Accident Rpt# CEN16LA247 06/26/2016 1400	**Regis# N92DV**	**Longmont, CO**	**Apt: Vance Brand LMO**
Acft Mk/Mdl BEECH E 90	**Acft SN LW-292**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl PRATT & WHITNEY PT6-28	**Acft TT 15829**	**Fatal 0 Ser Inj 1**	**Flt Conducted Under: FAR 091**
Opr Name: MILE HI SKYDIVING CENTER, INC.,	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: STN

Summary

The commercial pilot was conducting a skydiving flight with 15 skydivers on board. The pilot reported that, at 5,000 ft above ground level, he reconfigured the airplane for a climb and activated the interior amber jump lights, which indicated that the door could be opened to spot the jump zone. Two jumpers safely exited the airplane at that time. The pilot then initiated another climb. The pilot did not recall any jump indication lights being illuminated in the cabin during the climb, and none of the remaining jumpers notified him of any illuminated jump lights. However, three of the jumpers later reported that the amber jump light remained illuminated at that time. One of the jumpers informed a senior jumper from the operator that the light was on, but he indicated that it was not a problem, and the jumpers all affirmed that no one informed the pilot that the amber light remained on.

The three jumpers reported that, before reaching the jump location, when the pilot was in the process of configuring the airplane for the jump, the jump indication lights changed from amber to green, which is intended to indicate that it is safe to jump and prompted the jumpers to climb out of the airplane; however, the airplane was not correctly configured or at the proper airspeed for the jump. The three jumpers noted that the airspeed seemed faster than normal because they had difficulty holding onto the airplane. One of the jumpers, who struggled to swing his leg normally, jumped from the airplane and then struck the horizontal stabilizer. The pilot reported that he felt the flight controls jolt and heard a "thud" sound and then switched the jump lights to red and instructed the remaining jumpers to remain in the airplane. The pilot descended and landed the airplane without further incident. The jumper who struck the stabilizer was unable to move his arms and descended with his back to the ground until his automatic activation device deployed his parachute. He was subsequently transported to the hospital with serious injuries.

The accident is consistent with the pilot not reconfiguring the jump light system properly following the first jump and unintentionally turning on the green jump light before the airplane was configured properly or at the proper airspeed for a safe jump and not recognizing that he had done so. Additionally, the senior jumper did not tell the pilot that the amber light remained on after the first jump, and the jumpers improperly decided to exit the airplane even though they recognized the airplane was at a higher-than-normal airspeed.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's unintentional activation of the green jump light before the airplane was properly configured and slowed for a jump and the jumpers' improper decision to continue with the jump after they recognized that the airplane was at a higher-than-normal airspeed. Contributing to the accident were the pilot's failure to recognize that the amber light remained on after the first jump and the senior jumper's decision not to inform the pilot that the amber light remained on following the first jump.

Events

1. Maneuvering - Miscellaneous/other

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C
2. Aircraft-Aircraft systems-Lighting system-(general)-Unintentional use/operation - C
3. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Passenger - C
4. Personnel issues-Action/decision-Info processing/decision-Identification/recognition-Pilot - F
5. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Other/unknown - F
6. Personnel issues-Task performance-Communication (personnel)-Lack of communication-Other/unknown - F

Narrative

HISTORY OF FLIGHT

On June 26, 2016, about 1400 mountain daylight time, a Beech E-90 King Air airplane, N92DV, was struck by an exiting skydiver while the airplane was maneuvering near Longmont, Colorado. The pilot and 14 skydivers were not injured and one skydiver sustained serious injuries. The airplane sustained substantial damage. The airplane was registered to Mile Hi Skydivers Inc. and operated by Mile Hi Skydiving Center, Inc., Longmont, Colorado, under the provisions of 14 Code of Federal Regulations Part 91 as a skydiving flight. Visual meteorological conditions prevailed and no flight plan was filed, but the flight was receiving visual flight rules (VFR) flight following. The local flight originated from Vance Airport (LMO), Longmont, Colorado, about 1345.

The pilot reported that the loading and takeoff portion of the flight were normal with no anomalies. The flight contained 15 skydivers, one of which was a student and the rest were licensed skydivers with varied levels of experience. At 5,000 ft above ground level (agl) the pilot configured the airplane for a jump and

activated the jump indication lights. The student and one other skydiver safely exited the airplane at that time as "hop and pop" jumpers. The pilot de-configured the airplane and initiated a climb to the planned jump altitude. The pilot did not recall any jump indication lights being illuminated in the cabin during the climb and none of the remaining jumpers notified him of any illuminated jump lights. He continued the climb to 16,000 ft mean sea level (msl), which was 1,500 ft below normal exit altitude. At 12.2 nautical miles (nm) from the intended GPS waypoint, the pilot maintained a full power setting and continued the climb for 17,500 ft msl. The pilot stated that he activated the amber light, which indicated that the skydivers could open the door and spot check the area. Prior to reaching the jump location, which was 11.2 nm from the waypoint, he was in the process of configuring the airplane for the jump when he felt the flight controls shake, but the flight instruments appeared normal. He then felt a jolt in the flight controls and heard a "thud" sound. He looked back and noticed 3 skydivers had exited the airplane and 3 more were in the process of exiting. He switched the jump lights to red and instructed the remaining skydivers to remain in the airplane. The remaining skydivers told the pilot that someone had hit the tail. The pilot descended and landed the airplane at LMO.

The injured skydiver and two other skydivers (skydivers one, two, and three for report identification purposes only) stated that the amber jump light remained on after the "hop and pop" and was not turned off as expected. Skydiver two stated that he told a senior skydiver about the amber light but the senior skydiver was not concerned since he knew where to spot for the jump. No one notified the pilot that the amber light remained on. When the airplane arrived at 12,000 ft msl the light turned green and a Mile Hi employee opened the door. Skydivers one and two climbed out and held onto the airplane, while skydiver three remained in the doorway. They noted that the airspeed seemed faster than normal as they had difficulty holding on. Skydiver one was to swing his right leg away from the airplane and on the third leg swing they would all jump together. He struggled to swing his leg normally and on the third swing they jumped away from the airplane and tumbled immediately. Skydiver one struck the left horizontal stabilizer and was unable to move his arms. He continued to descend with his back to the ground until his automatic activation device deployed his parachute. He was transported to the hospital with serious injuries.

Another skydiver who was positioned near the pilot during the flight stated that they were on "what appeared to be a jump run" when the door was opened and the first group climbed out of the airplane. When the first group jumped the airplane was flying faster than normal based on the sound of the jumpers exit. He noticed the flap were retracted and another skydiver asked him if a "dent was always in the tail". A second group of skydivers exited the airplane and then the door was shut. He did not see the jump indication light color during the accident. Several others onboard mentioned that the yellow indication light had been on since the "hop and pops" had exited, then the light was green before the first group of three exited.

PERSONNEL INFORMATION

The pilot received initial training in the accident airplane conducted by the operator from April 21, 2016 to June 11, 2016. The training consisted of 11 flights and a total of 60.7 training hours. On June 11, 2016, the pilot passed the operators initial flight competency and proficiency check.

AIRCRAFT INFORMATION

According to the owner of Mile Hi, the jump indication lights are controlled by a rotary switch on the cockpit pedestal. There is one indication light on the pedestal and one light next to the jump door for the skydivers to see. When the light is off or red there are to be no jump activities. The amber light indicates that the door can be opened to spot check the area. The green light indicates that it's safe to jump. The lights can be viewed from anywhere in the airplane, unless another skydiver is blocking the view. If the green light is on and the airplane is obviously not configured for a safe jump, the skydivers should climb back into the airplane and not complete the jump.

METEOROLOGICAL INFORMATION

WRECKAGE AND IMPACT INFORMATION

The responding Federal Aviation Administration (FAA) inspector reported that the left horizontal stabilizer sustained substantial damage.

ADDITIONAL INFORMATION

FAA Advisory Circular (AC) 105-2E: Sport Parachuting

This AC provides suggestions to improve sport parachuting safety and disseminates information to assist all parties associated with sport parachuting to be conducted in compliance with 14 CFR Part 105. The AC states in part:

8. Pilot Responsibilities, b. Jump Pilot Training, (2) Flight Training, (d) Configuration for jump run and jumper exit including procedures for tail strike avoidance.

8. Pilot Responsibilities, e. Operational Requirements: The pilot in command (PIC) is solely responsible for the operational requirements of Parts 91 and 105, including compliance with the special operating limitations and placards required for flight with the door open or removed. The PIC is also responsible for ensuring that each occupant has been briefed on operation of his or her restraint system, procedures for ensuring aircraft W&B stays within limits while jumpers exit, and procedures to avoid tail strikes.

Skydiver's Video

A review of a skydiver's video, who exited the airplane in the group after the injured skydiver, revealed that the flaps were partially extended at the time of the video.

Accident Rpt# ERA16LA015	**10/15/2015 1500 CDT**	**Regis# N206CJ**	**Dickinson, AL**	**Apt: N/a**
Acft Mk/Mdl BELL 206L 3		**Acft SN 51579**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ALLISON 250-C20 SER		**Acft TT 6550**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 137**
Opr Name: COUCH HELICOPTER SERVICES, INC.		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: STN

Events

1. Maneuvering-low-alt flying - Flight control sys malf/fail

Narrative

On October 15, 2015, about 1500 central daylight time, a Bell 206L-3, N206CJ, experienced a loss of tail rotor thrust and contacted trees during an emergency descent near Dickinson, Alabama. The commercial pilot was not injured, and the helicopter was substantially damaged. The helicopter was registered to CB Couch, Inc., and operated by Couch Helicopter Service, Inc., as an aerial application flight under the provisions of 14 Code of Federal Regulations Part 137. Visual meteorological conditions prevailed in the area at the time, and no flight plan was filed for the local flight that originated about 5 minutes earlier from a nearby field.

The operator reported that, toward the end of the flight, during a left turn while flying at an airspeed less than 15 knots and between 70 and 120 ft above trees, the pilot heard a "pop" sound followed by a loss of tail rotor thrust. The pilot added full left anti-torque pedal input but that was not effective. He then lowered the collective but did not reduce throttle. As the helicopter descended, the main rotor blades, mast, and a portion of the tailboom contacted trees and fractured. The helicopter descended to the ground and came to rest on its left side.

Examination of the helicopter by a Federal Aviation Administration operations inspector revealed that the tailboom with attached tail rotor had separated but was found near the main wreckage. The tail rotor blades were intact and showed little damage except for scratches from contact with trees. Examination of the tail rotor drive system revealed that the first driveshaft assembly (shaft S1) aft of the oil cooler blower, and the second driveshaft assembly (shaft S2) aft of the oil cooler blower, were both fractured about midspan. One of the fasteners used to attach shaft S1 to the disc pack coupling at the shaft's aft end was missing, and the securing hardware was not located. The third tail rotor driveshaft (shaft S3) aft of the blower was not fractured. The forward flange of the fourth tail rotor driveshaft (shaft S4) aft of the blower was fractured on one side, and the fractured section remained attached to the disc pack coupling. The opposite side bolt remained trapped in the disk pack coupling, and the bolt was bent and fractured. Components of the tail rotor drive system consisting of fractured shafts S1 and S2, non-fractured shaft S3, and the fractured section of the forward end of shaft S4 with disc pack couplings and securing hardware were sent to the NTSB Materials Laboratory located in Washington, DC.

According to the NTSB Materials Laboratory report, the fracture surface of shaft S1 showed irregular fracture features with postfracture damage and inward deformation consistent with an overstress fracture, and the fracture features on shaft S2 were on slant planes and matte gray, which is consistent with overstress. There was no evidence of preexisting damage to either fracture surface. Examination of the fractured section of shaft S4 revealed fracture features consistent with an overstress fracture under shear loading.

Examination of the flange of the aft portion of shaft S1 associated with the missing hardware revealed wear in the hole bore corresponding to contact with the threads of the missing fastener. The outside face of the flange of the aft end of shaft S1 diametrically opposite from the flange with the missing fastener displayed circumferential sliding contact marks, and no torque paint was observed on the flange, washer, or bolt threads. At the missing attachment location, the forward plate in the disc pack coupling was cracked across the width of the plate between the inner and outer diameter, and the crack intersected the middle of the attachment hole. Contact marks were observed at the aft end of shaft S1 at the sides approximately orthogonal to the flanges. The shape and location of the contact marks were consistent with contact with the heads of the bolts attaching shaft S2 to the disc pack coupling and shaft S1 as it rotated about the remaining attachment bolt.

The prevailing or tare torque for one nut at the forward end and of the remaining nut at the aft end of shaft S1 were below the minimum torque specified in Bell Helicopter's Standard Practices Manual (SPM), and the prevailing or tare torque for the remaining fasteners were above the minimum torque specified in the SPM. (The prevailing torque is a measure of the turning resistance of a lock nut, and the turning resistance generally decreases as nuts are reused.) Returning torque measurements were conducted on each of the coupling attachments, which revealed that only the two fasteners on the forward end of shaft S1 were within limits.

According to the helicopter's maintenance records, on March 15, 2015, at helicopter total time 6,059.9 hours, the helicopter was modified in accordance with

Bell Helicopter Technical Bulletin 206L-07-226 dated October 8, 2007. The modification included installation of an improved upper left longeron/fitting assembly, P/N 206-031-314-217B, and aft fuselage bulkhead, P/N 407-030-027-103. According to the technical bulletin accomplishment instructions, preparation included, in part, removal of: the tail rotor driveshaft between the engine and oil cooler, the oil cooler and oil cooler blower assemblies, the engine, the tail rotor drive shaft segment aft of the oil cooler blower, and the tailboom assembly. The maintenance record entry returning the helicopter to service after the modification did not specify whether new hardware was used during reinstallation of the tail rotor drive shaft segments or if the old hardware was re-installed. Since the modification was performed, the helicopter had undergone four 100-hour inspections, the latest of which was completed on September 10, 2015. The helicopter total time at its last 100-hour inspection was 6,456.5 hours, and the total time at the time of the accident was reported to be 6,550 hours.

In May 2002, Bell Helicopter issued Revision A to Operations Safety Notice (OSN) 206L-02-43, which required a 100-hour recurring torque check for the tail rotor disc pack coupling hardware as well as the application of torque stripes after torqueing. The OSN also indicated that the 206L maintenance manual (MM) would be revised to incorporate the new torque check and torque stripe requirement and reminded mechanics of the need to include tare torque of the nut in the torque value. Postaccident review of the 206L maintenance manual revealed no reference to adding torque stripes to the disc coupling fasteners following torque check. As a result, Bell Helicopter changed the MM to incorporate application of torque stripes after torque check of the disc pack coupling fasteners.

On May 25, 2015, Transport Canada issued Revision 1 to Civil Aviation Safety Alert (CASA) 2013-04, which identified certain defective MS21042-4 nuts, which are the type of nuts used to secure components of the tail rotor drive shaft system. The alert indicated that failures of nuts due to hydrogen embrittlement had occurred, and the defective nuts were from 3 lots produced by a single manufacturer in 2009 and 2010. According to the operator, they could not determine whether they had ever had in their inventory any nuts from the suspected lots of nuts specified in Revision 1 of CASA 2013-04.

On March 29, 2017, Transport Canada issued CASA 2017-02, titled "Loss of Hardware - Tail Rotor Drive Shaft Couplings," which called attention to six previous NTSB investigations of Bell 206 helicopters involving in-flight loss of tail rotor authority. The recommended action section of the alert specified using a calibrated torque wrench when installing hardware pertaining to the tail rotor drive shaft system, avoiding re-use of the hardware, verifying that tare or run-on torque of nuts meets the minimum specification, requiring torque checks per the maintenance manual, and finally, applying torque stripe material to the hardware after torque check.

Review of the six NTSB investigations cited in CASA 2017-02 revealed that all identified separation of a fastener securing one of the tail rotor driveshafts to a disc pack coupling. Of the six fastener separations, only one separated nut was found. The report prepared by Bell Helicopter concerning the separated nut indicated that the prevailing or tare torque was greater than the minimum specified in the SPM. The NTSB metallurgy reports for two of the investigations indicated that the remaining fasteners of the provided parts were not checked with an instrument of sufficient accuracy; therefore, it could not be determined whether they met the minimum prevailing or tare torque value specified in the SPM.

The accident helicopter was manufactured in 1992, but certificated in accordance with Civil Air Regulations (CAR) 6, dated December 20, 1956, Amendments 6-1 thru 6-4, CAR 6.307(b) and 6.637 of Amendment 6-5, special conditions dated October 2, 1962, as revised February 8, 1966. Review of CAR 6.303, titled "Standard Fastenings," revealed that it stated, "Self-locking nuts shall not be used on bolts which are subject to rotation in operation." According to Bell Helicopter and Transport Canada personnel, the bolts used to secure the tail rotor driveshaft disc pack couplings are in rotation, but do not serve as the axis of rotation itself. Therefore, CAR 6.303 was not applicable.

Accident Rpt# CEN16LA168	**04/25/2016 1845 CDT**	**Regis# N435AE**	**Houston, TX**	**Apt: Memorial City Hospital 8TS4**
Acft Mk/Mdl BELL HELICOPTER TEXTRON CANADA		**Acft SN 52446**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROLLS-ROYC 250-C30P		**Acft TT 963**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 135**
Opr Name: AIR EVAC EMS INC		**Opr dba: METHODIST AIR CARE**		**Aircraft Fire: NONE**
				AW Cert: STN

Summary

The commercial pilot was departing for a positioning flight from a helipad bordered on three sides by buildings and parking structures. The pilot reported that, after lifting off, as he translated the helicopter from behind one of the buildings and into the prevailing wind, the nose began yawing right. He applied full left pedal, but the helicopter may have fully rotated once while moving back toward the helipad before the rotation stopped. The low rotor speed warning sounded, and the helicopter then began rotating rapidly right. The pilot lowered the collective and maneuvered toward the helipad. He subsequently raised the collective while at 25 ft above ground level, but the helicopter landed hard. A postaccident examination of the helicopter revealed no preimpact mechanical failures or malfunctions that would have precluded normal operation.♂♂A loss of tail rotor effectiveness can be encountered while hovering under certain wind conditions, which may be encountered unexpectedly near buildings due to rapidly changing wind conditions. However, the pilot's report that the low rotor speed warning sounded and engine data provided by the operator indicated that the main rotor speed decayed during the takeoff with a corresponding decrease in the tail rotor speed. A significant reduction in the tail rotor speed could result in an uncommanded yaw and a loss of directional control. The investigation was unable to determine if the pilot's loss of directional control was due solely to the decrease in rotor speed during takeoff, the varying wind conditions, or a combination of both.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain directional control during takeoff in varying wind conditions, which resulted in a hard landing.

Events

1. Takeoff - Loss of control in flight
2. Emergency descent - Off-field or emergency landing
3. Landing - Hard landing

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-Directional control-Not attained/maintained - C

Narrative

On April 25, 2016, about 1845 central daylight time, a Bell Helicopter 206L4, N435AE, was substantially damaged during an emergency landing following a loss of directional control shortly after takeoff from the Memorial City General Hospital Heliport (8TS4), Houston, Texas. The pilot and two medical crewmembers onboard were not injured. The aircraft was registered to Helifleet 2015, LLC, and operated by Air Evac EMS, Inc. doing business as Methodist Air Care under the provisions of 14 Code of Federal Regulations Part 135 as a positioning flight. Day visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The flight was originating at the time of the accident. The intended destination was the Victoria Regional Airport (VCT), Victoria, Texas.

The pilot stated that the helicopter was initially oriented on a west heading. After lifting off, he turned to a south heading so that the helicopter would be oriented into the prevailing wind as he departed the area. About 75 feet above ground level, as the pilot translated toward the east from behind the south building and into the prevailing wind, the nose of the helicopter began yawing to the right. He applied full left pedal; the helicopter may have made one full rotation at that time while moving back toward the helipad. The rotation stopped with the helicopter on a west heading; however, the low rotor speed warning subsequently sounded and the helicopter began rotating rapidly to the right. The pilot lowered the collective and attempted to maneuver back to the helipad. About 25 feet agl, he applied collective but the helicopter landed hard.

The paved helipad (30 feet by 30 feet, concrete) was surrounded by a grass area and a paved access driveway. The area outside of the perimeter driveway was bordered by buildings and parking structures to the north, west and south. A small parking area, power lines and an eight-lane roadway were located immediately east of the helipad. The helicopter came to rest upright on the grass area surrounding the helipad. It was oriented on a south heading about 15 feet southeast of the helipad. The landing skids had collapsed. The aft end of the tail boom was partially separated approximately halfway between the stabilizers and the tail rotor.

A postaccident examination conducted by a Federal Aviation Administration (FAA) inspector did not reveal any anomalies consistent with a preimpact failure or

malfunction. After release of the helicopter by the NTSB, the operator performed an engine test run. No anomalies were reported.

Engine torque and main rotor speed data was recovered by the operator from a Turbine Tracker unit on-board the helicopter; no other parameters were available. Thirty seconds of data were provided. During the initial 20 seconds, the engine torque peaked from about 20% to nearly 40% consistent with a pretakeoff hydraulic systems check. Over the final approximately 10 seconds of data, the torque increased as the main rotor speed decreased. The torque increased to a maximum of about 121% as the rotor speed decreased to minimum of about 92% before both recovered toward 100%.

The engine control system incorporated a fuel control and governor to provide fuel metering. With the throttle in the full open position, the fuel control unit would meter the fuel flow to maintain the desired engine speed set by the pilot. In addition, the fuel control unit restricted the maximum fuel flow to limit the maximum engine speed. The helicopter was also equipped with a low rotor speed warning system that provided a "low rotor RPM" caution light and an audible tone when the rotor speed decreased to 90% +/- 3%.

The engine run-up checklist noted that the GOV RPM switch is to be set at 100% in preparation for takeoff. The before takeoff checklist noted that the throttle is to be full open, and the rotor (Nr) and engine (N2) speeds are to be verified at 100%. The flight manual stated that the engine torque may not exceed 100% for takeoff (5 minutes), with a transient of 105% permitted for no more than 5 seconds. The maximum continuous torque limitation is 75%. The rotor speed limitation (power on) was 99% to 101%, with the minimum transient (5 seconds) of 95% and the maximum transient (5 minutes) 104%.

Loss of tail rotor effectiveness (LTE) is caused by the tail rotor not providing adequate thrust to maintain directional control and is usually caused by either certain wind azimuths while hovering or by an insufficient tail rotor thrust for a given power setting at higher altitudes. The result is an uncommanded yaw; to the right in helicopters with counterclockwise rotating rotor systems. Pilots are cautioned to be alert to changing wind conditions, which may be experienced when flying along ridge lines and around buildings. LTE is not related to an equipment or maintenance malfunction and may occur in all single-rotor helicopters at airspeeds less than 30 knots.

Incident Rpt# ENG17IA036	**09/06/2017 19 PDT**	**Regis# N686DA**	**Las Vegas, NV**	
Acft Mk/Mdl BOEING 757 232-232		**Acft SN 27589**	**Acft Dmg: NONE**	**Rpt Status: Prelim** **Prob Caus: Pending**
Eng Mk/Mdl P & W PW2037			**Fatal 0** **Ser Inj 0**	**Flt Conducted Under: FAR 121**
Opr Name: DELTA AIR LINES		**Opr dba:**		**Aircraft Fire: IFLT**
				AW Cert: STC

Events

1. Takeoff - Fire/smoke (non-impact)

Narrative

On September 6, 2017, at about 0019 Pacific daylight time, a Delta Air Lines Boeing 757-200, registration N686DA, equipped with two Pratt & Whitney PW2037 turbofan engines, sustained a No. 1 (left) engine undercowl fire during takeoff from McCarran International Airport (LAS)- Las Vegas, Nevada. The flight crew reported a left engine fire indication and associated aural fire alert at rotation/initial climb. The crew completed the quick reference handbook (QRH) procedures, shut down the left engine, and discharged one of the fire bottles. The flight crew then initiated LAS engine out procedures to return to the airport. On the downwind leg of the pattern, a second left engine fire warning indication was reported and the second fire bottle was discharged. The crew made an uneventful overweight landing at LAS and were met by aircraft rescue and firefighting (ARFF) on the runway. ARFF sprayed fire retardant into the engine and the airplane was cleared to taxi to the gate under its own power. No injuries were reported to passengers or crew. The flight was being operated in accordance with 14 Code of Federal Regulations Part 121 and was a regularly scheduled flight from LAS to John F. Kennedy International Airport (JFK)- Queens, New York.

Accident Rpt# GAA17CA564	**09/28/2017 1200 PDT**	**Regis# N43JM**	**Skagit, WA**	**Apt: Skagit Rgnl BVS**
Acft Mk/Mdl BOEING PT 13-D		**Acft SN 75-5825**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
			Fatal 0 **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: DAVID EDWIN EARL TRUST		**Opr dba:**		**Aircraft Fire: NONE**

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Prepared From Official Records of the NTSB By:
Air Data Research
9865 Tower View, Helotes, Texas 78023
210-695-2204 - info@airsafety.com - www.airsafety.com

Accident Rpt# WPR17LA207	**09/16/2017 1430 MST**	**Regis# N786WW**	**Sedona, AZ**	**Apt: Sedona SEZ**
Acft Mk/Mdl CESSNA 208B		**Acft SN 208B1099**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
Eng Mk/Mdl P&W PT6A SER			**Fatal 0** **Ser Inj 0**	**Flt Conducted Under: FAR 135**
Opr Name: WESTWIND AVIATION INC		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: STN

Events

2. Taxi - Ground handling event

Narrative

On September 16, 2017, about 1430 mountain standard time, a Cessna 208B, N786WW, collided with a light pole while taxiing after landing at the Sedona Airport (SEZ), Sedona, Arizona. The pilot and eight passengers were not injured and the airplane sustained substantial damage to the left wing. The airplane was registered to and operated by West Wind Aviation, Inc., as a 14 Code of Federal Regulations Part 135 on-demand air taxi flight. Visual meteorological conditions prevailed and a company visual flight rules flight plan was filed for the cross-country flight. The flight departed Grand Canyon West Airport, Peach Springs, Arizona at 1322.

According to the pilot, after an uneventful landing on runway 3, he taxied the airplane from taxiway A2 to taxiway A and waited for further instructions from ground control at SEZ. A Fly-in & Car Show event was taking place at the time, and several areas on the ramp were occupied by the show. The pilot was then instructed by ground control to follow a truck on A6 taxiway to transient parking. The transient parking was moved to the east side of the ramp and was only accessible by taxiway A6 during the event. The pilot stated that as he followed the truck, he noticed several airplanes that were parked to the right side and their wings overhung into the taxiway near to the centerline. As he approached the airplanes he steered left of centerline to maintain clearance to his right. He had one ground personnel to the right side clearing the airplane's right wing and no one on the left side to clear the left wing. The pilot advanced the throttle after he was clear of the airplanes to his right and subsequently impacted a light pole with the left wing. The light pole was positioned about 65ft from the centerline of taxiway A6.

The Federal Aviation Administration (FAA) records indicated that the pilot held a commercial and private pilot certificate with an airplane single-engine and multiengine land rating. The pilot reported that he had about 915 hours total flight experience, including about 102 hours in the accident airplane make and model.

Accident Rpt# WPR15LA257 09/03/2015 1752 UTC	**Regis# N9068F**	**Manra Island, PO KR**	**Apt: N/a**	
Acft Mk/Mdl HUGHES 369HS-HS	**Acft SN 210293S**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl ALLISON 250-C18C	**Acft TT 6871**	**Fatal 1 Ser Inj 1**	**Flt Conducted Under: FAR 091**	
Opr Name: WHIRLWIDE HELICOPTERS INC	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: SPR	

Events

1. Maneuvering - Low altitude operation/event

Narrative

HISTORY OF FLIGHT

On September 3, 2015, at 1752 Coordinated Universal Time (UTC), a Hughes 369HS helicopter, N9068F, was destroyed following a forced landing into the Pacific Ocean about 300 nautical miles east of Manra Island, Republic of Kiribati. The El Salvador certificated helicopter pilot was fatally injured, the passenger sustained serious injuries. The helicopter was operated by Whirlwide Helicopters Inc., of Port Vila, Vanuatu. The local aerial observation flight was conducted under the provisions of 14 Code of Federal Regulations (CFR) Part 91, when the accident occurred. Visual meteorological conditions prevailed, and no flight plan had been filed for the flight, which originated from a tuna fishing vessel 35 minutes prior to the accident.

In a written report to the NTSB, a representative from the operator stated that the pilot and passenger/spotter were conducting fish spotting duties when the accident occurred. He reported that the helicopter descended and impacted the water and rolled upside-down. The spotter was able to exit the helicopter when he observed that the pilot's life vest had deployed while inside the helicopter and the pilot was struggling to exit. He saw the pilot stop moving, but due to his injuries was unable to assist him.

A nearby fishing vessel was able to recover the pilot and the passenger but the helicopter sank and was not recovered.

Shortly after being rescued, the passenger, a Vietnamese national, reported to the fish master that "the helicopter went wrong in the air and started rolling over and fell into the water." After the passenger was transported to a hospital in Majuro, Marshall Islands, he was not available for further questioning.

The operator reported that the flight crews are issued life vests, but that some pilots preferred to use their own vests. The accident pilot had acquired his own vest which was equipped with an auto-inflation activation system which would activate anytime the vest was submerged underwater.

PERSONNEL INFORMATION

The pilot held a commercial helicopter pilot certificate issued by the Republic of El Salvador on May 20, 2004, and a first-class airman medical certificate issued on November 6, 2014, with the limitations that the pilot must wear corrective lenses. The pilot's logbook was not recovered for examination. The operator reported the pilot had 5,350 total flight hours with 355 hours in make and model. No personal flight records were located for the pilot.

The pilot did not hold a pilot certificate issued by the United States Federal Aviation Administration, which is required to operate a US registered aircraft while in international airspace.

MEDICAL AND PATHOLOGICAL INFORMATION

The pilot's body was transported to Majuro for further processing. The investigation was unable to obtain any results of any testing or examination of the pilot. The mechanism of his injuries, detailed postmortem information was not available.

Accident Rpt# ERA17LA305 09/01/2017 1058 EDT	**Regis# N5189K**	**Lawrenceville, GA**	**Apt: Gwinnett LZU**	
Acft Mk/Mdl MD HELICOPTER 369-FF	**Acft SN 0603FF**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim**	**Prob Caus: Pending**
Eng Mk/Mdl ALLISON 250-C20		**Fatal 0 Ser Inj 2**	**Flt Conducted Under: FAR PUBU**	
Opr Name: GWINNETT COUNTY POLICE DEPARTMENT	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: STN	

Events

1. Landing - Loss of tail rotor effectiveness

Narrative

On September 1, 2017, at 1058 eastern daylight time, a MD Helicopters 369FF, N5189K, was substantially damaged while on approach tofollowing an inflight loss of helicopter control at Gwinnett County Airport (LZU), Lawrenceville, Georgia. The commercial pilot and a pilot-rated crewmember were seriously injured. The helicopter was operated by the Gwinnett County Police Department as a local public flight. Day, visual meteorological conditions prevailed at the time, and no flight plan was filed. The flight originated at LZU about 1000.

The pilot reported the following that. T the preflight inspection of the helicopter and en route portions of the flight were uneventful. After about 1one hour on station performing law enforcement duties, the pilot returned to LZU due to approaching weather conditions. While approaching the landing zone, the pilot noted a "strong wind gust" followed by a "sudden, uncommanded, violent, right yaw" and "what seemed to be an uncommanded climb." He applied cyclic and pedal inputs; however, the helicopter continued in a right spin for at least two full rotations until it impacted the ground. The pilots were met by first responders and transported to a local hospital for treatment of their injuries.

An inspector with the Federal Aviation Administration responded to the accident site and examined the wreckage. He reported that the helicopter came to rest on its right side in the grass, adjacent to a taxiway. There was no fire. Structural damage to the fuselage, tail rotor, and main rotor were confirmed.

The wreckage was retained for further examination.

Accident Rpt# WPR15TA071 12/31/2014 1330 PST	**Regis# N530KK**	**Las Vegas, NV**	**Apt: North Las Vegas KVGT**
Acft Mk/Mdl MD HELICOPTER INC 369FF	**Acft SN 0174FF**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROLLS ROYCE 250-C30	**Acft TT 7314**	**Fatal 0 Ser Inj 2**	**Flt Conducted Under: FAR PUBU**
Opr Name: LAS VEGAS METROPOLITAN POLICE DEPARTMENT	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: STN

Summary

The commercial pilot was conducting a local public flight. He reported that, about 7 minutes into the flight, while the helicopter was orbiting over a fixed area, he noticed the engine and rotor rpm decrease. The pilot rolled the helicopter out of the orbit, and the engine and rotor rpm stabilized momentarily at 97%. The pilot then attempted to increase the engine and rotor rpm while turning the helicopter toward a nearby airport. During the maneuver, the engine and rotor rpm decreased rapidly. The pilot entered an autorotation and executed an emergency landing. The helicopter then landed hard, and the tail impacted the ground and separated from the airframe.

A postaccident examination of the airframe and the engine revealed no anomalies that would have precluded normal operation. During an engine test run, the engineÿproduced rated power. Examination of the fuel system revealed no anomalies, and a fuel sample taken from the helicopter tested positive as jet fuel (Jet A). The reason for the loss of engine power could not be determined.

Cause Narrative

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

Events

1. Enroute-cruise - Loss of engine power (total)
2. Autorotation - Off-field or emergency landing

Findings - Cause/Factor

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

Narrative

On December 31, 2014, about 1330, Pacific standard time, an MD Helicopter Inc. 369FF, N530KK, was substantially damaged during an emergency autorotation landing following a sudden loss of engine power in Las Vegas, Nevada. The two commercial pilots on board sustained serious injuries. The helicopter was registered to, and operated by, the Las Vegas Metropolitan Police Department as a public aircraft flight. Visual meteorological conditions prevailed, and no flight plan was filed. The local flight originated from North Las Vegas Airport (VGT), Las Vegas, at 1322.

The pilot reported that he had taken off with 64 gallons of fuel and was orbiting over a fixed location when he noticed a drop in engine and rotor revolutions per minute (rpm). The pilot then rolled the helicopter out of the orbit, and the engine and rotor rpm stabilized momentarily at 97%. The pilot attempted to increase the engine and rotor rpm while turning west towards the North Las Vegas Airport. During the maneuver, the engine and rotor rpm rapidly degraded. The pilot entered an autorotation, and executed an emergency landing. The helicopter touched down hard, the tail impacted the ground, and separated from the airframe.

The helicopter was examined on-scene by a Federal Aviation Administration (FAA) inspector. The inspector stated that he was only able to look at one side of the engine because of how the helicopter was positioned on the ground, and that he did not identify anything unusual. He checked the flight controls and reported that everything was connected. The helicopter was recovered to the Las Vegas Metro Police Department's hangar at the North Las Vegas Airport. Two FAA inspectors examined the helicopter on January 7, 2015, and reported that the engine outer combustion chamber, external fuel line connected to the fuel nozzle, and the fuel nozzle connection had sustained impact damage. Additionally, the engine fuel nozzle b-nut was "finger tight."

On January 14, 2015, representatives from MD Helicopters and Rolls-Royce examined the helicopter with oversight provided by a FAA inspector. The helicopter sustained substantial damage to the lower fuselage structure, aft fuselage section, tailboom and landing gear. There was no damage to the main structural members of the fuselage and the transmission/static mast support structure. The aft cabin was intact with no visible damage. The underside of the fuselage displayed damage to the belly skin and supporting interior structure with major damage to the aft landing gear fitting and center beam.

The top aft surface of the composite engine air fairing showed evidence of main rotor blade contact along with the tailboom. The tailboom was severed into two segments. The forward segment was still attached to the upper aft boom fairing. The vertical and horizontal stabilizer were both firmly attached to the aft segment. The vertical stabilizer's stinger was broken off and the vertical and horizontal stabilizers both displayed impact damage from ground contact. The aft portion of the left and right landing gear struts were broken and splayed outward resulting in the helicopter coming to rest on the lower fuselage structure.

Cyclic and collective control continuity was verified. Damage to the tail rotor controls corresponded with tailboom damage. The tail rotor blades exhibited impact damage with bent spars or tear to the blade skin. The main rotor blade damage varied in severity and included blades being bent, chordwise wrinkling, leading/trailing edge and tip cap damage. One blade was fractured at the inboard end just outboard of the root fitting. Drive system continuity was verified. The main rotor system hub assembly and components displayed typical damage from main rotor blades contacting the tailboom during the hard landing. There was visible damage to the hub upper and lower shoe, feather bearings, pitch change housings, and droop stops. Damage was consistent with the excessive blade flapping and lead-lag excursions of the main rotor from sudden stoppage at low rotor rpm without engine power.

The fuel cells were near full and there was no reported fuel spillage at the accident site. A vacuum check from the fuel inlet line at the fuel pump to the fuel shut off valve was satisfactorily completed. The fuel cells were drained using the maintenance fuel pump located in the fuel cell and the left fuel cell cover removed. The fuel cells appeared undamaged and the fuel removed looked visually clean. The maintenance fuel pump was removed and the fuel inlet ports and fuel tank sump was inspected. No contamination or blockage was found. Inspection of the fuel line plumbing and fittings did not identify any damage or discrepancies.

Visual inspection found the engine and related systems sustained only minimal external damage. There was visible impact damage to the engine's outer combustor case, fuel nozzle and fuel line. The fuel nozzle was cleaned just prior to the accident flight and the fuel line was reported loose at the accident site, however the fuel line also exhibited impact damage. The engine manufacturer reported that past experience has shown that b-nuts that are not fully torqued on the fuel nozzle may not affect normal engine operation, and that properly torqued b-nuts don't come loose under normal operating conditions.

There was no obvious evidence of fuel leakage in the engine area. Inspection of the engine mounts found the aft engine mount legs bent at the turn buckles. The left and right engine side mounts appeared undamaged. There were contact marks on the firewall from the engine driveshaft indicating movement of the engine during the crash sequence. With electrical power applied the engine trim switch (N2) was functional when tested. Some pneumatic and fuel line b-nuts had torque paint that was broken or misaligned. A check of air, fuel and oil lines found them to be at least hand tight. A check of the throttle and governor controls was completed with no discrepancies noted. The engine was removed from the airframe for further examination and testing.

Examination and functional testing of the engine was conducted on January 20, 2015 at Aeromaritime America Inc., located on Falcon Field in Mesa, Arizona. Representatives from the airframe and engine manufacturers were present and oversight was provided by a FAA inspector. The damaged outer combustion case, combustion liner and fuel nozzle were replaced with serviceable items. Except for the fuel line to the fuel nozzle and the fuel supply line at the fuel control, no other fuel or pneumatic lines were altered prior to the test cell run. The engine was run on the test cell and no operational discrepancies were noted, with the engine producing rated power. After the test cell run, a pneumatic leak check was performed on the pneumatic portion of the fuel control system. The scroll to Pc filter line was disconnected and 30 psi air pressure was applied to the Pc filter. A soap solution was used to check all fittings and lines in the system for leaks. The Pg accumulator line connection showed a formation of small air bubbles indicating a leak. The line was tightened with wrenches and the leak stopped. All the other lines were checked with a torque wrench and found to have 65 inch-pound or greater torque.

Two external fuel lines were examined by the NTSB investigator-in-charge, one line that had orange fire sleeve attached from end to end that connected the engine to the firewall, and the other, a black hose connecting the firewall to the fuel shut off valve. The fuel lines were examined visually using a borescope, and by sectioning the lines into segments. Additionally, the fuel filter was examined and found to be clear of debris. The examination of these items revealed that they were in very good functional condition with no anomalies identified.

A fuel sample was taken from the fuel line that runs between the firewall and the shutoff valve. The sample was a clear fluid with a petroleum odor and had a small amount of white particulate sediment. The sample was analyzed by a third party. The sample was examined using ASTM D2887 (Standard Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography) to determine the type of fuel in the sample. The distillation results for this sample were consistent with jet fuel (Jet-A). In addition, the visible particulates were tested using ASTM D5185 (Standard Test Method for Multi-element Determination of Used and Unused Lubricating Oils and Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)). The results were sodium (Na) 82.8 mg/kg, zinc (Zn) 4.9 mg/kg, iron (Fe) 5.4 mg/kg, and magnesium (Mg) 6.7 mg/kg. The elements found are commonly occurring elements found in many things, including soil.

The most recent weight and balance was dated April 3, 2014, showed the helicopter empty weight as 1975.22 pounds. At the time of the accident the gross weight was calculated to be 2,810 lbs. It was determined that the helicopter had been operating within the published weight and balance limits. Maintenance records and a witness statement show that a 100-hour airframe and engine inspection had been completed on December 31st but had not been signed off as completed by maintenance personnel before the pilots took the helicopter.