



Aviation Investigation Final Report

Location:	Compton, Illinois	Accident Number:	CEN13FA096
Date & Time:	December 10, 2012, 20:16 Local	Registration:	N911BK
Aircraft:	MBB BK 117 A-3	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	3 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled - Air Medical (Unspecified)		

Analysis

The medical transport helicopter was on a night flight conducted under visual flight rules (VFR) to pick up a patient for transport. The pilot had computer-based weather information available, but it is unknown what information he reviewed before deciding to accept the flight. Weather observation stations along the route of flight were reporting VFR conditions around the time that the pilot accepted the flight. About 17 minutes into the flight, the pilot reported to the receiving hospital's communications center that he was aborting the mission due to encountering inclement weather and was returning to base. Flight track data indicated that the helicopter initiated a right turn at this time, away from a nearby lighted windmill farm toward an area with sparse ground lighting. The flight track then showed a slight descent before the end of the data. The last recorded position was about 0.75 miles east-southeast of the main wreckage site. The helicopter impacted an agricultural field in an inverted, nose-low attitude. Examination of the wreckage revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. Weather data and reports from first responders indicated that the flight likely encountered areas of snow, freezing drizzle, and supercooled liquid water. The lack of ground lighting combined with the precipitation encountered likely reduced the visibility and outside visual references available to the pilot resulting in spatial disorientation and subsequent loss of control.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The inadvertent encounter with inclement weather, including snow, freezing rain, and reduced visibility conditions, which led to the pilot's spatial disorientation and loss of aircraft control.

Findings

Environmental issues	Freezing rain/sleet - Effect on operation
Environmental issues	Snow - Effect on operation
Environmental issues	Low visibility - Effect on operation
Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Enroute-cruise	Structural icing
Enroute-cruise	Loss of control in flight (Defining event)
Enroute-cruise	Loss of visual reference

HISTORY OF FLIGHT

On December 10, 2012, about 2016 central standard time (CST), a Messerschmitt Bolkow-Blohm model BK 117-A3 helicopter, N911BK, impacted the ground near Compton, Illinois. The pilot, flight nurse, and flight paramedic were fatally injured, and the helicopter sustained substantial damage from impact forces. The emergency medical services (EMS) equipped helicopter was registered to Rockford Memorial Hospital, and operated by Air Methods Corporation under the provisions of 14 Code of Federal Regulations Part 135 as an on-demand air-taxi flight. Night visual meteorological conditions prevailed for the flight, which operated on a company visual flight rules flight plan. The flight originated from the Rockford Memorial Hospital Heliport (LL83), Rockford, Illinois, about 1958 and was en route to the Mendota Community Hospital Heliport (14IL), Mendota, Illinois, where it was to pick up a patient for transport back to the Rockford Memorial Hospital.

The helicopter was based at the Rockford Memorial Hospital (LL83), Rockford, Illinois. The purpose of the accident leg of the flight was to position the helicopter for a subsequent air medical inter-facility patient transport flight from the Mendota Community Hospital to the Rockford Memorial Hospital. The request was received by the Rockford Memorial Hospital Dispatch Center and the pilot was notified at 1927. During the initial call requesting the flight, the pilot confirmed acceptance of the flight. At 1959, the pilot reported to the dispatch center that he was departing from the helicopter's base at the hospital. He reported that he lifted off with one hour forty-five minutes of fuel and three persons on board and was en route to Mendota, Illinois. During the initial radio call the pilot stated that the risk category was alpha. At 2010, the pilot radioed that he was 12 minutes from Mendota. At 2016, the pilot contacted the dispatch center notifying that he was aborting the flight due to the weather conditions encountered. No further communications were received from the helicopter.

Flight track data for the helicopter showed that it departed LL83 at 1958 and proceeded south on a direct course toward 14IL. When the helicopter was about 13 miles from 14IL, it initiated a right turn. The initiation of the turn coincided with the time that the pilot reported that he was returning to base. The flight track then showed a slight descent before the end of the data. The last recorded position was about 0.75 miles east southeast of the main wreckage site.

PERSONNEL INFORMATION

The pilot held an airline transport pilot certificate with a helicopter rating. A type rating for Bell 206 helicopters was listed on the certificate. The certificate also listed private pilot privileges for single-engine land airplanes. He was issued a first-class airman medical certificate, with a restriction for corrective lenses, on July 17, 2012.

According to the operator's report, the pilot had accumulated 7,619 hours total flight experience with 446 hours in the same make and model helicopter as the accident helicopter. He had flown 27 hours in the preceding 90 days and 11 hours in the preceding 30 days. His most recent flight review was conducted on January 11, 2012. The flight review was conducted in a BK 117 Helicopter.

The pilot was assigned to a VFR only flight operations base. The training records indicated that during the January 11, 2012, flight review the pilot performed a limited review of instrument flight procedures. The instrument procedures listed on the training form consisted of recovery from instrument meteorological conditions, and an instrument landing system (ILS) instrument approach. Since the pilot was assigned to a VFR only operation, a full review of instrument procedures was not required.

According to operator duty time records, the pilot had started his shift about one hour prior to the start of the accident flight. He had been on-duty a total of 61.2 hours during the preceding five days and had accumulated 2:47 (h:mm) of flight time, including 1:49 of night flight, during that period. The duty time records showed that the pilot worked shifts of about 12 hours each day. With about 12 hours of time off between work shifts.

AIRCRAFT INFORMATION

The helicopter was a turbine-powered twin-engine medium utility–transport helicopter with a single main rotor system and an anti-torque tail rotor mounted on the rear of the helicopter. It was powered by two Lycoming LTS 101-650 B-1 engines bearing serial numbers LE45139EA and LE45306EA respectively. Each engine was rated to produce 592 shaft horsepower for short durations and 550 horsepower continuously. The helicopter was equipped with two doors on each side of the helicopter and a two-piece clam-shell door at the rear of the fuselage under the tail-boom. The accident helicopter was configured for patient transport. In addition to the two pilot stations, the rear of the helicopter had provision for a patient litter, two rearward facing seats, and a two position side facing bench seat.

The helicopter had accumulated 10,836 hours total flight time as of the date of the accident. Engine number one had accumulated 9,800 hours total time in service and engine number two had accumulated 10,518 hours total time in service. The most recent inspection was performed on November 1, 2012 under an Approved Airworthiness Inspection Program (AAIP).

METEOROLOGICAL INFORMATION

The pilot had WSI and Aviation Sentry Weather as computer based weather resources available to him before the flight, but neither system logs access, so there was no record or knowledge of the weather information obtained by the pilot before the flight.

The National Weather Service (NWS) Surface Analysis Chart for 2100 depicted a warm front stretching from northern Iowa northwestward into the northern Plains. A surface high pressure center with a pressure of 1021-hectopascals (hPa) was located in Oklahoma. The station models around the accident site depicted air temperatures in the mid 20's to low 30's Fahrenheit (F), with temperature-dew point spreads of 5° F or less, a west wind between 5 and 15 knots, cloudy skies, and light snow.

The area surrounding the accident site was documented utilizing official NWS Meteorological Aerodrome Reports (METARs) and Specials (SPECis).

Rochelle Municipal Airport (RPJ) was the closest official weather station to the accident site located about 2 miles south of Rochelle, Illinois, and had an Automated Weather Observing System (AWOS)

whose reports were not supplemented by a human observer. RPJ was located 9 miles north of the accident site, at an elevation of 781 feet, and had a 1° westerly magnetic variation.

At 1955, the RPJ weather observation was, wind from 270° at 6 knots, 10 miles visibility, light snow, an overcast ceiling at 3,100 feet above ground level (agl), temperature of -1° C, dew point temperature of -2° C, and an altimeter setting of 29.93 inches of mercury. Remarks: automated station with precipitation discriminator, temperature of -1.3° C, dew point temperature of -2.4° C.

At 2015, the RPJ weather observation was, wind from 290° at 8 knots, 7 miles visibility, light snow, an overcast ceiling at 3,300 feet agl, temperature of -1° C, dew point temperature of -2° C, and an altimeter setting of 29.94 inches of mercury. Remarks: automated station with precipitation discriminator, temperature of -1.5° C, dew point temperature of -2.3° C.

At 2035, the RPJ weather observation was, wind from 280° at 6 knots, 7 miles visibility, light snow, an overcast ceiling at 3,300 feet agl, temperature of -2° C, dew point temperature of -2° C, and an altimeter setting of 29.94 inches of mercury. Remarks: automated station with precipitation discriminator, temperature of -1.7° C, dew point temperature of -2.5° C.

At 2055, the RPJ weather observation was, wind from 280° at 9 knots, 7 miles visibility, light snow, scattered clouds at 1,200 feet agl, scattered clouds at 1,800 feet agl, an overcast ceiling at 3,300 feet agl, temperature of -2° C, dew point temperature of -3° C, and an altimeter setting of 29.94 inches of mercury. Remarks: automated station with precipitation discriminator, temperature of -1.8° C, dew point temperature of -2.8° C

Airmen's Meteorological Information (AIRMET) Zulu and Sierra were valid for the accident site at the accident time. They were issued at 1445 and forecasted moderate icing between the freezing level and 12,000 feet (with the freezing level between the surface and 4,000 feet), and IFR conditions with ceilings below 1,000 feet and visibility below 3 miles in precipitation and mist:

RFD was the closest site with a NWS Terminal Aerodrome Forecast (TAF). The TAF valid at the time of the accident was issued at 1720 and was valid for a 24-hour period beginning at 1800. The TAF expected wind from 270° at 6 knots, visibility greater than 6 miles, and a broken ceiling at 2,500 feet agl around the time of the accident.

The Area Forecast issued at 1345 forecasted a broken ceiling at 3,500 feet msl with tops at 7,000 feet. Until 1500, widely scattered light snow showers were expected.

Weather radar imagery at 2017 cst near the accident site and aircraft's location indicated small droplets sizes, or a small amount of hydrometeors in the beam, hydrometeors that are spherical or near spherical in shape as they fall, and all the hydrometeors in the scan near the accident site had the same or very similar physical characteristics. One indicator, Zdr, was an indicator of the shape of the dominant hydrometeors. Negative Zdr values indicated a more vertical shape, positive values indicated a more horizontal shape, and values near zero indicated a near spherical hydrometeor shape. In between the aircraft's location at 2007 and 2017 cst there was a distinct change in the Zdr values, with two small horizontal bands of enhanced Zdr where the Zdr values were between 0.25 and 1.5 dB. The recorded Zdr enhancement indicated that these were areas where the hydrometeors were more horizontal than vertical as they fell, characteristics consistent with freezing drizzle and supercooled liquid water.

COMMUNICATIONS

The communications between the Rockford Memorial Hospital Communications Center and the pilot of N911BK were provided by the Rockford Memorial Hospital via a CD re-recording of the communications. The communications were provided in 6 sections. Each section was preceded by an audio header stating the date and time of the recording. The following is a transcription of those re-recordings.

The people recorded were as follows:

- PLT – The pilot of N911BK
- RMH – The person on-duty at the Rockford Memorial Hospital Communications Center
- MCH – The caller from the Mendota Community Hospital

December 10, 2012 at 7:27 pm

- Dial tone
- PLT - react (pilot's name)
- RMH - hey (pilot's name), (RMH CC employee's name)
- PLT - yep
- RMH - just checking to see how mendota looks
- PLT - oh man you're going to start on me right away aren't you
- RMH - hey I'm just trying to get it out of the way early
- PLT - yeah it looks okay
- RMH - does it all right i'll call you back
- PLT - all right bye
- RMH - yeah the pilot said that should be fine
- MCH - really fabulous okay so what um it's going to be um doctor (doctor's name) is accepting
- RMH - is that (patient name)
- MCH - yes um do you have a room number for her actually do you have all the information
- RMH - actually let me put you on hold real quick and get some info here

December 10, 2012 at 7:50 pm

- (Alert Tone)
- PA ANNOUNCEMENT - attention react flight crew your flight to mendota is a go flight is a go patient weighs one hundred and five kilos and you're coming back through d as david three o four d as david three o four

December 10, 2012 at 7:59 pm

- PLT - and roc comm react one an hour forty five on the fuel three p o b's about 22 minutes risk category alpha
- RMH - good copy React one

December 10, 2012 at 8:10 pm

- PLT – roc comm react one ops normal twelve minutes down to mendota
- RMH - good copy react twelve on e t a

December 10, 2012 at 8:16 pm

- PLT – roc comm react one
- RMH - react one

- PLT - yeah we're going to have to turn around and come back uh we got ran into some weather down here we're going to have to go back to rockford
- RMH - good copy aborting due to the weather
- PLT - that's affirmative

December 10, 2012 at 8:27 pm

- RMH - react one ops check

December 10, 2012 at 8:27 pm

- RMH - react one roc comm ops check

No further recordings were provided.

WRECKAGE AND IMPACT INFORMATION

The helicopter impacted a level, harvested agricultural field in a rural area. About two miles east-southeast of the accident was a large windmill farm. Each of the windmills had a flashing beacon mounted on top. Except for the windmill farm, the lighting in the general area was sparse and consisted of only the lights from the widely spaced houses in the area. Ground impact marks and wreckage distribution indicated that the helicopter impacted in a nose-low inverted attitude. The helicopter was fragmented and distributed in a fan-shaped pattern to the north. The main impact crater contained the engines, main rotor transmission, rotor head and mast, and the cockpit section of the fuselage. The main rotor head was about four feet below the surface of the surrounding terrain. The cargo section of the fuselage and the tail boom were distributed along the remainder of the wreckage path. All four main rotor blades and the tail rotor blades were located in the immediate area of the accident scene. Subsequent examination of the wreckage included a partial layout of components, and examinations of the flight control system, rotor systems, transmission and drive system, engines and instrumentation. Postaccident examination of the wreckage revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was performed by the Lee County Coroner's Office, Dixon, Illinois, on December 12, 2012. The pilot's death was attributed to injuries received in the accident.

Toxicology testing was performed by the FAA Civil Aerospace Medical Institute. Testing results were negative for all substances in the screening profile.

TESTS AND RESEARCH

The AWOS at RPJ began to report light rain at 2135 CST (after the accident time) even with an air temperature reported below freezing. This was not an isolated METAR report as for the next 2 hours RPJ reported light rain several times when the air temperature was reported below freezing and below 28° F. RPJ was an FAA-approved Level III P/T AWOS which reported wind speed and direction, temperature, dew point, pressure, cloud height, visibility, present weather, and thunderstorm information and was within specification of FAA Advisory Circular No. 150/5220-16D. When the temperature was less than 28° F and precipitation was reported an AWOS-III P/T should have reported the precipitation either as snow or unknown precipitation 99 percent of the time. The AWOS-III P/T was not equipped with a freezing rain sensor or equipment. An inspection of the RPJ AWOS was done on December 18, 2012, and all RPJ AWOS equipment was and had been performing normally. The FAA Technical

Operations Service provided the following information regarding AWOS equipment in the National Airspace System (NAS):

AWOS does not generate a report of freezing rain without a freezing rain sensor.

All present weather equipped AWOS as well as ASOS and Automated Weather Sensor System (AWSS), can report light rain with a measured temperature below freezing.

The present weather sensor is an intelligent stand-alone device that measures precipitation types and the rate of fall. The present weather sensor uses its internal built-in temperature sensor to report precipitation other than liquid precipitation (RA).

ADDITIONAL INFORMATION

The operator, Air Methods, was a commercial on-demand air taxi operator specializing in helicopter emergency medical services (HEMS). Air Methods provides air medical emergency transport services under three separate operating models: the community-based model, the hospital-based model, and the alternative delivery model. The accident base used a hospital-based model in which EMS helicopters and their crews received flight requests through the hospital's communication center. The hospital communication center was not staffed, nor was it required to be staffed, with certified aircraft dispatchers. The hospital communications center staff responsible for flight following functions were trained by Air Methods. The hospital communication specialist would receive requests for services, notify the pilot of the request for services, enter the flight plan into the computer system, coordinate patient transfer with the requesting agency and receiving hospital, and provide flight following services. Once a mission is in progress, the communication specialist communicated with the pilot through the aircraft radios when the helicopter is in flight and through the pilot's company-issued cell phone when the helicopter on the ground.

Once a flight plan was entered into the system by the hospital communications specialist, the Air Methods Operational Control Center (OCC) in Englewood, Colorado, was automatically notified via computer. The OCC's mission from this point was to perform flight monitoring and continuing risk assessment for the flight. The OCC performed this mission for all Air Methods aircraft. The OCC consisted of two workstations, one of which was staffed with an experienced EMS helicopter pilot. The OCC system included GPS tracking and weather information overlays on computerized displays and the OCC staff had the ability to retrieve information on individual or multiple flights. The OCC computer system could monitor the flight progress, weather, position reporting, and other parameters and issue warnings to the OCC staff of discrepancies. The staff member would then review the warnings and take appropriate action. In the case of the accident flight, no warnings were displayed until after the helicopter had crashed.

At the time of the accident, the risk assessment program employed by Air Methods used a risk assessment form consisting of 54 questions in three categories, pilot and medical crewmembers, aircraft, and flight request. Each question had a numerical score depending on the response. The sum of the individual scores then placed the overall risk assessment into one of four categories, low risk, medium risk, high risk, and extra high risk. The risk assessment worksheet listed that risks should be mitigated as necessary. High and extra high risk flights should have the risks mitigated or the pilot should decline the flight. The pilot reported the accident flight risk as "alpha" which is in reference to a previous risk management matrix employed by Air Methods which corresponded to the risk assessment naming

convention within the Air Methods Flight Log (FLOG) software. On that matrix, alpha referred to the lowest risk category which is referred to as "Normal Operations"

A printed copy of a risk assessment form dated December 10, 2012, at 1849 listed a low risk, but the flight request section of the form had not been completed. It was reported that the pilots would routinely complete the pilot/crewmember and aircraft sections of the form at the beginning of their shift to use as a guide in performing the remaining risk assessment tasks. Once a transport request was received and specific details about the flight were known, the pilot would refer to the printed risk assessment form and incorporate the specific flight details to arrive at a total score for the assessment. A fully completed risk assessment form was not required by Air Methods policies.

Since the accident, Air Methods has implemented a required review of night flights for VFR operations without the use of night vision goggles (NVGs). This process requires the experienced Operational Control Analysts in the OCC to review the flight request before acceptance of the flight. This "Conditional Flight Release" is granted only if specific criteria are met that will allow for the safest possible operations at night without NVGs. Since the accident, all Air Methods helicopters have been equipped and are capable of night vision goggle (NVG) flights.

Pilot Information

Certificate:	Airline transport; Private	Age:	65
Airplane Rating(s):	Single-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Helicopter	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	July 17, 2012
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	7619 hours (Total, all aircraft), 446 hours (Total, this make and model), 27 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	MBB	Registration:	N911BK
Model/Series:	BK 117 A-3	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Transport	Serial Number:	7099
Landing Gear Type:	Skid	Seats:	
Date/Type of Last Inspection:	November 1, 2012 AAIP	Certified Max Gross Wt.:	6283 lbs
Time Since Last Inspection:		Engines:	2 Turbo shaft
Airframe Total Time:	10836 Hrs at time of accident	Engine Manufacturer:	Lycoming
ELT:	Installed	Engine Model/Series:	LTS101-650B-1
Registered Owner:	ROCKFORD MEMORIAL HOSPITAL	Rated Power:	
Operator:	Air Methods Corporation	Operating Certificate(s) Held:	On-demand air taxi (135)
Operator Does Business As:		Operator Designator Code:	QMLA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night/dark
Observation Facility, Elevation:	RPJ,781 ft msl	Distance from Accident Site:	10 Nautical Miles
Observation Time:		Direction from Accident Site:	10°
Lowest Cloud Condition:		Visibility	7 miles
Lowest Ceiling:	Overcast / 3300 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	8 knots / None	Turbulence Type Forecast/Actual:	/
Wind Direction:	290°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.94 inches Hg	Temperature/Dew Point:	-1°C / -2°C
Precipitation and Obscuration:	Light - None - Snow		
Departure Point:	Rockford, IL (LL83)	Type of Flight Plan Filed:	Company VFR
Destination:	Mendota, IL (14IL)	Type of Clearance:	None
Departure Time:	19:59 Local	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	3 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 Fatal	Latitude, Longitude:	41.747501,-89.095832

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Kevin Raymond; FAA - Dupage FSDO; West Chicago, IL Seth Buttner; Airbus Helicopters; Grand Prairie, TX Michael Benton; Air Methods Corporation; Englewood, CO Dana Metz; Honeywell
Original Publish Date:	December 10, 2014
Last Revision Date:	July 3, 2024
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=85778

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](#).