emergency extension procedure because the airplane was too low, and he decided to land gear-up

on the snow adjacent to runway 30.

He reported that just prior to touchdown, when the airplane was about 5 ft above ground level, the landing gear began to extend, and he saw two green lights indicating the main landing gear had locked, but no green light for the nose gear. The airplane touched down, and the nose dug into the snow. The airplane abruptly stopped, sustaining substantial damage to the forward fuselage and both wings (Photo 1).

AIRPLANE INFORMATION

The low-wing, high-performance, pressurized airplane was manufactured in 1987. It was equipped with a twin-turbocharged six-cylinder Continental TSIO-550-C14B engine, manufactured in November 2011. The engine had accrued 431.8 flight hours at the time of the last annual inspection, which was completed 18 days and 9.7 flight hours before the accident.

The aircraft was equipped with hydraulically operated, retractable, tricycle landing gear, with hydraulic pressure provided by an electrically driven hydraulic pump. Gear operation was controlled by a conventional two-position selector switch. Three green lights, which are individually activated as each gear mechanically locks into the down position are located above the landing gear selector.

The landing gear is held in the up position by hydraulic pressure which is trapped in the system lines by a check valve in the pump assembly.

The emergency gear extension system is activated by manually pulling a control on the instrument panel. The control activates a valve which relieves the pressure in the up side of the circuit, and bypasses fluid to the down side of the system. The additional fluid required for down operation comes directly from the reservoir. The landing gear is held in the down position by spring-loaded mechanical locking mechanisms built into the actuating cylinders of each landing gear leg.

The Pilot's Operating Handbook includes three initial steps for emergency procedures for an engine power loss in flight. The steps call for the pilot to switch fuel tanks, set the auxiliary fuel pump to LOW, and set induction air to ALTERNATE. If power is not restored, the auxiliary fuel pump should then be set to HIGH, fuel mixture FULL RICH, and the throttle to approximately 75 % power.

TESTS AND RESEARCH

Engine Monitor

The airplane was equipped with a JPI EDM-700 Engine Monitor. The unit was sent to the NTSB Office of Research and Engineering for data extraction. The EDM-700 recorded exhaust gas temperatures (EGT), cylinder head temperatures (CHT), turbine inlet temperature (TIT), and battery voltage from the time between engine start and the accident.

The extracted data revealed that the EGT and CHT values varied in concert with one another throughout the initial portions of the flight over a period which correlated to the takeoff and climb. At 1347, about 29 minutes after takeoff, the EGTs for all six cylinders reached about 1,500 degrees F, the CHT's about 290 degrees F, and TIT about 1,650 degrees F. The values remained closely matched and consistent for the next hour, until at 1448 an abrupt drop in EGT for all six cylinders to 150 degrees F, along with a similar drop in TIT was recorded. At the same time, CHT for all cylinders began gradually falling, reaching 80 degrees F, about 5 minutes later. At 1459, 11 minutes after the initial anomaly, the EGT displayed a momentary, 30-second increase from 150 to 300 degrees F along with a similar spike in TIT, the values then all dropped, and at 1501 the data ended. Battery voltage throughout the flight remained at 28 volts.

Airframe

The airframe sustained wrinkles aft of the firewall, with crush damage to the underside of the engine. Within the cabin, the fuel mixture control was found in the full-forward (RICH) position, the propeller was in the full-forward (INCR) position, and the throttle in the full-aft position (CLSD).

The auxiliary fuel pump switch was OFF, the fuel selector valve was in the LEFT position, both magneto switches were ON, and all circuit breakers appeared

closed.

Both wings were removed from the airframe during recovery, and significant quantities of fuel were recovered from both fuel tanks at that time. During the examination, both the left and right collector/sump tanks were drained at their respective drain ports, and contained about 25 fluid ounces of clear blue-colored fuel each. Each tank also contained about 1 tablespoon of clear fluid, which was confirmed to be water when tested with water detecting paste.

The fuel filter bowl under the baggage compartment door was removed and contained about 5 fluid ounces of blue-colored fuel. The filter element was clear and free of debris, and no water was present.

The fuel line fittings from wing roots through to the engine driven fuel pump inlet were secure, and there were no indications of a leak. All fuel and vent lines were tested for blockage, and all were clear. The fuel selector valve was found in the left tank detent, and the valve could be moved freely between all positions.

Control continuity was established for the throttle, mixture, and propeller controls through to their respective control arms on the engine. All controls moved freely and in the correct direction.

Landing Gear

The nose landing gear remained stowed within the wheel well and appeared undamaged. Both main landing gear struts were in the fully extended and locked position; each wheel strut had bent aft and separated from the trunnion assembly.

The hydraulic system was intact, and no fluid leaks were observed. Power was applied to the airplane's electrical bus, and the hydraulic pump engaged and operated immediately. The landing gear system was examined, and no anomalies were noted which would have precluded normal operation.

During the last annual inspection, the landing gear emergency down spring, up-pressure switch, and sequence valve were replaced. The mechanic who performed the maintenance stated that the spring was an item that he typically replaces at every annual inspection, and that the sequencing valve was replaced because it was leaking hydraulic fluid at its actuating shaft. The pressure switch was operating intermittently, such that during the inspection the landing gear would not retract when commanded, unless the switch was tapped.

Engine

All fuel, oil, and induction lines appeared secure, and except for an indentation to the oil sump and right intercooler inlet manifold, no engine damage was observed beyond. The crankcase was intact, and there were no indications of catastrophic engine failure. The left and right magnetos remained firmly attached, and their engine timing was measured at 24 degrees, which corresponded to the specifications on the engine data tag.

The engine could be rotated by hand at the propeller flange, and cylinder compression was present when checked at the top spark plug bores of each cylinder.

The compressor impellers for both turbochargers could be rotated smoothly within their housings, and the inlet area of each compressor housing was undamaged.

The engine was removed from the airframe and shipped to the facilities of Continental Motors for testing. Once correctly configured within a test cell, the engine started on the first attempt, and was run at idle until operating temperatures were reached. The engine responded appropriately to a magneto check, and ran smoothly through speeds ranging from idle to 2,600 rpm and up to manifold pressures of 35.59 inHg.

ADDITIONAL INFORMATION

The pilot made himself available for interview, but despite multiple requests, did not submit a Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1/2).

The pilot reported that during a flight in the accident airplane about 6 to 7 years prior, he had experienced a drop in manifold pressure during cruise, but on that

occasion, had decided to continue the flight. After landing he discovered that the turbocharger crossover pipe had detached, and that this could have caused an in-flight fire. It was that prior experience that prompted him to initiate a rapid descent to land during the accident flight, rather than attempt to troubleshoot the loss of power.

The pilot further reported that a few years before the accident he had experienced two separate instances when the landing gear failed to extend after flying at high altitudes (FL22), in cold temperatures. On those occasions, he had attempted to utilize the landing gear to expedite the descent, and both times the landing gear failed to initially extend, but at some point, it eventually deployed as he got closer to the ground. He stated that he discussed the problem with multiple mechanics, with the consensus that this was not necessarily unusual, could likely be attributed to the cold temperatures, and that a thorough landing gear inspection should be performed if it persisted. It did not happen again, and he did not have the landing gear inspected.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA137 02/05/2017 1330 EST Regis# N7518G Fallston, MD Apt: Fallston W42
Acft Mk/Mdl ROBINSON HELICOPTER R22-BETA Acft SN 4005 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-360-J2A Acft TT 3343 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: MIDDLE RIVER AVIATION LLC Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The flight instructor in the skid-landing-gear-equipped helicopter reported that he was providing hovering instruction during the student's first helicopter lesson. The student was manipulating all flight controls with the instructor's "guided assistance." The helicopter began drifting aft, and the instructor told the student to "ease up on the controls." The helicopter entered an immediate spin to the left, and the student "froze up on the flight controls." The instructor's counter-control inputs to gain control of the helicopter were ineffective, and the instructor rolled off the throttle. The helicopter descended, and the left skid and empennage struck the ground hard and sustained substantial damage.

The flight instructor reported that there were no preaccident mechanical malfunctions or failures with the helicopter that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The flight instructor's inability to maintain helicopter control while hovering because the student pilot froze on the flight controls, which resulted in a hard landing.

Events

1. Maneuvering-hover - Collision with terr/obj (non-CFIT)
2. Maneuvering-hover - Abrupt maneuver

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Instructor/check pilot - C
2. Personnel issues-Psychological-Cognitive limitation-Cognitive overload-Student/instructed pilot - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-(general)-Not attained/maintained - C
4. Personnel issues-Task performance-Communication (personnel)-Common phraseology-Instructor/check pilot

Narrative

The flight instructor in the skid landing gear equipped helicopter reported that he was providing hovering instruction during the student's first helicopter lesson. The student was manipulating all flight controls, with the instructor's "guided assistance". The helicopter began drifting aft and the instructor told the student to "ease up on the controls". The helicopter entered an immediate spin to the left and the student "froze up on the flight controls". The instructor's counter-control inputs to acquire control of the helicopter were ineffective and the instructor rolled off the throttle. The helicopter descended, the left skid and empennage struck the ground hard and sustained substantial damage.

The pilot reported that there were no preaccident mechanical malfunctions or failures with the helicopter that would have precluded normal operation.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA16LA216	06/17/2016 1245 EDT	Regis# N141TM	Chatham, MA	Apt: N/a
Acft Mk/Mdl ROBINSON HELICOPTER		Acft SN 1216	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-540		Acft TT 2192	Fatal 0 Ser Inj 2	Flt Conducted Under: FAR 091
Opr Name: RYAN ROTORS INC		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Summary

The commercial pilot reported that, during an aerial photography flight, the helicopter was about 300 ft above a pond when it experienced an engine overspeed, followed by a loss of engine power. The pilot subsequently entered an autorotation to shallow water.

Examination of the engine revealed that the No. 2 cylinder head rocker shaft bosses, the No. 2 intake valve upper spring, and the No. 3 intake valve spring seat were fractured, consistent with an engine overspeed. Examination of the airframe revealed that the engine cooling fan shaft had separated. Without the resistance of the fan shaft, the engine oversped, which resulted in sufficient engine damage for the engine to lose total power. The aft face of the fan shaft's lower sheave exhibited caked-on grease, consistent with grease leaking beyond the lower forward clutch actuator bearing seal for a prolonged period of time. Metallurgical examination of the bearing revealed that its rollers were seized, and no grease was recovered, consistent with a lack of lubrication. The helicopter manufacturer's maintenance manual required that the entire airframe be overhauled every 2,200 hours, which would include an overhaul of the engine cooling fan driveshaft lower bearing and seal. Review of maintenance records revealed that, due to a maintenance logbook entry error (time since overhaul) that occurred about 9 years before the accident and was carried forward, the helicopter had been operated about 52 hours beyond the mandatory airframe overhaul time limit. The manual also required that the lower clutch actuator bearings be lubricated every 300 hours or 3 years, whichever occurred first. Although the failed bearing had been lubricated with grease both about 1 year and 2 years preceding the accident, there was no record indicating that the bearing had been lubricated with grease during the preceding 4 years 11 months and 685.1 hours of operation, which likely damaged or degraded the bearing and led to its failure during the accident flight.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The inadequate maintenance of the lower forward clutch actuator bearing for a prolonged period of time, which resulted in a bearing failure. Contributing to the accident was an erroneous maintenance entry, which resulted in the helicopter being operated beyond its mandatory airframe overhaul time.

Events

1. Maneuvering-low-alt flying - Sys/Comp malf/fail (non-power)
2. Maneuvering-low-alt flying - Powerplant sys/comp malf/fail
3. Maneuvering-low-alt flying - Loss of engine power (total)
4. Emergency descent - Off-field or emergency landing
5. Landing - Hard landing

Findings - Cause/Factor

1. Aircraft-Aircraft systems-(general)-(general)-Fatigue/wear/corrosion - C
2. Personnel issues-Task performance-Maintenance-Scheduled/routine maintenance-Maintenance personnel - C
3. Personnel issues-Task performance-Record-keeping-Aircraft/maintenance logs-Maintenance personnel - F

Narrative

On June 17, 2016, about 1245 eastern daylight time, a Robinson R44, N141TM, operated by Ryan Rotors, was substantially damaged during a forced landing to a pond, following a total loss of engine power while maneuvering near Chatham, Massachusetts. The commercial pilot and passenger were seriously injured. The local aerial photography flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan was filed for the flight that originated Plymouth Municipal Airport (PYM), Plymouth, Massachusetts, about 1026.

The pilot reported that the passenger hired him so that she could take aerial photographs of real estate. The helicopter was over a saltwater pond, about 300 feet above ground level, approaching homes near the shoreline. At that time, the pilot felt a lateral shudder followed by the clutch light illuminating. The helicopter then began a violent yaw and the low oil pressure light illuminated. The pilot subsequently performed an autorotation to shallow water near the shoreline.

Review of data downloaded and plotted from a handheld GPS revealed that the helicopter proceeded along the north shore of Cape Cod after departing PYM, then transitioned to the south shore near Dennis, Massachusetts. The helicopter continued along the south shore and in the Chatham, Massachusetts area, completing many circuits, consistent with aerial photography. The last two data points recorded indicated a GPS altitude of 402 feet and 268 feet, respectively.

Examination of the wreckage by a Federal Aviation Administration inspector revealed that the helicopter came to rest on its left side at the edge of a pond. The inspector observed substantial damage to the airframe and also noted that a rocker arm was protruding from the engine crankcase. The wreckage was examined again at a recovery facility. Examination of the engine revealed that the No. 2 and No. 3 cylinders exhibited damage consistent with engine overspeed. Specifically, the No. 2 cylinder head rocker shaft bosses were fractured and the No. 2 intake valve upper spring was fractured. The No. 3 intake valve spring seat was also fractured.

Examination of the airframe revealed that the engine cooling fan shaft had separated. Examination of the aft face of lower sheave revealed caked on grease, consistent with grease leaking beyond the lower forward clutch actuator bearing seal over a period of time. Metallurgical examination of the bearing revealed that its rollers were seized and no grease was recovered, consistent with a lack of lubrication (For more information, see Material Laboratory Factual Report in the NTSB Public Docket). The seal and bearing housing were severely damaged during the accident, which precluded determination of the exact point on the seal that was compromised.

Review of maintenance records that the helicopter's most recent 100-hour inspection was completed on April 23, 2016. At that time, the helicopter's total time airframe (TTAF) was noted as 2,192.4 hours and time since the airframe was overhauled (TSOH) was noted as 1,637.4 hours. Review of the helicopter's hour meter after the accident revealed that it had flown an additional 59.5 hours since that inspection, resulting in a TTAF of 2,251.9 and TSOH of 1,696.9 hours. Further review of the aircraft logbook revealed that an extensive repair and annual/100-hour inspection was completed on July 12, 2006, at the manufacturer's facility. Although the engine was overhauled during the repair, the airframe was not. An employee of the manufacturer correctly noted repair (verses overhaul) in the airframe logbook entry, but incorrectly noted the TSOH as 4.2 hours rather than 559.2 hours. The erroneous TSOH recording carried forward throughout the aircraft logbook. At the time of the accident, the TTAF and TSOH for the airframe were both 2,251.9 hours. The helicopter manufacturer required the airframe to be overhauled by the manufacturer every 2,200 hours, during which, the engine cooling fan driveshaft lower bearing and seal would have been overhauled.

Review of Robinson Helicopter Company Service Bulletin (SB)-42 revealed a requirement to service the lower clutch actuator bearings with grease every 300 hours or annually, whichever occurred first, to prevent failure due to lack of lubrication. The SB was superseded by an addition to the maintenance manual that required a similar procedure of every 300 hours or every 3 years, whichever occurred first. Review of the maintenance records revealed that the lower clutch actuator bearings were most recently serviced on December 17, 2015, at a TTAF of 2,095.1 hours. They were previously serviced on September 17, 2014 at a TTAF of 1,885.4 hours and May 11, 2011 at a TTAF of 1244.3. Prior to that, the last recorded servicing was on June 13, 2006 at a TTAF 559.2 hours, resulting in no recorded servicing during a period of 4 years 11 months and 685.1 hours of operation. Further, the maintenance manual also contained instructions to check the condition of the lower clutch actuator bearing seals at every 100-hour or annual inspection. There was no record of the failed seal having ever been replaced.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR15LA096 02/01/2015 30 PST Regis# N510KJ Calexico, CA Apt: Calexico Intl CXL
Acraft Mk/Mdl ROBINSON HELICOPTER COMPANY R44 Acft SN 10338 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO-540 SER Acft TT 1687 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 137
Opr Name: JOHN REED AVIATION Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The commercial pilot was conducting an agricultural application flight. He reported that, after reaching a field and during the first turn, the engine experienced a partial loss of engine power. During the subsequent attempt to land, the pilot turned the helicopter to avoid power lines. The helicopter subsequently landed hard and rolled onto its right side.

A postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. The engine was test run with no anomalies noted. The reason for the partial loss of engine power could not be determined.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A partial loss of engine power for reasons that could not be determined because postaccident examination of the airframe and engine did not reveal any anomalies that would have precluded normal operation.

Events

1. Maneuvering-low-alt flying - Loss of engine power (partial)
2. Autorotation - Off-field or emergency landing
3. Autorotation - Hard landing

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

On February 1, 2015, about 0030 Pacific standard time, a Robinson R44 II, N510KJ, force landed following a partial loss of engine power approximately 5 miles east of Calexico, California. The commercial pilot was not injured, and the helicopter was substantially damaged. The helicopter was registered and operated by John Reed Aviation as a 14 Code of Federal Regulations Part 137 aerial application flight. Night, visual meteorological conditions prevailed and no flight plan was filed. The local flight originated at Calexico International Airport, Calexico, California, about 0025.

The pilot reported in a written statement to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), that the pilot who flew the helicopter on the previous flight stated to him prior to the accident flight that there was a "feeling and increasing vibration on the pedals." A subsequent examination of the helicopter revealed no anomalies. He further stated, "I started it [the accident helicopter], and did a hover control check to make sure everything was working properly, after that I took off to do the high recon of the field. There were power lines to the north, after the recon I set up for my first practice pass (south to north) wind was out of the west so the turns where going to be to the west." After reaching the field and during the first turn, the engine experienced a partial loss of power. He further stated "I started my pull, to perform a 'P' turn [A turning maneuver where at the conclusion of the spray pass, the helicopter pulls up, initially turns to the right, and then makes a left turn until it is lined up for the next pass], with the same inputs on the controls as I've done plenty of times in the past, and as the aircraft started to gain altitude and lose airspeed, the RPMs went down, it felt like the governor was not able to keep them on the green, I lowered collective and rolled throttle on, also I turned to the west to avoid the power lines, I flared as I got close to the ground." The helicopter landed hard and rolled onto its right side, resulting in substantial damage to the forward fuselage and tailboom.

The pilot reported to the NTSB that he accumulated a total time of 583 hours in rotorcraft, and 40 hours in the last 90 days. He also accumulated a total night flying experience of 85 hours.

The United States Naval Observatory data indicated that the sunset and end of civil twilight at the accident site were at 1714 and 1740, respectively. The moon was in a waxing gibbous phase, with 96% of the moon's visible disk illuminated.

Examination of the helicopter was performed by the NTSB and a Federal Aviation Administration (FAA) inspector. The agricultural sprayer assembly was removed from the fuselage prior to the examination of the wreckage. The main rotor blades, tail boom sections, drive shaft, tail rotor assembly and four transmission drive belts were removed from the helicopter prior to the examination and found with the main wreckage. The four transmission drive belts were

cut to facilitate their removal and revealed normal wear. A section of the tail rotor pitch control rod, about 3 feet in length, separated from the aft control rod end, and was not found during the examination. Examination of the fuselage revealed that the windshield separated from both left and right sides and was buckled in several locations. The main rotor blades remained intact and were buckled in several locations. The tail rotor assembly was intact and the stinger separated near the aft attachment. The tail rotor blade pitch movement moved freely by hand. The engine cowling and fan shroud was undamaged. The instrument panel was undamaged. Control continuity was established from the cabin controls to the swashplate and damaged tail rotor control rod. Examination of the Lycoming IO-520-AE1AA engine revealed no anomalies. The helicopter was setup for a test run and the engine started with little hesitation. The engine ran smoothly for several minutes and a magneto check was performed. Several throttle bursts were applied and the engine was shut down normally.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN16FA304 08/03/2016 1047 CDT Regis# N1549W Jeanerette, LA Apt: N/a
Acft Mk/Mdl SCHWEIZER 269C 1 Acft SN 0219 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING HIO-360-G1A Fatal 1 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: GULF COAST HELICOPTERS INC Opr dba: GULF COAST HELICOPTERS INC Aircraft Fire: NONE
AW Cert: STN

Summary

The commercial pilot was completing a scheduled biweekly patrol of a series of intersecting pipelines. When the helicopter failed to arrive as scheduled, a search was initiated. The helicopter was located partially submerged in a remote, thickly wooded cypress swamp. The damage to the helicopter and to surrounding trees indicated that the helicopter was in a near-vertical descent with a nose-down attitude at impact.

Examination of the helicopter and engine revealed no evidence of preimpact discrepancies or anomalies, and damage to the main rotor blades was consistent with the engine producing power at impact. Review of weather information revealed that there was a large thunderstorm complex in the area, but it did not extend over the accident site. The closest weather station, located about 18 miles from the accident site, was reporting visual flight rules to marginal flight rules conditions due to light rain and a broken-to-overcast cloud layer. Due to an overcast layer of high cirriform clouds over the accident site, it was not possible to determine if any low clouds were in the immediate vicinity of the accident site. The circumstances of the accident are consistent with a loss of control by the pilot. The reason for the pilot's loss of helicopter control could not be determined.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's loss of helicopter control for reasons that could not be determined based on available evidence.

Events

1. Maneuvering-low-alt flying - Loss of control in flight
2. Maneuvering-low-alt flying - Collision with terr/obj (non-CFIT)
3. Enroute-cruise - Other weather encounter

Findings - Cause/Factor

1. Environmental issues-Conditions/weather/phenomena-Convective weather-Thunderstorm-Not specified
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-(general)-Not attained/maintained - C
3. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C

Narrative

HISTORY OF FLIGHT

On August 3, 2016, about 1047 central daylight time, a Schweizer 269C-1 helicopter, N1549W, was destroyed when it impacted trees in swampy terrain near Jeanerette, Louisiana. The commercial pilot was fatally injured. The flight was being operated by Gulf Coast Helicopters, Inc., as a 14 Code of Federal Regulations Part 91 pipeline patrol flight, and no flight plan had been filed. Day visual meteorological conditions prevailed for the low-altitude cross-country flight. The flight originated from the Louisiana Regional Airport (L38), Gonzales, Louisiana, about 0730 and was destined for the Harry P. Williams Memorial Airport (PTN), Patterson, Louisiana.

The helicopter was completing a scheduled biweekly patrol of a series of intersecting pipelines. When the helicopter failed to arrive at PTN, the operator notified the Federal Aviation Administration (FAA). An alert notice was issued, and a search was initiated. The helicopter wreckage was found the next day partially submerged in the Atchafalaya Basin, a remote, thickly wooded cypress swamp, about 15 miles east of Jeanerette, Louisiana.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with a rotorcraft-helicopter rating. He was not instrument rated although he had logged 5 hours in simulated instrument meteorological conditions. His second-class airman medical certificate, dated April 24, 2015, contained the restriction: "Must wear corrective lenses."

The pilot's logbook was recovered from the submerged wreckage. It contained entries from August 8, 2012, through August 2, 2016. The pilot had successfully completed the practical test for a commercial pilot certificate on March 29, 2015, and according to the FAA, this met the biennial flight review requirements of

61.56 (d). At that time, the pilot had accumulated about 427 hours of flight experience.

According to Gulf Coast Helicopters, the pilot was hired on June 8, 2015. At that time, he had logged a total of about 488 hours of flight experience. The operator reported that most of the pilot's activity in the past year was pipeline patrol with most of that flying about 500 ft above ground level.

Based on a review of the pilot's logbook, his most recent FAA airman medical certification application, information provided by the operator, the helicopter's daily logs, and other records, the pilot's flight experience on August 2, 2016, was estimated to be 1,611 total flight hours, all of which were in helicopters and more than 800 hours of which were in the Schweizer 269. The pilot had logged 1,069 hours in the last 12 months, 225 hours in the last 3 months, 72 hours in the last 30 days, and 8 hours in the last 24 hours.

AIRCRAFT INFORMATION

The helicopter, serial number 0219, was manufactured by the Schweizer Helicopter Corporation in 2005. It was powered by a Lycoming HIO-360-G1A engine (serial number RL-29952-51E), rated at 180 horsepower. Power from the engine was transmitted through eight drive belts and two drive shafts to the three-bladed main rotor and the two-bladed tail rotor. The helicopter had a gross weight of 1,750 pounds.

According to the maintenance records, the helicopter's last annual inspection was on September 20, 2015, and the last 100-hour inspection was on July 28, 2016, when the helicopter had accrued 5,595.4 flight hours. The engine was remanufactured by Lycoming on March 6, 2013, and it had accrued 4,199.2 flight hours at that time.

METEOROLOGICAL INFORMATION

The National Weather Service forecast chart indicated that scattered rain showers and thunderstorms were expected over southeastern Louisiana with summer air mass type convection. The surface analysis chart with a satellite composite image overlaid for 1000 depicted a large circular area of enhanced clouds associated with convective clouds or thunderstorms over southeastern Louisiana; the accident site was located adjacent to the eastern edge of this area. The area indicated an anticyclonic or clockwise wind flow. Cloud cover ranged from clear skies over the northern and western portions of Louisiana to overcast skies over the New Orleans area with thunderstorms and rain being depicted in that area. The national composite radar mosaic for 1045 depicted a large area of intense-to-extreme intensity echoes over southeast Louisiana with the strong portion of the echoes between Baton Rouge and New Orleans. Only very light intensity echoes were depicted bordering the accident site eastward.

The closest weather reporting facility was the destination, PTN, located about 18 miles south of the accident site. At 1056, PTN reported visibility 5 miles in moderate rain and mist, a few clouds at 8,000 ft, ceiling overcast at 10,000 ft, and lightning distant northeast, east, and southeast. A thunderstorm began at 0957 and ended at 1019. Another thunderstorm began at 1021 and ended at 1049. Rain began at 1002, ended at 1012, and began again at 1029. Visual flight rules (VFR) to marginal VFR (MVFR) conditions prevailed at the station due to the light rain and broken to overcast cloud layer. The next closest weather reporting facility was Acadiana Regional Airport (ARA), New Iberia, Louisiana, located about 25 miles west of the accident site. At 1053, ARA reported VFR conditions with clear to partly cloudy skies with no thunderstorms reported. The next closest weather reporting location was the departure airport, L38, located about 26 miles north-northeast of the accident site. At 1035, L38 reported thunderstorms with light rain and lightning distant in all quadrants.

At 1045, the Geostationary Operational Environmental Satellite number 13 depicted a large cluster of cumulonimbus clouds over southeast Louisiana with cloud tops near 45,000 ft. The enhanced cloud centers were located northeast through east and southwest of the accident site. The accident site was under the anvil outflow or cirrostratus clouds from the cumulonimbus cloud system. Strong active convection was noted in the system to the east of Baton Rouge and off the Louisiana coast with overshooting cloud tops. The overcast cloud cover over the accident site was associated with high cirriform clouds. Due to the extensive cloud cover, it was not possible to determine if any low clouds were in the immediate vicinity of the accident site.

The accident site was on the border between the forecasts for southwestern and southeastern Louisiana. The forecast for the southwestern portion of the state expected scattered clouds at 3,000 ft, light winds, and no convective activity. The forecast for the southeastern portion expected scattered to broken clouds at 4,000 ft with tops to 14,000 ft with isolated thunderstorms and light rain. The cumulonimbus clouds tops were expected to reach 45,000 ft. The quantitative precipitation forecast indicated a chance of precipitation between 0.01 to 0.10 inches over the accident site.

WRECKAGE AND IMPACT INFORMATION

The helicopter was partially submerged in the swamp in a nose-down attitude. There was a hole in the overhead trees, consistent with a steep descent. There were also blade strike marks on the tree trunks. The wreckage was recovered and transported to Air Salvage of Dallas, Lancaster, Texas, where it was further examined on August 31, 2016.

The tailboom was intact but separated from the steel tube frame. The main rotor blades were bent and separated. There was impact damage to the aft cabin wall, bulkhead, and forward side of fuel tanks. The seat deck assembly was compressed and folded back toward the aft cabin wall. The aft cabin wall was deformed and pushed aft. The forward sides of both fuel tanks were compressed and deformed, and the aft portions were intact and remained relatively in their original shapes. The mast was intact. The forward bulkhead mount tabs were fractured. The canted horizontal stabilizer was not present. The forward attach fitting remained attached to the tailboom. The lower vertical stabilizer was crushed and deflected to the right with a large rounded dent, which deformed the boom and was oriented about 90° to the longitudinal centerline of the tailboom.

The landing gear was damaged. Neither of the forward skids were present for examination. The left side forward strut was not recovered. All remaining struts and damper attach points exhibited damage consistent with the landing gear assembly being pushed aft. The aft crossbeam was intact and relatively straight. The forward crossbeam was bowed aft in the center section but remained straight in the outer ends. The right hand drag strut was straight and fractured at the aft rod end bearing threads. The left drag strut was bent in the middle nearly 90° with the forward end remaining attached to the crossbeam and aft end to the aft strut.

The yellow and red main rotor blades were bent in a spanwise downward direction. The blue blade separated near the root and exhibited minor downward bending, trailing edge wrinkles, and peeled upper skin near the tip. The red blade was bent up at the root with tearing and separation, and bent down about 90° midspan and down again about 90° near the tip. The yellow blade was bent down about 90° midspan and down about 30° near the tip. Both tail rotor blades were intact, straight, exhibited only minor damage, and remained attached to the hub. The main rotor head was intact and attached to the drive shaft. The swashplate was intact. The rotating scissors links were intact. The rotor head turned freely in the mast bearing. All three pitch housings remained attached to the main rotor hub. The pitch shaft droop stop lugs were intact and appeared straight. All three pitch housings rotated smoothly, flapped smoothly, and exhibited signs of contact with the upper hub, indicative of full-up flapping motion. All three main rotor dampers were attached at the pitch housings and the blade roots. The pitch change links were intact. The droop stop assembly was intact.

The tail rotor fork and teetering bolt were intact. The assembly teetered properly. The pitch control unit was intact, rotated freely, and slid in and out on the pinion. It was attached to the pitch links, which were straight. The control bell crank was engaged in the pitch control housing and attached to the tail gearbox and the control rod. The tail rotor gearbox remained attached to the tailboom adapter, rotated, and exhibited continuity. The tail rotor drive shaft was bent at the forward bulkhead, and the drive adapter splines were intact. The main gearbox housing was intact, rotated freely, and exhibited continuity. The belt drive assembly was intact and did not exhibit damage. The upper pulley rotated and engaged the overrunning clutch properly. All pulleys were intact, all bearings turned, and the belts were intact. The engine drive shaft was undamaged. There was no evidence of preimpact discrepancies or anomalies with the airframe.

The engine was generally intact. The fuel servo, engine-driven fuel pump, and the right magneto were still attached. Both magnetos were installed on a magneto test bench and rotated up to 2,000 rpm but no sparks were observed. The technician stated that the magnetos were probably not functioning due to internal corrosion caused by water submersion. The spark plugs were removed, and the engine rotated, producing thumb compression on all cylinders. Valve motion was noted on all cylinders. Fuel was found in the servo fuel screen, and no water was present. The electric boost pump was seized; the engine-driven fuel pump operated and pumped liquid; the gascolator was intact with some gas and water present; and the screen was not blocked. The fuel injector and the inlet fuel screen were clear. Fuel injector nozzles 1 and 3 were plugged with a foreign substance. Cylinder nozzle 2 was impact damaged. The remainder of the nozzles were clear and unobstructed. All fuel lines were secure, and the fittings were tight. Fuel and water was observed throughout the engine fuel system. Oil was observed in and around the engine during the engine examination. The oil system was complete and intact with no preimpact defects noted. The oil suction screen was contaminated with carbon deposits and plant material. Nothing was observed during the examination that would have precluded the engine from operating normally before impact.

MEDICAL AND PATHOLOGICAL INFORMATION

According to the Louisiana Forensic Center's autopsy report, the pilot's cause of death was "blunt force injuries."

According to the toxicology screen performed by the FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, no carbon monoxide or drugs were detected in the pilot's blood. A cyanide test was not performed. The pilot tested positive for ethanol: 71 mg/dL in brain tissue, 60 mg/dL in muscle tissue, and 54 mg/dL in blood. N-butanol was detected in blood, and N-propanol was detected in muscle, brain tissue, and blood. According to the laboratory, the ethanol, N-butanol, and N-propanol were most likely the byproducts of postmortem putrefaction.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN16LA084 12/21/2015 2130 CST Regis# N292B Warrenton, MO Apt: N/a
Acft Mk/Mdl SCHWEIZER 269C-UNDESIGNAT Acft SN S1385 Acft Dmg: DESTROYED Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING HIO-360 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: DOUG TILLET Opr dba: Aircraft Fire: NONE
AW Cert: STN

Summary

The noninstrument-rated private pilot reported that he checked the local weather before he departed in his single-engine helicopter. He said that the weather was good (6 miles visibility and clear skies). Upon the night departure, there was a slight haze about 100 ft above ground level (agl), and he climbed the helicopter to his planned en route altitude of 2,000 ft agl. The first 15 minutes of the flight were uneventful. However, as the pilot approached a river basin area, he started to lose visual reference to the ground, but he thought it was just a small area of fog and that he could fly out of it. He tried to descend but could not see the ground through the fog/low clouds and initiated a climb. The helicopter's altitude ranged from about 1,200 to 2,000 ft agl. The pilot decided to turn around, and while making a slow right turn, the helicopter struck a tree. The pilot tried to initiate a climb, but the helicopter struck another tree. The pilot lowered the collective, and the helicopter descended through the trees to the ground.

The nearest automated weather facility was located about 11 miles southwest of the accident site at an elevation about 200 to 250 ft lower than the accident site. The METAR observation about the time of the accident reported reduced visibility (5 statute miles with mist), a 1° dew point depression, and a cloud ceiling of 1,000 ft agl (which would have been about 750 ft above the accident site elevation). Given the reported weather information and the pilot's statements about the weather conditions, it is likely that the airplane entered instrument meteorological conditions near the accident area at night, which led to the pilot's loss of visual reference to the ground and the subsequent impact with trees and terrain.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The noninstrument-rated pilot's continued flight into instrument meteorological conditions at night, which resulted in the loss of visual reference to the ground and his subsequent failure to maintain clearance from trees.

Events

1. Maneuvering-low-alt flying - VFR encounter with IMC

Findings - Cause/Factor

1. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Effect on operation - C
2. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C
3. Environmental issues-Conditions/weather/phenomena-Ceiling/visibility/precip-Fog-Effect on personnel - C

Narrative

On December 21, 2015, about 2130 central standard time, a Schweizer 269C helicopter, N292B, registered to the pilot, was destroyed after it impacted terrain after encountering fog while maneuvering near Warrenton, Missouri. The private pilot, who was the sole occupant, sustained minor injuries. The flight was being conducted under the provisions of Federal Aviation Regulations Part 91. Dark night instrument meteorological conditions (IMC) prevailed in the accident and a flight plan was not filed. The flight originated from Moscow Mills, Missouri, about 2100 and was enroute to the pilot's private home helipad in Waynesville, Missouri.

The pilot reported that he checked the weather before he departed Moscow Mills and said that the weather was good (6 miles visibility and clear skies). He said that there was a slight haze upon departure, about 100 feet AGL, and climbed to his planned enroute altitude of 2,000 AGL. The first 15 minutes of the flight were uneventful until he approached the Missouri River area. He stated that he started to lose visual reference to the ground, but thought it was just a small area of fog and that he would fly out of it soon. He tried to descend but did not see the ground through the fog/low clouds and initiated a climb. He stated that his altitude ranged from about 1,200 to 2,000 feet AGL. He then decided that he should turn around and exit the way he came in. He started a slow right turn and after established in the turn, the helicopter struck a tree. The pilot tried to initiate a climb and the helicopter struck another tree. The pilot lowered the collective and the helicopter descended through the trees to the ground.

The automated weather facility at Washington Municipal Airport (FYG) was located about 11 miles southwest of the accident site, at an elevation about 200-250 feet lower than the accident site. The FYG METAR observation at 2135 showed reduced visibility (5 statute miles with mist), a 1-degree dew point depression, and a cloud ceiling of 1,000 feet AGL (which would reference about 750 feet above the accident site elevation). The pilot reported in a statement

that he received an adequate weather briefing prior to departure.

It is unknown where the pilot obtained his weather briefing and the helicopter did not have on-board weather monitoring equipment installed. With the weather information that the pilot reported, and the automated weather reported from the FYG reporting station, VMC conditions prevailed at the departure location when the pilot initiated the flight, however, IMC conditions were encountered near the accident area.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA118 02/20/2017 845 MST Regis# N709TC Albuquerque, NM Apt: Albuquerque Intl Sunport ABQ
Acft Mk/Mdl THUNDER & COLT AIRBORNE AMER Acft SN 2444 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: ARTHUR V. MOLLER Opr dba: Aircraft Fire: NONE
AW Cert: STB

Summary

The commercial pilot of the balloon was performing a local sightseeing flight. The balloon took off from a field, climbed, and drifted southeast. As the balloon approached an interstate, the pilot began a descent to land on a field nearby a university campus. About 100 to 140 ft above ground level (agl), the balloon entered a rapid descent. The pilot applied maximum fuel to the burner system to arrest the descent; however, the descent continued. The pilot stopped the descent about 50 ft agl and the balloon began to climb again; upon reaching 75 ft agl, the balloon gondola contacted power lines. The contact caused electricity to arc through the gondola, severing two of the four suspension cables. The pilot "hand-removed" the power line from the gondola, applied heat to the burner system, and climbed away from the power lines. The pilot subsequently made an uneventful landing on a soccer field at the university about a mile away from the power lines. The National Weather Service (NWS) surface analysis chart depicted a cold front, which was located immediately south of the area at the time of the accident and moving across the state. The front resulted in a shift of the prevailing wind to the north-northwest with an increasing pressure gradient behind the front. Some lifting would be associated ahead of the front and then would subside but wouldn't be classified as strong downdrafts near the accident site. Though not conclusive, it is possible that the shifting wind and changing weather conditions could have affected the performance of the balloon, causing an increase in its descent rate during the pilot's landing approach.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's delayed reaction to the balloon's increased rate of descent during an attempted landing, which resulted in impact with a power line.

Events

1. Approach - Loss of control in flight
2. Approach - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Action/decision-Action-Delayed action-Pilot - C
2. Environmental issues-Physical environment-Object/animal/substance-Wire-Effect on equipment
3. Environmental issues-Conditions/weather/phenomena-Wind-Downdraft-Effect on operation

Narrative

On February 20, 2017, about 0845 Mountain Standard Time, a Thunder and Colt, AX-10-180S1, lighter than air balloon with airborne heater, N709TC, struck power lines while approaching to land near the University of New Mexico, Albuquerque Campus, Albuquerque, New Mexico. The commercial pilot and 9 passengers on board were not injured. The balloon was substantially damaged. The balloon was registered to and operated by the pilot as a 14 Code of Federal Regulations Part 91 business sight-seeing air tour flight. Visual meteorological conditions prevailed and no flight plan was filed for the local flight that originated from a field in northwest Albuquerque, New Mexico, about 0745.

The pilot reported he had established a stable level flight approach to a field near the university campus. About 100 to 140 ft. above ground level (agl) the balloon entered a severe downdraft. The pilot applied maximum heat to the burner system to climb out of the downdraft; however, the balloon continued to descend. The pilot arrested the descent about 50 ft. agl and began to climb again. However, on reaching 75 ft. agl, the balloon gondola contacted power lines. The contact caused electricity to arc through the gondola severing two of the four suspension cables. The pilot "hand-removed" the power line from the gondola, applied heat to the burner system to burn a new hole in the envelope throat that had collapsed during the power line contact, and climbed away from the accident site. He then made an uneventful landing on a soccer field at the university about a mile away from the power lines.

Several passengers on board the balloon reported that as they approached Interstate 25, they were descending and the pilot was applying the burners continuously. One passenger said as they cleared some high rise building she saw the power lines. The pilot was applying the burners and continued burning as they approached the interstate. The balloon did not ascend and it struck the power lines.

The pilot held a commercial pilot certificate with a lighter than air with airborne heater rating. On September 1, 2016, he received a second-class medical certificate limited by a requirement for corrective lenses.

The pilot's logbook showed that he had flown 647 total hours, 19 hours of which were in the 30 days before the accident. The logbook also showed that the pilot

successfully completed a flight review in a Cameron N-133 balloon on March 21, 2016.

The 11-place ride balloon, serial number 2444, was registered to the pilot and used for business. The envelope had a 180,000 cubic-foot (of air) capacity and was 76 ft. tall and had a diameter of 74 ft. The gondola or basket was a single t-configuration dividing it into three compartments, two for passengers and one for the pilot, the four 15-gallon propane tanks, and the fuel lines to the double burner system that provided heat to the envelope. The complete system had a maximum gross weight 3,197 lbs.

The balloon underwent an annual inspection on July 22, 2016, with a total time of 408.3 hours. The balloon's total time at the accident was 490 hours.

An examination of the balloon showed that two of the four suspension cables were burned through and separated. The gondola showed thermal damage to the wicker vertically along where the cables ran inside the basket structure. The envelope skirt, several load tapes, and several lower envelope panels were charred and melted. (See Figure 1 for a photograph showing the gondola damage, and Figures 2 and 3 for photographs showing the failed suspension cables.)

Figure 1. A photograph showing the damaged balloon gondola.

Figure 2. A photograph of one failed suspension cables.

Figure 3. A photograph of a second failed suspension cables.

Examination of the burners, fuel system, and vent line system showed no anomalies.

At 0852, the automated weather observation station weather at Albuquerque International Sunport, 1 nautical mile southeast of where the accident occurred, recorded wind 290ø at 3 knots, visibility 10 miles, few clouds at 4,000 ft., temperature 46ø Fahrenheit (F), dew point 33ø F, and altimeter 30.22 inches, with remarks; automated surface observation sea level pressure 1021.0-hPa, mountain tops obscured northeast and southeast.

The National Weather Service (NWS) surface analysis chart for 0800 depicted a cold weather front moving across New Mexico and was located immediately south of the Albuquerque area at the time of the accident. The front resulted in a shift in the wind to the north-northwest with an increasing pressure gradient behind the front. For more information see the report, "NTSB Senior Meteorologist's Weather Summary" in the public docket for this accident.