



Aviation Investigation Final Report

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|--------------------------------|---|-------------------------|--------------------|
| Location: | Kingfisher, Oklahoma | Accident Number: | CEN10FA424 |
| Date & Time: | July 22, 2010, 19:25 Local | Registration: | N918EM |
| Aircraft: | Eurocopter AS 350 B2 | Aircraft Damage: | Substantial |
| Defining Event: | Abrupt maneuver | Injuries: | 2 Fatal, 1 Serious |
| Flight Conducted Under: | Part 91: General aviation - Positioning | | |

Analysis

The surviving paramedic reported that while en route to the destination hospital to pick up a patient, a conversation began about flying on a coyote hunt. The pilot abruptly began a low-level maneuver in an attempt to demonstrate a coyote hunt flight. As the pilot maneuvered at low level, the helicopter and main rotor blades impacted trees and then terrain. An examination of the airframe and engine did not reveal any preimpact malfunctions or failures that would have precluded normal operation. Toxicological testing performed on specimens from the pilot detected the presence of numerous medications, including hydrocodone (a prescription narcotic for pain treatment), diazepam (a prescription medication with sedative effects) and chlorpheniramine (an over-the-counter sedating antihistamine). It is likely that these medications would have impaired the pilot's judgment and ability to maintain control of the helicopter. A review of the pilot's medical history found medical treatment for several conditions that were not reported to the Federal Aviation Administration, the certificate holder, or the operator.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's impaired judgment, due to medications, which led to an abrupt low-level maneuver and subsequent impact with trees and terrain.

Findings

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|-------------------------|----------------------------------|
| Personnel issues | Prescription medication - Pilot |
| Personnel issues | OTC medication - Pilot |
| Personnel issues | Decision making/judgment - Pilot |
| Personnel issues | (general) - Pilot |

Factual Information

History of Flight

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|-----------------------------------|------------------------------------|
| Maneuvering-low-alt flying | Abrupt maneuver (Defining event) |
| Maneuvering-low-alt flying | Collision with terr/obj (non-CFIT) |
| Uncontrolled descent | Collision with terr/obj (non-CFIT) |

This report was modified on May 9, 2013. Please see the docket for this accident to view the original report.

HISTORY OF FLIGHT

On July 22, 2010, approximately 1925 central daylight time, a Eurocopter AS 350 B2, helicopter, N918EM, impacted terrain near Kingfisher, Oklahoma. The commercial pilot and one flight nurse were fatally injured and one paramedic flight nurse was seriously injured. The helicopter was substantially damaged. The helicopter was registered to and operated by EagleMed LLC under the provisions of 14 Code of Federal Regulations Part 91 as a positioning flight. Visual meteorological conditions prevailed for the flight, which operated on a visual flight rules (VFR) company flight plan. The helicopter departed the Integris Baptist Medical Center Heliport (OK19), Oklahoma City, Oklahoma, at 1913 to pick up a patient in Okeene, Oklahoma.

In an interview with the surviving paramedic flight nurse, he recalled that during the flight to Okeene, the left side door had come unlatched and was slightly ajar (about one-half inch). The paramedic informed the pilot that he was getting out of his seat to close the door and secure the handle. The pilot acknowledged the paramedic. After securing the handle, the paramedic stated that he had sat back down and begun to gather his seatbelt when a conversation began about another pilot flying on a coyote hunt. The paramedic reported that the pilot made a statement similar to "like this... (with some laughter)" and made a nose down control input. He reported that the pilot pulled up on the collective and the helicopter struck a tree. During the ground impact, the paramedic, who was not secured in his seat, was thrown through the windscreen; the paramedic crawled away from the wreckage and dialed 911 on his cell phone.

The company monitored the helicopter's position through a Sky Connect device, configured to report a position about every five minutes. The last position report, recorded at 1919, depicted the helicopter at 1,509 feet mean sea level (msl), flying northwest, at 131 knots. This last reported position was approximately 11 nautical miles southeast of the accident site.

PERSONNEL INFORMATION

The pilot, age 56, held a commercial pilot certificate for airplane single engine land, instrument airplane, rotorcraft-helicopter, and instrument helicopter. He held a second class medical

certificate issued February 8, 2010. On the pilot's last application for a medical certificate the pilot reported having accumulated 12,241 hours, with 119 hours logged with the preceding six months. Of note, the pilot reported that he was not currently using any medications.

A review of company pilot records, revealed the pilot flew 2.2 hours in July 2010, 14 hours in June, 10.1 hours in May, and 3.6 hours in April. On May 20, 2010, the pilot completed his Part 135.293 and Part 135.299 checkrides. For several months prior to the accident the pilot was scheduled to be the night shift duty pilot from 1900 to 0700. When on-call, the pilot would be assigned between three to eight days with three to eight days off between shifts. The accident flight was at the beginning of the pilot's fourth day of being the duty pilot. The pilot's previous flight was on July 21 about 0300.

AIRCRAFT INFORMATION

The single engine helicopter, N918EM, serial number 3107, was manufactured in 1998. It was powered by a 732-shaft horsepower Turbomeca Arriel 1D1 engine, serial number 9759. The helicopter was configured with an air medical system under the Supplemental Type Certificate (STC) SE09139RC. Review of the maintenance documents revealed that the last inspection was a 100-hour inspection logged on May 28, 2010. Prior to departing on the accident flight, the helicopter had accrued 3,355.6 airframe hours. In addition according to the aircraft's daily flight/discrepancy log, there was at least one previously reported discrepancy that the front left passenger door had come open in flight. According to this log, the door was inspected and adjusted, and the aircraft was returned to service on June 25, 2010

METEOROLOGICAL INFORMATION

At 1953, the automated weather reporting station at Wiley Post Airport (PWA), Oklahoma City, Oklahoma, located about 20 nautical miles southeast of the accident site reported winds from 170 degrees at 20 knots, visibility 10 miles, a clear sky, temperature 90 degrees Fahrenheit (F), dew point 68 F, a barometric pressure of 29.90 inches of mercury, and a remark for a peak wind condition from 170 degrees at 28 knots recorded at 1856.

WRECKAGE AND IMPACT INFORMATION

The wreckage of the helicopter was located in a flat, grassy field with an approximate elevation of 1,085 feet msl. A post impact fire had consumed a majority of the fuselage. Downed tree limbs with signatures consistent with rotor strikes, were found in a tree line located about 690 feet east of the wreckage. Portions of the helicopter's windscreen, main rotor blade skin, main rotor blade foam core, and the right position light lens from the helicopter's horizontal stabilizer, were also found nearby. About 520 feet east of the wreckage, a portion of the helicopter's right skid was located. The first ground scars began 115 feet east of the main wreckage and were consistent with the helicopters skids digging to the terrain. Portions of the skids were located at the beginning of the ground scars. The main wreckage consisted of the helicopter cockpit, cabin, transmission, and engine; all of which sustained impact and thermal

damage.

The main rotor blades are marked with a color code of either red, blue, and yellow for identification purposes. The red main rotor blade remained attached to the Starflex main rotor head. The blue blade separated from the rotor head with signatures consistent with overload and was located 145 feet southwest of the main wreckage. The yellow blade separated from the rotor head with signatures consistent with overload and was located 285 feet north of the main wreckage. All three blades displayed signs of damage near the mid-span of the blades. Portions of blade skin and foam core had separated from all three blades and were found near the tree strikes and wreckage site. The transmission shaft, forward of the flex coupling, exhibited torsional damage and splaying of the flex coupling discs consistent with power being applied from the engine at the time of impact. The engine to tail rotor output flex coupling exhibited splaying and flailing damage consistent with power being applied by the engine to the tail rotor system at the time of impact. Tail rotor drive continuity was confirmed from the long tail rotor drive shaft through the tail rotor gear box to the tail rotor. No pre-impact anomalies were detected with the airframe.

An examination of the helicopter's engine revealed nicks and gouges on the axial compressor blades consistent with foreign object damage (FOD). Rotational continuity was established throughout the engine. The freewheel shaft was found slightly deformed consistent with power being applied at the time of impact. In addition, the module 5 input pinion slippage marks were misaligned/tightened 1.5 mm, consistent with power being applied by the engine during a sudden stoppage on the main rotor blades. No pre-impact anomalies were detected with the engine.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Office of the Chief Medical Examiner, Oklahoma City, Oklahoma. The manner of death was ruled an accident.

Forensic toxicology was performed on specimens from the pilot by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The toxicology noted the following:

No carbon monoxide detected in the blood, with no detection below 10% saturation.

39.31 (ug/ml, ug/g) Acetaminophen detected in Urine
Chlorpheniramine detected in Blood
Chlorpheniramine detected in Urine
0.198 (ug/ml, ug/g) Diazepam detected in Blood
0.026 (ug/mL, ug/g) Dihydrocodeine detected in Blood
1.026 (ug/mL, ug/g) Dihydrocodeine detected in Urine
0.15 (ug/ml, ug/g) Hydrocodone detected in Blood
4.112 (ug/ml, ug/g) Hydrocodone detected in Urine
Hydromorphone NOT detected in Blood

0.302 (ug/mL, ug/g) Hydromorphone detected in Urine
0.322 (ug/ml, ug/g) Nordiazepam detected in Blood
0.629 (ug/ml, ug/g) Nordiazepam detected in Urine
0.011 (ug/ml, ug/g) Oxazepam detected in Blood
2.169 (ug/ml, ug/g) Oxazepam detected in Urine
Temazepam NOT detected in Blood
1.569 (ug/ml, ug/g) Temazepam detected in Urine

A review of the pilot's medical history found that the pilot was being treated for several medical conditions and had been prescribed multiple medications since at least 2007. In April 23, 2007, the pilot reported to his personal physician that he had bronchitis, hypertension, and sleep apnea, and after his visit, he was prescribed the following medications: Nexium (for gastroesophageal reflux), Caduet (for hypertension), Flexeril (sedating muscle relaxant), Lortab (hydrocodone and acetaminophen; narcotic pain medication), Lunesta (for sleep disturbance), and Requip (for restless leg syndrome). The pilot continued to report to his personal physician that he experienced increased pain and was prescribed stronger pain medications, to include prescription narcotics and benzodiazepines. In addition, steroid joint injections were applied to his right knee and shoulder to treat persistent pain. The last documented visit, February 25, 2010, the pilot was prescribed the following: Caduet (for hypertension), omeprazole (for gastroesophageal reflux); Meloxicam (a non-steroidal anti-inflammatory); Lunesta (sleep aid); Norco (10/325 hydrocodone/acetaminophen combination two tablets three times a day); baclofen (a muscle relaxant, 10 mg three times a day) and Valium (diazepam, a benzodiazepine, 10 mg three times a day). In addition to his prescribed medications, chlorpheniramine, an over-the-counter sedating antihistamine medication was also detected in the toxicology. There was no evidence that the pilot's sleep apnea had been treated prior to the accident. In addition, the pilot did not report any of his conditions and prescription medications to the FAA, to the certificate holder, or to the operator.

ADDITIONAL INFORMATION

Garmin GPSMap 496

A Global Positioning System (GPS) device recovered from the accident scene was downloaded by the NTSB Laboratories in Washington D.C. A review of the accident flight data, revealed the helicopter cruised at approximately 130 knots and about 200 to 300 feet above ground level. At 1924:23, the helicopter descended at 385 feet per minute, followed by a descent rate of 1,890 feet per minute at 1924:25. The location and altitude of the helicopter, as recorded by the GPS corresponded to the location rotor impact marks with the trees.

Pilot Information

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| Certificate: | Commercial; Flight instructor | Age: | 56, Male |
| Airplane Rating(s): | Single-engine land | Seat Occupied: | Right |
| Other Aircraft Rating(s): | Helicopter | Restraint Used: | |
| Instrument Rating(s): | Airplane; Helicopter | Second Pilot Present: | No |
| Instructor Rating(s): | Airplane single-engine; Helicopter; Instrument airplane | Toxicology Performed: | Yes |
| Medical Certification: | Class 2 With waivers/limitations | Last FAA Medical Exam: | February 8, 2010 |
| Occupational Pilot: | Yes | Last Flight Review or Equivalent: | May 20, 2010 |
| Flight Time: | (Estimated) 12240 hours (Total, all aircraft), 6000 hours (Total, this make and model), 28 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft) | | |

Aircraft and Owner/Operator Information

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|--------------------------------------|------------------------------|---------------------------------------|--------------------------|
| Aircraft Make: | Eurocopter | Registration: | N918EM |
| Model/Series: | AS 350 B2 | Aircraft Category: | Helicopter |
| Year of Manufacture: | | Amateur Built: | |
| Airworthiness Certificate: | Normal | Serial Number: | 3107 |
| Landing Gear Type: | High skid | Seats: | 4 |
| Date/Type of Last Inspection: | May 28, 2010 100 hour | Certified Max Gross Wt.: | 4961 lbs |
| Time Since Last Inspection: | 165 Hrs | Engines: | 1 Turbo shaft |
| Airframe Total Time: | 3355 Hrs at time of accident | Engine Manufacturer: | TURBOMECA |
| ELT: | Installed, not activated | Engine Model/Series: | ARRIEL 1D1 |
| Registered Owner: | EAGLEMED LLC | Rated Power: | 712 Horsepower |
| Operator: | EAGLEMED LLC | Operating Certificate(s) Held: | On-demand air taxi (135) |
| Operator Does Business As: | EagleMed | Operator Designator Code: | 7EMA |

Meteorological Information and Flight Plan

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| Conditions at Accident Site: | Visual (VMC) | Condition of Light: | Day |
| Observation Facility, Elevation: | PWA,1300 ft msl | Distance from Accident Site: | 134 Nautical Miles |
| Observation Time: | 19:53 Local | Direction from Accident Site: | 20° |
| Lowest Cloud Condition: | Clear | Visibility | 10 miles |
| Lowest Ceiling: | None | Visibility (RVR): | |
| Wind Speed/Gusts: | 20 knots / | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | 170° | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 29.89 inches Hg | Temperature/Dew Point: | 32°C / 20°C |
| Precipitation and Obscuration: | No Obscuration; No Precipitation | | |
| Departure Point: | Oklahoma City, OK (OK19) | Type of Flight Plan Filed: | Company VFR |
| Destination: | Okeene, OK | Type of Clearance: | None |
| Departure Time: | 19:13 Local | Type of Airspace: | |

Wreckage and Impact Information

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|----------------------------|--------------------|-----------------------------|---------------------------|
| Crew Injuries: | 1 Fatal | Aircraft Damage: | Substantial |
| Passenger Injuries: | 1 Fatal, 1 Serious | Aircraft Fire: | On-ground |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 2 Fatal, 1 Serious | Latitude, Longitude: | 35.782501,-97.914169(est) |

Administrative Information

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| Investigator In Charge (IIC): | Aguilera, Jason |
| Additional Participating Persons: | Robert Drake; Federal Aviation Administration; Washington, DC Dan Donnelly; Federal Aviation Administration; Oklahoma City, OK Scott Gerard; EagleMed; Wichita, KS Lindsay Cunningham; American Eurocopter; Grand Prairie, TX Archie Whitten; Turbomeca; Grand Prairie, TX Bryan Larimore; Turbomeca; Grand Prairie, TX Bernard Boudaille; Bureau d'Enquetes et d'Analyses (BEA); Bourget, France Scott Gerard; EagleMed; Wichita, KS Michael Hemann; FAA Rotorcraft Directorate; Arlington, TX |
| Original Publish Date: | July 18, 2013 |
| Last Revision Date: | |
| Investigation Class: | Class |
| Note: | The NTSB traveled to the scene of this accident. |
| Investigation Docket: | https://data.nts.gov/Docket?ProjectID=76724 |

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).