

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR11LA274	06/21/2011 1155 PDT	Regis# N38EA	Franklin, CA	Apt: Franklin Field F72
Acft Mk/Mdl BELL 206B		Acft SN 2555	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk Prob Caus: Pending
Eng Mk/Mdl ROLLS ROYCE 250 SERIES			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: PHOTOS UNLIMITED		Opr dba:		Aircraft Fire: GRD

Narrative

HISTORY OF FLIGHT

On June 21, 2011, about 1155 Pacific daylight time, a Bell 206B, N38EA, landed hard during a practice autorotation near Franklin Field Airport, Franklin, California. The helicopter was being operated by the California Department of Justice as a public-use, instructional flight. The solo student pilot was not injured; the helicopter sustained substantial damage during the landing, and was subsequently consumed by post impact fire. The flight departed Franklin at 1130. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot reported that he initially departed in the helicopter from Sacramento Mather Airport, Sacramento, California, with the intention of performing pattern practice at Franklin. Upon arrival, he performed a series of straight-in autorotations, quick-stops, and low-hovers. He then performed two 180-degree autorotations to the left. He reported no anomalies with the helicopter during that period, and stated that all the maneuvers were uneventful.

Due to the direction of the traffic pattern, he was unable to practice 180-degree autorotations to the right. He therefore departed with the intention of continuing the maneuvers in a field 3 miles east of the airport.

The pilot chose a 50-foot-wide area, consisting of chest-high grass, where he practiced slope landings and pickups, and one uneventful 180-degree autorotation. He recalled that the temperature in the area was in excess of 100 degrees Fahrenheit. As he rounded the base leg for a second 180-degree autorotation, he confirmed all flight instruments were indicating normal engine operation, but noted his airspeed was too slow. He lowered the helicopter's nose, and the descent rate increased to about 1,800 feet per minute. About 100 feet above ground level (agl), he heard the low rotor warning horn, and immediately countered by quickly rolling the throttle to full power while applying up-collective. The helicopter then shuddered and vibrated, with accompanying, "snorting and popping sounds," that he had never experienced before.

He elected to perform a run-on landing rather than continue with the recovery. During the landing, the helicopter impacted the ground hard, spreading the skids. The right skid dug into the ground and separated, and the helicopter rolled onto its right side. He then shutdown the fuel supply and egressed as a fire erupted.

The pilot stated that the engine was still operating after he exited. The helicopter continued to burn for 2 more hours as fire crew attempted to gain access to the accident site.

PERSONNEL INFORMATION

A review of Federal Aviation Administration (FAA) airman records revealed that the pilot held a commercial pilot certificate with ratings for airplane single-engine land, and instrument airplane. He additionally held a private pilot certificate for airplane single-engine sea. The pilot did not hold a rotorcraft/helicopter certificate, but received an endorsement on October 15, 2010, to fly solo, and as pilot-in-command of helicopters in preparation for his practical test. He reported a total flight time in helicopters of 106 hours, with 62 in the accident make and model.

TESTS AND RESEARCH

The remaining sections of the helicopter, which included the engine, main rotor blades, tail rotor and associated gearbox were recovered for examination. Subsequent examination by an NTSB investigator did not reveal any anomalies with the airframe or engine that would have precluded normal operation. Refer to the engine and airframe report included in the public docket for further details.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN11GA020	10/15/2010 1110 CDT	Regis# N96MP	Clarkson Valley, MO		
Acft Mk/Mdl BELL 206B		Acft SN 3377	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk	Prob Caus: Pending
Eng Mk/Mdl ALLISON 250-C20B		Acft TT 11254	Fatal 1	Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: MISSOURI STATE HIGHWAY PATROL		Opr dba:	Aircraft Fire: NONE		

Narrative

HISTORY OF FLIGHT

On October 15, 2010, at 1110 central daylight time, a Bell 206B, N96MP, operated by the Missouri State Highway Patrol (MSHP), impacted terrain near Clarkson Valley, Missouri. Visual meteorological conditions prevailed at the time of the accident. The 14 Code of Federal Regulations Part 91 flight was not operating on a flight plan. The private pilot, who was the sole occupant, was fatally injured. The flight last departed from Arnold, Missouri, about 1053 and was en route to Spirit of St. Louis Airport (SUS), St. Louis, Missouri.

Two MSHP Troopers arrived at the Arnold Police Department, located in Arnold, Missouri, about 0845, to fly with the pilot on a speed enforcement operation in the accident helicopter. They saw the helicopter approach from the east and land in a field just south of the police department shortly before 0900. Shortly after 0900, the flight departed from the field and headed towards interstate 55. The trooper who was seated in the front seat stated that while the helicopter was en route, he observed that the fuel gauge was "slightly above 25." The trooper stated that the pilot pointed to the altimeter and said that the altitude was 1,500 feet. The trooper also stated that the pilot said that he would not be able to "stay up as long as normal" because he would have to obtain fuel before his next flight in Franklin County at 1200. After over an hour of flying, the pilot informed the troopers that he would perform an additional speed enforcement, which was completed about two minutes later. While returning to the Arnold Police Department, the trooper in the front seat asked the pilot how long it took to fly from the Arnold Police Department to St. Louis; the pilot replied that it took about 10 minutes. When the helicopter landed, the trooper in the front seat noticed that the fuel gauge indicated "half way between E and 25." The pilot shut down the helicopter, and the two troopers aboard exited.

The front seat trooper stated, that throughout the flight, the pilot made no statements about the helicopter not running "properly." The front seat trooper noticed "no strange or unusual noises or actions" from the helicopter when it took off for SUS.

A witness near the accident site stated that the helicopter was flying from right to left. He heard the noise of the engine "sputter" and then "stop." The rotor had separated from the helicopter and they both descended. The helicopter fuselage was "gyrating wildly" and "seemed out of control."

PERSONNEL INFORMATION

The pilot, age 47, was appointed to the MSHP on August 1, 1993. On October 3, 2003, he was issued a private pilot certificate with a single-engine airplane rating. On October 19, 2003, he became a pilot for the MSHP and was based at SUS. He was later issued the following ratings: airplane multiengine land, instrument airplane, and helicopter. He accumulated a total flight time of 2,607 hours, of which 820 hours were in the make and model of the accident helicopter.

Pilot logbook records show that the pilot received his last Part 61.107 flight review following the completion and issuance of a multiengine airplane rating on his pilot certificate. The training and rating issuance was from April 7 to April 9, 2009.

On June 2, 2010, the pilot completed his last Bell 206B training at Bell Helicopter Training Academy, Ft. Worth, Texas, using a Bell 206B. The training was refresher training that had a flight duration of 1.5 hours and no ground training. The training included Bell 206B emergency procedures.

The pilot had no Federal Aviation Administration (FAA) record of previous accidents, incidents, or enforcement actions.

AIRCRAFT INFORMATION

The 1981 Bell 206B, serial number 3377, helicopter was operated by and registered to the MSHP. The helicopter was powered by an Allison 250-C20B, serial number CAE-832009, engine. The helicopter was last inspected during a 100-hour/300-hour/annual inspection dated May 7, 2010, at a total time of 11,185.4 hours and an hour meter of 2,133.4 hours. The engine was last inspected during a 100/300-hour inspection dated May 7, 2010, at a total time of 11,185.4 hours and an hour meter of 2,133.4 hours. The total airframe time at the time of the accident was 11,254.5 hours.

National Transportation Safety Board - Aircraft Accident/Incident Database

METEOROLOGICAL INFORMATION

The SUS automated weather observing system recorded at 1054: wind - 240 degrees at 8 knots, visibility - 10 statute miles, weather phenomena - clear, temperature - 16 degrees Celsius, dew point - 3 degrees Celsius, altimeter setting - 30.11 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The accident site was located about 3 nautical miles southeast of SUS and at an elevation of about 632 feet. The debris path was about 600 feet in length and oriented along a south-southeast (SSE)/north-northwest (NNW) heading. The debris path contained blue and white colored paint chips that were near the SSE area of the debris path and extended to about 400 feet from the helicopter fuselage, which was near the NNW edge of the debris path. The paint chips were consistent in color with the exterior of the helicopter. The main rotor with the rotor hub attached was located about 50 feet SSE of the helicopter fuselage. The fuselage was on its left side with the tail boom and tail rotor attached. The area surrounding the main wreckage did not contain evidence consistent with fuel spillage.

Examination of the main rotor revealed that one of the two attached rotor blades exhibited blue marks consistent with the color of the helicopter. The blue marks were located in a spanwise direction of about 13 feet from the hub. The areas of separation of the pitch change links were consistent with overstress.

The tail boom was twisted with the tail rotor intact. There was gouging on the top portion of the tail boom near the horizontal stabilizer, about 13 feet from the main rotor hub. There was no circumferential scoring on the tail rotor drive shaft and/or covering. No binding was noted when the tail rotor was rotated and the pitch change links were manipulated using hand pressure.

The short shaft was deformed into the engine exhaust and did not display circumferential scoring.

Examination of the fuel system revealed that about 3 quarts of liquid consistent with JET A aviation fuel was present in the fuel tank bladder. The fuel shut off valve was in the open position, and it would open and close when a 24-volt electrical source was applied. The low fuel switch was also tested and was functional. The fuel float arm was intact and was moved by hand without restriction. The airframe fuel filter (volume of the fuel filter container was about 20 ounces) contained about 1 ounce of liquid consistent with JET A. The fuel line leading to the inlet of the engine driven fuel pump contained 2 drops of liquid consistent with JET A. The fuel lines were intact.

Examination of the flight control system confirmed flight control continuity.

MEDICAL AND PATHOLOGICAL INFORMATION

The pilot's medical information was reviewed by the Medical Officer for the National Transportation Safety Board.

A review of the pilot's FAA Aerospace Medical Certification Division records revealed that his last application for a Second Class Airman's Medical Certificate was made on May 27, 2010. The pilot answered "No" to the question "Do you take any medications?" He answered "No" to the question "mental disorders of any sort; depression, anxiety, etc." Medical issues reported by the pilot were a kidney stone in 1987, hay fever and allergies to "cats and grass clippings." The pilot's aviation medical examiner found no issues on physical exam or in the patient's clinical history that would have disqualified the pilot for an Airman's Medical Certificate. The Second Class medical certificate was awarded on May 27, 2010.

An autopsy of the pilot was performed by the St. Louis County Medical Examiner's Office, on October 16, 2010, revealed that death resulted from multiple blunt injuries to the head, neck, chest, abdomen, and all extremities.

The FAA Final Forensic Toxicology Fatal Accident Report reported the following:

No ethanol detected in urine

Alpha-hydroxyalprazolam not detected in blood

0.204 (ug/mL, ug/g) Alpha-hydroxyalprazolam detected in urine

0.134 (ug/ml, ug/g) Alprazolam detected in urine

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Page 3

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National Transportation Safety Board - Aircraft Accident/Incident Database

Alprazolam not detected in blood
0.961 (ug/mL, ug/g) Desmethylvenlafaxine (O-) detected in blood
Desmethylvenlafaxine (O-) detected in urine
Naproxen detected in urine
0.547 (ug/ml, ug/g) Venlafaxine detected in blood
Venlafaxine detected in urine

TESTS AND RESEARCH

Engine Examination:

The engine underwent a disassembly examination at Rolls Royce, Indianapolis, Indiana, under the supervision of an FAA inspector from the Indianapolis Flight Standards District Office. The inspector reported that the compressor halves were removed, and one half showed a rub mark on the lining material that extended 40-45 degrees of rotation. Compressor blade bending was also noted. The damage was consistent with engine rotation at the time of impact. The number 1 bearing rotated freely after removal of the housing, which had sustained impact damage. The centrifugal compressor shroud was removed and rub marks were noted on about 180 degrees of the shroud.

The turbine section was separated at the power turbine split line. The number 3 and 4 turbine wheels rotated freely. There were no rotational marks in the number 3 or 4 blade paths. The number 1 and 2 turbine wheels would rotate but not freely, which was consistent with crush damage at the aft end of the turbine section. There were no rotation marks on the number 2 wheel blade path.

All of the fuel nozzle spray holes appeared to be open.

There was little or no fuel in any of the fuel lines from the fuel control to the fuel nozzle.

Component Examination:

The following components were sent to Bell Helicopter, Hurst, Texas, for examination under the supervision of an FAA COS Specialist from the Aircraft Certification Service, Rotorcraft Directorate, Fort Worth, Texas: mast section, yoke, sprag clutch, and coupling.

The mast section was fractured well above the shoulder on the mast. The mast was elongated and possessed slight bending on the examined section. A fracture immediately below the splined portion of the trunion exhibited a shear from overload feature. The mast at the fracture was elongated. The mast was twisted at the spline.

The yoke and torsion-tension straps were examined and no anomalies were noted.

The sprag clutch housing exhibited impact damage. The clutch rotated freely and was observed to clutch and declutch. Witness marks present on the shaft were consistent with impact damage.

The coupling was bound internally due to impact damage, which precluded disassembly. No anomalies were noted.

The Rotorcraft Flying Handbook (FAA-H-8083-21), Chapter 11, Low G Conditions and Mast Bumping, states, in part, that "pushing the cyclic control forward abruptly from either straight-and-level flight or after a climb can put the helicopter into a low G flight condition." Figure 11-9, states, "In a low G condition, improper corrective action could lead to the main rotor hub contacting the rotor mast. The contact with the mast becomes more violent with each successive flapping motion. This, in turn, creates a greater flapping displacement. The result could be a severely damaged rotor mast, or the main rotor system could separate from the helicopter."

MSHP Operating Procedures

The MSHP Aircraft Operations Standard Operating Procedures (Revision 7-2006), II. Policy and Procedures, F. Use of Intoxicants and Drugs, paragraphs 2a and b, states:

"Certain drugs in common use have a marked effect on the nervous system, which is temporarily detrimental to flight crew's flying ability. Crewmembers will ask their doctor if any prescribed drug, or any nonprescription medications they are taking will affect their ability to function as a pilot. Any pilot whose ability to pilot an aircraft is affected by a drug will not operate patrol aircraft."

"Crew members are authorized and expected to ground themselves when the possibility of drug side effects exist or when they sense that their physical or mental condition might affect their ability to perform flight crew duties. In such cases, a flight surgeon will be consulted and an estimated availability date for resumption of flying duties will be provided to the member's supervisor and to the Director of Aircraft."

III. Duties, Responsibilities, and Qualifications, H. Flight Crew Qualifications - General, paragraph 2, states:

"All pilots will possess at least a current second-class medical certificate, which has been issued within the preceding twelve (12) months. No pilot will be assigned any flight duties during a period of a known physical deficiency that would render him unable to pass the examination for this certificate."

The MSHP party representative stated that the Troop C Command Staff, the Director of the Aircraft Division, and all personnel in the pilot's chain of command had no knowledge of the pilot's use of the medications listed in the FAA Final Forensic Toxicology Fatal Accident Report or his medical condition that would have been associated with their use.

National Transportation Safety Board - Aircraft Accident/Incident Database

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Acft Mk/Mdl BELL 206B		Acft SN 2555	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk Prob Caus: Pending
Eng Mk/Mdl ROLLS ROYCE 250 SERIES		Acft TT 8514	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR PUBLU
Opr Name: CALIFORNIA DEPARTMENT OF JUSTICE		Opr dba:		Aircraft Fire: GRD

Narrative

HISTORY OF FLIGHT

On June 21, 2011, about 1155 Pacific daylight time, a Bell 206B, N38EA, landed hard during a practice autorotation near Franklin Field Airport, Franklin, California. The helicopter was being operated by the California Department of Justice as a public-use, instructional flight. The solo student pilot was not injured; the helicopter sustained substantial damage during the landing, and was subsequently consumed by post impact fire. The flight departed Franklin at 1130. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot reported that he initially departed in the helicopter from Sacramento Mather Airport, Sacramento, California, with the intention of performing pattern practice at Franklin. Upon arrival, he performed a series of straight-in autorotations, quick-stops, and low-hovers. He then performed two 180-degree autorotations to the left. He reported no anomalies with the helicopter during that period, and stated that all the maneuvers were uneventful.

Due to the direction of the traffic pattern, he was unable to practice 180-degree autorotations to the right. He therefore departed with the intention of continuing the maneuvers in a field 3 miles east of the airport.

The pilot chose a 50-foot-wide area, consisting of chest-high grass, where he practiced slope landings and pickups, and one uneventful 180-degree autorotation. He recalled that the temperature in the area was in excess of 100 degrees Fahrenheit. As he rounded the base leg for a second 180-degree autorotation, he confirmed all flight instruments were indicating normal engine operation, but noted his airspeed was too slow. He lowered the helicopter's nose, and the descent rate increased to about 1,800 feet per minute. About 100 feet above ground level (agl), he heard the low rotor warning horn, and immediately countered by quickly rolling the throttle to full power while applying up-collective. The helicopter then shuddered and vibrated, with accompanying, "snorting and popping sounds," that he had never experienced before.

He elected to perform a run-on landing rather than continue with the recovery. During the landing, the helicopter impacted the ground hard, spreading the skids. The right skid dug into the ground and separated, and the helicopter rolled onto its right side. He then shutdown the fuel supply and egressed as a fire erupted.

The pilot stated that the engine was still operating after he exited. The helicopter continued to burn for 2 more hours as fire crew attempted to gain access to the accident site.

PERSONNEL INFORMATION

A review of Federal Aviation Administration (FAA) airman records revealed that the pilot held a commercial pilot certificate with ratings for airplane single-engine land, and instrument airplane. He additionally held a private pilot certificate for airplane single-engine sea. The pilot did not hold a rotorcraft/helicopter certificate, but received an endorsement on October 15, 2010, to fly solo, and as pilot-in-command of helicopters in preparation for his practical test. He reported a total flight time in helicopters of 106 hours, with 62 in the accident make and model.

TESTS AND RESEARCH

The remaining sections of the helicopter, which included the engine, main rotor blades, tail rotor and associated gearbox were recovered for examination. Subsequent examination by an NTSB investigator did not reveal any anomalies with the airframe or engine that would have precluded normal operation. Refer to the engine and airframe report included in the public docket for further details.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA12MA122	12/26/2011 554 EST	Regis# N5016M	Green Cove Spri, FL		
Acft Mk/Mdl BELL 206B		Acft SN 2636	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk	Prob Caus: Pending
Eng Mk/Mdl ROLLS-ROYCE M250-C20B		Acft TT 11175	Fatal 3 Ser Inj 0	Flt Conducted Under: FAR 135	
Opr Name: SK LOGISTICS INC		Opr dba: SK JETS		Aircraft Fire: GRD	
				AW Cert: STN	

Narrative

On December 26, 2011, at 0554 eastern daylight time, a Bell 206B, N5016M, operated by SK Logistics, d.b.a. SK Jets, collided with terrain while maneuvering near Green Cove Springs, Florida. The certificated airline transport pilot and 2 passengers (a doctor and a medical technician) were fatally injured. The on-demand air taxi flight was conducted under the provisions of 14 Code of Federal Regulations Part 135. Night instrument meteorological conditions prevailed and no flight plan was filed for the planned flight to Shands Cair Heliport (63FL), Gainesville, Florida. The flight originated from Mayo Clinic Heliport (6FL1), Jacksonville, Florida, about 0537.

According to representatives of the Mayo Clinic Hospital, Jacksonville, Florida, the flight was contracted by the hospital to carry a doctor and a medical technician to Shands Hospital, Gainesville, Florida, for the purpose of procuring an organ for transplantation. The flight was then to return to the Mayo Clinic Hospital with the procured organ. The flight did not arrive at Shands Hospital and was reported overdue by a Mayo Clinic Hospital representative, which activated local search and rescue operations. The wreckage was located about 1000 in a remote wooded area by the Jacksonville Sheriff's Department Aviation Unit.

According to preliminary radar and communication data from the Federal Aviation Administration, the helicopter departed 6FL1 to the southwest, flying a track slightly south and east of a direct course to 63FL. The pilot contacted Jacksonville Approach at 0549 to inquire about the status of restricted airspace. At 0550, the controller replied the restricted areas were inactive, and the pilot acknowledged the transmission. No further communications were received from the helicopter. During the enroute portion of the flight, the helicopter's altitude varied between 200 and 700 feet mean sea level (msl). The last radar target was recorded at 0553:23, about 1 mile north of the accident site, indicating an altitude of 300 feet msl.

A debris field was observed which originated with several trees that were severed by breaks at descending altitudes. The debris field was approximately 320 feet long, 70 feet wide, extending on a magnetic course of 172 degrees. The initial tree strike was at an estimated height of 30 feet above the ground, which severed an approximately 50-foot tall tree, at a ground elevation of 118 feet msl. The main wreckage was located about 175 feet along the debris path and approximately 80 percent of the wreckage was consumed during a postcrash fire. Sections of the skids, tailboom, main rotor blades, and engine were identified. The airframe and engine were retained for further examination.

The accident site was located about 12 miles northeast of Palatka Municipal Airport (28J), Palatka, Florida. The recorded weather at 28J, at 0554, was: wind 070 degrees at 5 knots; visibility 5 miles in mist; overcast ceiling at 400 feet; temperature 17 degrees C; dew point 15 degrees C; altimeter 30.21 inches Hg.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN10FA291	06/02/2010 1400 CDT	Regis# N515MK	Midlothian, TX		
Acft Mk/Mdl BELL 222-U		Acft SN 47515	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk	Prob Caus: Pending
Eng Mk/Mdl LYCOMING LTS101		Acft TT 9925	Fatal 2 Ser Inj 0	Flt Conducted Under: FAR 091	
Opr Name: CAREFLITE		Opr dba:		Aircraft Fire: BOTH	
				AW Cert: STN	

Narrative

HISTORY OF FLIGHT

On June 2, 2010, at 1400 central daylight time, a Bell 222U, N515MK, registered to and operated by CareFlite, Grand Prairie, Texas, collided with the ground following an in-flight break-up near Midlothian, Texas. The post maintenance flight was operated under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions (VMC) prevailed and a company flight plan was filed. The airline transport pilot and mechanic were killed. The helicopter sustained substantial damage. The flight departed from Grand Prairie Municipal Airport (GPM) Grand Prairie, Texas, at 1352, about 8 minutes before the accident.

During interviews with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), several witnesses consistently reported seeing the tail boom, main rotor hub, main rotor blades, and other debris separate from the helicopter. Another witness heard a "loud crack" sound. The helicopter subsequently collided with the ground and exploded into flames.

Review of radar data confirmed N515MK departed GPM at 1352:03. The helicopter proceeded southbound until the last radar target was recorded at 1359:49. The last six radar hits recorded from 1359:26 to 1359:49 indicated an average altitude of 1,300 feet mean sea level (msl), at an average ground speed of 115 knots, and an average ground track of 178 degrees.

PERSONNEL INFORMATION

The certificated airline transport pilot, age 44, held an airline transport pilot certificate, with a rating for rotorcraft-helicopter, issued on November 10, 2004. In addition, he held a commercial pilot certificate, with ratings for airplane single-engine land, airplane multiengine land and instrument airplane, issued on November 10, 2004. The pilot also held a flight instructor certificate, with ratings for rotorcraft-helicopter and instrument-helicopter, issued on July 18, 2009, and a ground instructor certificate, with ratings for advanced and instrument, issued on November 10, 2004.

He was issued a second-class airman medical certificate on January 21, 2010, with no limitations. The pilot's logbook was not recovered for examination. Based on the pilot's airman medical certification application, company crewmember records and other documents, his total flight experience was estimated at 6,500 hours with at least 5,300 hours in helicopters, and an estimated 346 hours in Bell 222 helicopters. The pilot's last Part 135 competency check in the Bell 222U was completed on July 29, 2009. He completed a Part 135 competency check and flights review in an Augusta A-109E on April 23, 2010. The pilot had flown 19.6 hours in the last 90 days of which 9.8 hours were in the Bell 222U. He had flown 3.2 hours in the last 30 days.

The mechanic, age 23, held a mechanic certificate with ratings for airframe and powerplant, issued on September 26, 2006. In addition, he held a private pilot certificate, with a rating for rotorcraft-helicopter, issued on April 19, 2006. The mechanic's pilot logbook was not recovered. The mechanic held a first-class airman medical certificate that was issued April 13, 2007, with no limitations.

AIRCRAFT INFORMATION

The Bell 222U was a 5-place twin engine helicopter, serial number 47515, and was equipped with high skid landing gear. The pilot's station was located in the right cockpit seat and the co-pilot's station in the left cockpit seat. Flight controls were not installed in the co-pilot station. A medical interior was installed in the main cabin with seats for three passengers and a stretcher for one patient. Two Honeywell LTS-101-750-1, 680-shaft horsepower engines powered the helicopter.

The helicopter had been previously maintained on the manufacturer's inspection program was in the process of being added to the operator's Approved Airworthiness Inspection Program (AAIP). According to the Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1) submitted by the operator, the helicopter had an estimated total time in service of 9,925.1 flight hours. A review of the maintenance logbooks indicated that the last recorded inspection of the engines and

National Transportation Safety Board - Aircraft Accident/Incident Database

airframe was a 600-hour inspection which had been completed on May 27, 2011, at 9,924.0 hours.

Prior to the accident, the swashplate and lever assembly (p/n 222-010-400-127, s/n EA136) was removed from N515MK. The swashplate and lever assembly (p/n 222-010-400-127, s/n EA0052), previously installed on N142CF, was reinstalled on N515MK at 9,925.0 total time air frame hours. As of the accident date, the recently installed assembly had approximately 49.9 hours remaining until overhaul.

The outer ring assembly, (p/n 222-010-403-005, s/n AR-16) had accumulated 4,069.6 hours since new and 2,450.1 hours since overhaul. The drive pins, (p/n 230-010-402-103, s/n A-5 and s/n A-17), were installed in the outer ring assembly during an overhaul on December 23, 1999.

A review of manufacturing records provided by Bell Helicopter Textron show they built 17 drive pins of p/n 230-010-402. Fifteen were non-stepped straight pins (p/n 230-010-402-101) and two were stepped pins (p/n 230-010-402-103), s/n A-5 and A-17. All 17 of the drive pins built were hardened in furnace number 72212-03. The s/n A-5 drive pin was the only part aged in furnace number 72101-15.

The maintenance manual requires an inspection of the drive pins, (p/n 230-010-402-103), every 300 hours. The last inspection was conducted at 2,346.4 hours. The drive pins had accumulated about 5.9 flight hours of operation since that inspection had been completed.

A records review revealed none of the rotor system components had any history of being involved in a previous accident.

METEOROLOGICAL INFORMATION

At 1353, the automated surface observing system (ASOS) at Arlington Municipal Airport (GKY), Arlington, Texas, about 11 miles north northwest of the accident site, reported the wind from 200 degrees at 8 knots, gusting to 14 knots, visibility 10 statute miles, sky clear, temperature 33 degrees Celsius, dew point 19 degrees Celsius, and an altimeter setting of 29.77 inches of Mercury.

At 1350, the ASOS at GPM, about 13 miles north of the accident site, reported the wind from 210 degrees at 10 knots, visibility 10 statute miles, few clouds at 5,000 feet, temperature 34 degrees Celsius, dew point 18 degrees Celsius, and an altimeter setting of 29.79 inches of Mercury.

COMMUNICATIONS

At 1349 N515MK called the FAA contract air traffic control tower at GPM and requested to depart the Care Flite ramp southbound to Joe Pool Lake. The tower approved the departure and issued N515MK the altimeter setting. N515MK acknowledged and departed. There were no further recorded conversations between N515MK and the tower.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located in a field about 13 miles south of GPM at an estimated surface elevation of 650 feet msl. The fuselage was oriented on a 044-degree heading, covered in soot and partially consumed by thermal damage. The other portions of the wreckage did not exhibit fire damage. The separated tail boom was found approximately 550 feet northeast from the main fuselage and 340 feet northeast from the main rotor. The main rotor was found approximately 220 feet northeast from the fuselage. The fractured and separated main rotor mast section was found about 80 feet east of the main fuselage.

Pieces of wreckage found northeast of the main fuselage included fuselage skin from a sponson, a patient backboard, sections of tail boom skin exhibiting tail rotor blade strikes, and push-out window sections. The most distant debris was located about 1,500 feet north-northeast of the main fuselage and included several pieces of main rotor blade skin and small fuselage paint chips.

The main rotor system was found mostly intact. There was no evidence that large pieces departed from the main rotor, although some blade skin and honeycomb had departed the rotor blades. One main rotor blade exhibited trailing edge damage just inboard of the outboard trim tab, consistent with striking a hard object. A severed mesquite tree and bent steel rebar exhibited evidence of contact where the main rotor came to rest. The other main rotor blade exhibited abrasions and gouges on its bottom surface, exhibiting signatures consistent with contact with a hard object. Further examination revealed a separated tail rotor hanger bearing section fit the size and shape of a gouge on the bottom main rotor blade skin surface. For identification and differentiation purposes, the main rotor blades were labeled "A" and "B".

National Transportation Safety Board - Aircraft Accident/Incident Database

The A side pitch change link had intact connections at both top and bottom but was bent near the center of the link. The B side pitch change link was connected to the walking beam on its bottom end, but the bolt was fractured at the upper connection to the pitch change horn.

The rotating outer ring swashplate was found with the A side drive pin fractured and separated. The separated head of the side A drive pin remained in the interior of the swashplate. The entire shank and attaching hardware from side A were not found. The side B drive pin on the opposite side was found intact and installed in the rotating swashplate.

The separated tail boom assembly was found in an upright orientation and flattened on its bottom surface. It exhibited fractures of the tail boom skin and longerons approximately 4 inches aft of the fuselage attachment structure. The left end plate on the horizontal stabilizer exhibited a main rotor blade strike near its bottom surface. The strike was to the inboard face on the bottom of the end plate in an outboard direction. The tail boom also exhibited strikes to the left side of the aft tail boom area, which matched damage to the tips of both tail rotor blades. The tail rotor hub and blade assembly remained connected to the tail boom assembly. Both tail rotor pitch change links were bent near the center of the links.

The main transmission remained connected with the main fuselage and was covered with soot. The transmission outer case exhibited several holes in it, consistent with impact fractures. The right aft transmission mount was fractured, but the other three mounts were intact. Free rotation was observed through the intact tail rotor gearbox assembly.

The main rotor mast was fractured and separated near the top of the mast and just above the transmission top case. The appearance of the fractured surface at the top of the mast was consistent with a hard contact with the main rotor yoke.

The swashplate and lever assembly, swashplate drive assembly, main rotor hub assembly and mast section were forwarded to Bell Helicopter Engineering Laboratories for initial examination under the supervision of an NTSB investigator. The main rotor system components: including the swashplate and lever assembly, swashplate drive assembly, main rotor hub assembly, ring assembly-rotating, main rotor controls, pin-outer ring, swashplate, main rotor controls, and main rotor pitch link assembly were forwarded to the NTSB Materials Laboratory for further analysis.

Control continuity in the main fuselage area for the main rotor cyclic, collective, and tail rotor controls could not be verified. Melted remnants of aluminum control tubes were observed in several locations surrounding the main fuselage.

Tail rotor control continuity was confirmed in the tail boom section from the forward tail boom fracture to the tail rotor hub and blade assembly.

The left engine remained in the wreckage and was fire damaged. The engine data plate was not recovered. The engine was removed from the wreckage and examined at a salvage yard. The accessory gearbox, inlet housing and all engine accessories manufactured from aluminum and magnesium were consumed by fire. The power section of the engine was not disassembled. The external surfaces of the engine contained ash and debris. The plenum sustained damage on the lower right side. The remains of the exhaust pipe were removed. The power turbine wheel was free to rotate with corresponding rotation of the power turbine shaft through the power pinion gear. The power turbine rotor was intact and no rotational scoring was present on the turbine tip shroud surface. Rotational scoring was present on the aft side of the power turbine disk rim and the aft surface of the power turbine blade platforms and attachment fir trees.

The axial compressor rotor was intact and no damage was present on the leading edges of the compressor blades. The gas generator group was rotated with resistance due to rubbing between the rotating and static parts of the group. The remainder of the power section was not disassembled.

The accessory and reduction gearbox gears were collected from the wreckage and examined. The gear teeth were intact and were able to provide power on all three gears, including the power pinion, torque meter idler gear, and the power output gear. All remaining gears from the accessory reduction gearbox were examined and the gear teeth were intact.

The right engine remained in the wreckage and was fire damaged. The engine data plate was not recovered. The engine was removed from the wreckage and examined at a salvage yard. The accessory gearbox, inlet housing and all engine accessories manufactured from aluminum and magnesium were consumed by fire. The fuel pump, fuel control unit, and the power turbine governor were consumed by fire. The power section of the engine was not disassembled. The external surfaces of the engine contained ash and debris. The plenum sustained damage around the majority of the circumference. The remains of the exhaust pipe were removed. The power turbine wheel would not rotate. One turbine blade was missing a piece 1/4 inch in radius from the trailing edge tip corner. The remainder of the turbine blades was intact. Rotational scoring was present near the trailing edges on the suction aft side of the blades.

National Transportation Safety Board - Aircraft Accident/Incident Database

The axial compressor rotor was intact and no damage was noted on the leading edges of the blades. The gas generator would not rotate. The remainder of the power section was not disassembled.

The accessory and reduction gearbox gears were collected from the wreckage and examined. The gear teeth were intact and were able to provide power on all three gears, including the power pinion, torque meter idler gear, and the power output gear. All remaining gears from the accessory reduction gearbox were examined and the gear teeth were intact.

MEDICAL AND PATHOLOGICAL INFORMATION

The Southwestern Institute of Forensic Sciences, Dallas, Texas, conducted an autopsy on the pilot on June 3, 2010. The cause of death was blunt force and thermal injuries. The Bioaeronautical Research Science Laboratory, FAA, Oklahoma City, Oklahoma performed postmortem toxicology of specimens from the pilot. No testing for carbon monoxide or cyanide was performed. No ethanol was detected in the liver. Acetone, 2 (mg/dl, mg/hg) was detected in the liver. Ethanol, 31 (mg/dl, mg/hg) was detected in the kidney, 17 (mg/dl, mg/hg) was detected in the muscle, and 15 (mg/dl, mg/hg) was detected in the brain. N-Propanol 1 (mg/dl, mg/hg) was detected in the kidney.

The Southwestern Institute of Forensic Sciences, Dallas, Texas, conducted an autopsy on the mechanic on June 3, 2010. The cause of death was multiple blunt force injuries. The Bioaeronautical Research Science Laboratory, FAA, Oklahoma City, Oklahoma performed postmortem toxicology of specimens from the mechanic. No carbon monoxide or cyanide was detected in the blood. No ethanol was detected in the urine. Naproxen was detected in the urine.

TESTS AND RESEARCH

Metallurgical examination revealed that fractures through the mast, B side pitch link bolt and actuator attachments were consistent with overstress separations.

The A side pin fracture surface was viewed in a scanning electron microscope (SEM). High magnification examinations of the fracture surface found predominately brittle cleavage-like fracture interspersed with intergranular separations and small regions of ductile dimples.

As a comparison, a new pin was provided by Bell and a bending overstress fracture was induced at a mechanically reduced section. The resulting fracture displayed bulk yielding and deformation adjacent to the fracture and a 100 percent ductile dimpled fractured surface when viewed at high magnification.

Maintenance records established that the outer ring assembly (p/n 222-010-403-5, s/n AR-16) had been repaired by Bell in December 1999, with the original (p/n 230-010-402-101) constant diameter pins replaced by (p/n 230-010-402-103) stepped pins, which have a larger diameter shank in the areas that mate with the rotating ring. The repair documents indicated that the pin holes in the outer ring were enlarged, then shot-penned and honed to a final diameter of 0.6430 inch for the A side and 0.6432 inch for the B side. From the engineering drawing, the corresponding diameter on the stepped pins was between 0.6446 inch and 0.6450 inch after plating. The actual diameters of the pins were not recorded on the repair documents. However, after removal from the outer ring the enlarged shank diameter on the B side pin was measured at several locations with the diameter ranging from 0.6443 inch to 0.6448 inch and averaged 0.6446 inch.

Using the drawing dimensions for the pin and outer ring would result in a range of interference fits between 0.0011 inch and 0.0020 inch. Using the recorded diameters of the outer ring holes and the drawing dimensions for the pins the interference fit would have been between 0.0020 inch and 0.0016 inch for the A side and between 0.0018 inch and 0.0014 inch for the B side. With the measured diameter of the B side pin (0.6446 inch) and the repair recorded hole dimension (0.6432 inch), the interference fit calculated as 0.00145 inch.

The engineering drawing specifies that p/n 230-010-402-103 drive pins be manufactured from AerMet 100 steel, AMS 6532, heat treated to 280,000 to 300,000 psi ultimate strength (HRC 52.5 to 55 when converted per ASTM E140). Further, the pins were supposed to be vacuum cadmium plated throughout.

The material of both pins was confirmed as AerMet 100 by handheld x-ray fluorescence spectrometer and by an optical emission spectrometer. Hardness measurements in the washer face of the A pin recorded values of 50.4 and 51.9 HRC. Tests in several locations on the B side pin averaged 51.1 HRC. SEM viewing of the cadmium plating revealed a scaly surface texture consistent with vacuum deposited cadmium. Energy dispersive x-ray spectra acquired during SEM examination confirmed the plating as cadmium. A radial metallographic section through the head of the A side pin revealed a fine tempered martensite microstructure consistent with the alloy and heat treatment.

Bell reported that manufacturing records indicated that drive pin A-5 was manufactured in December, 1998 as a finished lot of one part. Initially pin A-6 was also part of the manufacturing lot, but was scrapped during production for unknown reasons.

The atomic hydrogen content was measured in two samples removed from both the A and B side pins. Samples from the fractured pin A-5 (A side) contained 8.7 and 9.3 parts per million (ppm) hydrogen and samples from pin A-17 (B-side) contained 4.6 and 4.5 ppm hydrogen.

To explore the influences of hydrogen on the fracture behavior of the pin material, two tests were conducted by Bell at the direction of the NTSB Materials Laboratory. For the test, the cadmium layer was removed from two new drive pins and each was reheat treated at the same austenitizing conditions, but aged at 850 degrees F and 900 degrees F. Both parts were then pickled for 60 seconds, then electrolytically plated with a heavy layer of cadmium, but not baked. Each test pin was then inserted through aluminum blocks and using the proper nuts torqued to 125 ft-lbs of lubricated torque. The test pins remained loaded for 7 days, at which time the nuts were removed for inspection. With little applied loosening torque, the 850-degree F aged pin fractured through the first engaged thread. The 900-degree F aged pin remained intact. SEM examinations of the fracture surfaces reveal a brittle cleavage-like fracture over the vast majority of the surface. Some intergranular separation and small isolated patches of ductile dimples were also noted. Hydrogen content was measured on both pins and determined to be 2.0 ppm for both.

The bore of the A-side pin hole had skewed longitudinal scrape marks and a series of circumferential impressions over much of the bore. The A side bore markings were consistent with the gradual extraction of the shank portion of the pin. The spacing of the marks was indicative of the relative outward movement of the pin fragment with each force reversal with gradual increasing displacement.

National Transportation Safety Board - Aircraft Accident/Incident Database

Incident Rpt# CEN12IA123	12/22/2011 1450 MST	Regis# N469WN	Denver, CO	Apt: Denver International Airport DEN
Acft Mk/Mdl BOEING 737-7H4		Acft SN 33859	Acft Dmg: MINOR	Rpt Status: Unk Prob Caus: Pending
Eng Mk/Mdl CFM INTL. CFM56 SERIES			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 121
Opr Name: SOUTHWEST AIRLINES CO		Opr dba:		Aircraft Fire: NONE
				AW Cert: STT

Narrative

On December 22, 2011, approximately 1450 mountain standard time, a Boeing 737-7H4, N469WN, was impacted by a front loader, while parked at the gate, at Denver International Airport (KDEN), Denver, Colorado. The captain, first officer, 3 cabin crew, and 128 passengers were not injured. The driver of the front loader was not injured. The airplane was registered to and operated by Southwest Airlines under the provisions of 14 Code of Federal Regulations Part 121. Instrument meteorological conditions prevailed at the time of the incident.

According to airport personnel, the airplane was parked at Gate C-29. The passengers and the flight crew were seated and the ground crew was preparing to push the airplane away from the gate. The front loader was conducting snow removal operations in the non-movement area. The front loader was westbound when it impacted the left rear fuselage of the airplane under the leading edge of the horizontal stabilizer. Several holes were torn in the skin, and a stringer was severed.

The routine aviation weather report for KDEN, issued at 1453, reported winds 080 degrees at 4 knots, visibility 10 miles, sky condition 1,100 feet overcast, temperature minus 07 degrees Celsius, dew point minus 10 degrees Celsius, altimeter 30.28 inches.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR11LA058	11/23/2010 2220 MST	Regis# N614SK	Salt Lake City, UT	Apt: Salt Lake City SLC
Acft Mk/Mdl BOMBARDIER INC CL-600-2C10		Acft SN 10051	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk Prob Caus: Pending
Eng Mk/Mdl GENERAL ELECTRIC CF34-8C5B1		Acft TT 20574	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 121
Opr Name: SKYWEST AIRLINES INC		Opr dba: DELTA CONNECTION		Aircraft Fire: NONE

Narrative

HISTORY OF FLIGHT

On November 23, 2010, about 2220 mountain standard time, a Bombardier CL-600-2C10 (CRJ), N614SK, operated by SkyWest Airlines as Delta Connection flight 4543, collided with a tow tractor during pushback from gate B4 at Salt Lake City International Airport (SLC), Salt Lake City, Utah. The 2 flight deck crewmembers, 2 flight attendants, 65 passengers, and ground handling crew were not injured. The airplane sustained substantial damage to the lower fuselage skin and multiple belly stringers. The scheduled passenger flight was operating on an instrument flight plan and was destined for Will Rogers World Airport (OKC), Oklahoma City, Oklahoma, under the provisions of 14 Code of Federal Regulations Part 121. Night instrument meteorological conditions prevailed. The flight was delayed prior to the accident, with a scheduled departure time of 2000.

SkyWest Airlines is a regional airline headquartered in St. George, Utah. The airline serves as a feeder airline and operates under contract with various major carriers. The accident flight was performed under a code sharing agreement with Delta Air Lines, Inc. Ground handling duties at the time of the accident were performed by agents from Delta Air Lines, Inc. The airplane was dispatched with the auxiliary power unit (APU) inoperative, a condition which is permissible based on the airplane's Minimum Equipment List (MEL), and which requires that one or both engines be started utilizing an external air-start cart or a precharged air bottle.

The airplane load agent, who was responsible for driving the tow tractor, stated that snow was falling during the loading and pushback sequence. He reported that during loading he observed a member of the flight crew performing an external preflight inspection.

Once the airplane had been loaded, he began to prepare for pushback. He was seated in the tow tractor, which was configured as a pushback tug and connected to the airplane's nose wheel utilizing a tow bar. He was in communication with the flight crew via the interphone, and stated that the crew could see him from their position on the flight deck. The captain requested an, "air-start" at the gate, and reported that he was going to start both engines. The engines were then started and the captain reported that the brakes were released and they were clear to commence the pushback. The driver then began the process of pushing the airplane back, but the wheels of the tug slipped and the airplane would not move. He subsequently informed the flight crew, and he decided to use a larger tug. With the larger tug attached, he began the pushback. The airplane subsequently started moving, and they began to back out of the gate area towards the alleyway. He was about to begin the turn into the alleyway, when the airplane started to skid to the left in the direction of the turn. He reported that the airplane then began to move forward, towards the tug, pushing it to the right side of the airplane. The driver stated that about this time, the captain asked if the airplane was pushing the tug, to which he responded yes. The airplane continued to move forward, subsequently overtaking the tug, which remained connected to the airplane's nose wheel. He further reported that the tug struck the belly of the airplane about the same time as tow bar severed at the nose wheel connection.

The tug driver reported that two wing-walkers were present at the time of the accident, and that neither tug was equipped with snow chains or traction devices.

The captain recounted similar observations regarding the initial pushback attempt. He became concerned that disconnecting the tug with both engines running could cause the airplane to move forward in the slippery conditions. He considered shutting down one or both of the engines; however, when he attempted to communicate his concerns with the driver, he had already departed to get the larger tug. By this time, the air-start equipment had also been removed from the gate area. The airplane appeared to remain firmly in position at the gate, and as such, he decided to keep both engines running.

The driver returned with a larger tow tug, and the airplane was successfully pushed back from the gate. Shortly thereafter, the captain experienced a turning and slipping sensation. He asked the tug driver if he still had control of the airplane, to which he replied in the affirmative. He then observed the tug rotate to the right and felt a collision. He reported that although he did not believe the airplane was moving forward, the events transpired so quickly that it was possible he may have missed any forward motion. As such, he could not definitively confirm if the tug struck the airplane, or if the airplane struck the tug.

With regard to starting both engines instead of one in lieu of a functioning APU, the captain stated that he made a judgment call based on a concern that if he started one engine only, he would encounter control problems taxiing in the slippery conditions. He reported that he could also have attempted to start the second

National Transportation Safety Board - Aircraft Accident/Incident Database

engine in the alleyway after pushback using a cross-bleed start. However, he was concerned that attempting such a start would require increasing the power to the running engine and could be disruptive to ground personnel and other traffic within the alleyway.

With regard to weather, the captain stated that although snow was falling at the time, the ramp area at the gate was plowed and mostly clear, and that the alleyway was contaminated with snow and ice. His view was not obscured by precipitation during the maneuver, and he could see the tug.

Examination of a photograph taken following the accident revealed that the airplane's nose gear had become canted to the right over-steer limits, with the tow bar bracket remaining partially attached to the left side of the wheel by the axle engagement pins. The bracket separated from the tow bar at its shank, which remained within the tow bar collar. The tow bar remained attached to the tug, which had come to rest impinged against the right forward fuselage, and opposite the direction of travel. Tire-shaped snow tracks were observed in the snow behind the nose wheel, the tracks continued in a sweeping arc aft towards the left side of the airplane. No snow disruption was present forward of the nose wheel.

METEOROLOGICAL INFORMATION

A special automated surface weather observation for SLC was issued at 2222. It indicated winds from 020 degrees at 6 knots; 2 miles visibility, with light snow and mist, a broken cloud ceiling at 1,600 feet, scattered clouds at 700 feet and overcast at 6,000 feet; temperature minus 7 degrees C; dew point minus 9 degrees C; and an altimeter setting of 29.81 inches of mercury.

FLIGHT RECORDERS

The airplane was equipped with both a Flight Data Recorder (FDR), and a Cockpit Voice Recorder (CVR). Both units were sent to the NTSB Office of Research and Engineering for data extraction. Examination of the CVR revealed that the unit was not de-energized subsequent to the collision, and as such, the accident sequence had become overwritten.

The FDR recorded about 77 hours of data, including the accident sequence. The data revealed that both engines were started about 2158 and powered to an N1 (Fan rpm) speed of 25% rpm while the airplane remained on a heading of 142 degrees magnetic. At 2220, the heading decreased until it reached 57 degrees, 45 seconds later, with a coincident jump in lateral and longitudinal acceleration of 0.07 and -0.08 g, respectively. The brake pedals were not applied until about 2 seconds after the acceleration event.

ADDITIONAL INFORMATION

SkyWest CRJ Standard Operating Procedures (SOP), in part, required the following prior to commencing the pushback:

"When ramp surface conditions would prevent adequate traction for ground equipment, engine start will be delayed until pushback is complete, and the pushback crew is clear of the aircraft. The pushback operator is responsible to notify the captain accordingly."

The corresponding SkyWest "Below-Wing Stations Operating Manual" made the following reference with regard to pushback/dispatch procedures with the tow bar and tow unit:

"WARNING - WHEN RAMP SURFACE CONDITIONS PREVENT ADEQUATE PUSHBACK UNIT TRACTION, ENGINE START MUST BE DELAYED UNTIL PUSHBACK IS COMPLETE. THE PUSHBACK OPERATOR IS RESPONSIBLE TO NOTIFY THE PIC ACCORDINGLY."

Neither the SOP nor the Below-Wing Operations Manual provided guidance for pushback procedures with an inoperative APU during low traction ramp conditions.

Subsequent to this accident, SkyWest issued a Ground Operations Bulletin, and Delta issued an Immediate Action Bulletin requiring that when ramp surface conditions prevent adequate pushback unit traction, only one engine may be started prior to pushing back a regional jet aircraft.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR12CA069	12/17/2011 1300 PST	Regis# N275PM	Mesquite, NV	Apt: Mesquite Airport K67L
Acft Mk/Mdl CESSNA 208		Acft SN 20800119	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk Prob Caus: Pending
Eng Mk/Mdl P&W PT6A SER			Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: SKYDIVE MESQUITE		Opr dba:		Aircraft Fire: NONE
				AW Cert: STN

Narrative

Prior to the flight, the pilot fueled the airplane with 16 gallons of jet fuel. He planned on making two local flights carrying skydivers aloft. During the second skydiving flight he delayed releasing the skydivers due to traffic in the area. As he turned the plane back towards the drop zone the airplane's engine experienced a total loss of power. The pilot signaled the skydivers to exit the airplane, feathered the propeller, and executed an attempted forced landing to the runway. The airplane landed long, went off the end of the runway, across a road, and finally came to rest on a golf course. The pilot stated that the airplane and engine had no mechanical failures or malfunctions during the flight. He also stated that the cause of the loss of engine power was poor fuel management and fuel exhaustion.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# DCA12WA003 10/14/2011 1150 UTC Regis# A2AKD Xakanaka, BC
Acraft Mk/Mdl CESSNA 208B Acft Dmg: SUBSTANTIAL Rpt Status: Unk Prob Caus: Pending
Fatal 9 Ser Inj 2 Flt Conducted Under: FAR NUSC
Opr Name: Opr dba: Aircraft Fire: GRD

Narrative

On October 14, 2011, about 1350 local time, A2-AKD, a Cessna 208B chartered flight, crashed shortly after takeoff from an airstrip near Xakanaka, Botswana. Visual meteorological conditions prevailed. Of the 12 persons on board, the pilot and 8 passengers were fatally injured. The airplane was destroyed and there was a post crash fire. The destination of the flight was the Okavanga Delta, Botswana

An investigation has been instituted by the Botswana Ministry of Transport and Communications. As the State of manufacture of the airplane, a U.S. Accredited Representative has been designated. Inquiries about the investigation should be directed to:

Ministry of Transport and Communications
Private Bag 00414
Gaborone, Botswana

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA12FA127	12/28/2011 950 EST	Regis# N877G	Ft. Lauderdale, FL	Apt: Ft. Lauderdale Executive FXE
Acft Mk/Mdl CESSNA 650		Acft SN 650-7063	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk Prob Caus: Pending
Eng Mk/Mdl GARRETT TFE 731 SER		Acft TT 5616	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: CITATION 7063 CORP		Opr dba:		Aircraft Fire: NONE
				AW Cert: STT

Narrative

On December 28, 2011, about 0950 eastern standard time, a Cessna 650, N877G, was substantially damaged when it impacted an airport perimeter fence while returning for landing at Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida. The two crewmembers and six passengers were not injured. The airplane had just taken off from FXE in visual meteorological conditions on an instrument flight rules flight plan to Teterboro Airport (TEB), Teterboro, New Jersey. The personal flight was operating under the provisions of 14 Code of Federal Regulations Part 91.

According to the first officer, the takeoff roll and rotation from runway 26 were normal, but once airborne, the airplane began rolling to the right. Positive-rate climb was called, but the landing gear remained down and the flaps remained at 20 degrees. The first officer noticed that the captain was having "extreme" difficulty in rolling the airplane level, but eventually accomplished it through rudder and asymmetric thrust. As the right turn brought the airplane around to runway 13, the captain was able to land long, but the airplane then left the runway and impacted the airport perimeter fence. The first officer also noted that there were no warning lights or advisories in the cockpit during the event.

In a written statement, the captain noted that the preflight examination of the airplane was normal, as were the pre-takeoff checks, including the ailerons and all flight control surfaces. After taking off and obtaining a positive rate of climb, the captain found that he needed a "little left control;" then the airplane started a slow right turn which he could not stop. The captain then found that he needed differential thrust and rudder to keep the airplane from rolling over, and as he kept adjusting both, another runway came into view, and he completed the landing.

In a follow-up telephone interview, the captain further stated that as the airspeed increased, the airplane tended to roll more. He recalled thinking that the airplane might have had a flap misconfiguration, but there were no lights or warnings. As he reduced power, the right wing would start to come back up, and as he added differential thrust to maintain altitude, airspeed would increase and the right wing would then fall again. The captain found himself going through the same series of actions over and over again to maintain flight, and as he did so, he saw that the airplane was gradually lining up with runway 13 through the right window. As the airplane came around toward the runway, the captain felt that he only had a "one time shot," and did the best he could to get the airplane onto the runway.

The first officer and a passenger estimated that the maximum roll angle approached 90 degrees of bank.

The airplane was subsequently examined in a hanger, where leading edge wing damage, a slice through the top outer skin and ribs of the cabin, and the nose wheel bent back into the pressure hull with compromised hydraulic lines were documented. Although the captain's yoke pedestal was jammed against the seat, control continuity was confirmed from the cockpit to all flight control surfaces. The flaps remained in the 20-degree position, and all four spoilers on each wing were flush with the wing.

The hydraulic lines in the nose well were subsequently capped and 3,000 pounds of pressure to the hydraulic system were supplied via a hydraulic ground power unit. As soon as the hydraulic pressure was supplied, the right wing roll spoiler (the outermost most of the four spoilers, located next to the aileron) extended upwards 7.9 degrees. Multiple left-right applications of the flight controls, with the hydraulic ground power unit both on and off, resulted in the roll spoiler being extended normally, but returning to a resting position 7.8 to 7.9 degrees above the flush position. A final attempt at exercising the controls resulted in the roll spoiler coming to rest 5.5 degrees above the flush position.

During one of the flight control tests, the spoiler hold-down switch was activated. The right wing roll spoiler then locked down, but when the switch was deactivated, it returned to 7.8 degrees above the flush position.

In preparation for confirmation of proper rigging, an attempt was made to secure the right roll spoiler bellcrank with an alignment pin. As the pin contacted the bellcrank, the bellcrank snapped into a different position which then lowered the roll spoiler to the flush position. The bellcrank and the hydraulic actuator for the right roll spoiler were retained for further examination.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN12LA111	12/08/2011 1530 EST	Regis# N5813	Batavia, OH	Apt: Clermont County I69
Acft Mk/Mdl CURTISS WRIGHT P40M		Acft SN 27501	Acft Dmg: SUBSTANTIAL	Rpt Status: Unk Prob Caus: Pending
Eng Mk/Mdl ALLISON V-1710-81		Acft TT 556	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: TRI-STATE WARBIRD MUSEUM		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Narrative

On December 8, 2011, about 1530 eastern standard time, a Curtiss Wright P40M airplane, N5813, impacted a fence during a forced landing and a runway excursion, following a loss of engine power, at Clermont County Airport (I69). The pilot sustained minor injuries. The airplane sustained substantial damage to both wings and the horizontal stabilizer. The airplane was registered to and operated by the Tri-State Warbird Museum under the provisions of 14 Code of Federal Regulations Part 91. Day visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The local flight originated from I69 about 1440.

The World War II era airplane was recently restored and had accumulated approximately 5 hours since it had been returned to an airworthy condition. The airplane was originally manufactured in May 1943.

The pilot reported that he had completed maneuvers in the local area prior to the accident. He stated that while returning to the airport, the engine shuddered several times and the oil pressure dropped to zero. Approximately 20 seconds later, the engine failed completely. About that time, the windshield and canopy were covered with oil and coolant restricting forward visibility. The pilot was able to execute a forced landing to the airport; however, he was unable to stop on the available runway. The airplane subsequently departed the end of the runway and impacted the airport perimeter fence.

A postaccident inspection revealed that the engine oil cooler exhibited a crack adjacent to a thermostatic bypass valve. The oil cooler was an original World War II era component. The crack did not appear to have initiated at a previously repaired area.