NTSB cites pilot determination to return to home base in connection with two fatal EMS helicopter crashes in 2010.

Heading for Home

BY LINDA WERFELMAN

The U.S. National Transportation Safety Board (NTSB) has cited the pilot's decision to fly into instrument meteorological conditions (IMC) as the probable cause of two fatal crashes in late 2009 and early 2010 of emergency medical services (EMS) helicopters.

Each crash killed all three people aboard — the pilot and two aeromedical personnel — and each involved a Eurocopter AS350. The NTSB issued final reports on both accidents in mid-January.

The first of the two crashes occurred at 2331 local time on Sept. 25, 2009, 1.92 nm (3.6 km) southwest of Georgetown County Airport in Georgetown, South Carolina.

The multi-leg operation began about 2023 when the helicopter left Conway–Horry County Airport (HYW) in Conway to pick up a patient from Georgetown Memorial Hospital for transfer to the Medical University of South Carolina in Charleston (MUSC). After the transfer was completed, the helicopter was flown to Charleston Air Force Base/International Airport for refueling. At 2302, the pilot told MUSC flight control that he was leaving Charleston for HYW with a flight nurse and flight paramedic aboard; at 2316, he said he was flying at 110 kt and 1,000 ft above mean sea level (MSL) and that he expected to arrive at HYW in 29 minutes.

A routine flight update was due 15 minutes later, but there were no further communications

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Eurocopter AS350

The Eurocopter AS350 is a light five/six-seat utility helicopter first flown in 1974.

The first versions to be marketed were AS350 Bs, with either Avco Lycoming or Turbomeca Arriel turboshaft engines. The AS350 B2s, with uprated engines and transmissions, were certified in 1989; the B3s, with digital engine controls, were first flown in 1997.

Both models have a maximum takeoff weight of 4,960 lb (2,250 kg). Maximum cruising speed at sea level is 134 kt for the AS350 B2 and 140 kt for the B3, and maximum rate of climb at sea level is 1,752 fpm for the B2 and 2,028 fpm for the B3. Range at recommended cruising speed with maximum fuel is 362 nm (670 km) for the B2, and 352 nm (652 km) for the B3.

Source: *Jane's All the World's Aircraft*

from the helicopter, and MUSC flight control activated the emergency action plan. Sheriff's deputies located the wreckage about 0206 on Sept. 26.

The 45-year-old commercial pilot had reported two months earlier that he had 4,600 flight hours, including 3,736 hours as a naval aviator in the U.S. Marine Corps. He had ratings for single- and multi-engine airplane, rotorcraft helicopter, instrument airplane and instrument helicopter, and a second-class medical certificate.

Although he had experience in IMC, he was no longer instrument current and was not required to be, because the operator — Omniflight Helicopters, doing business as Carolina Life Care — conducted its AS350 B2 operations under visual flight rules. In his last U.S. Federal Aviation Regulations Part 135 competency/proficiency check, conducted in December 2008, he "satisfactorily demonstrated inadvertent IMC recovery," the NTSB said in its final report on the accident.

The pilot had worked the day shift, from 0800 to 2000, from Sept. 22–24 and switched to the night shift, from 2000 to 0800 on the day of the accident.

The helicopter was manufactured in 2000. It had 2,967 total hours of operation on Sept. 17, when its last 500-hour inspection was completed. Although it was not approved by the U.S. Federal Aviation Administration (FAA) for operations in IMC, it was equipped with instruments to operate in case of inadvertent entry into IMC. However, it did not have on-board weather radar, a night vision imaging system, an autopilot or a helicopter terrain awareness and warning system.

Omniflight's operations manual said that the pilot-in-command was responsible for obtaining weather information before any series of flights, and Omniflight pilots told accident investigators that they routinely obtained the information from a base computer at the beginning of each shift and advised the Omniflight Operations Center (OCC) of conditions during their flights. They also called the OCC before beginning a series of flights.

Accident investigators did not recover the weather data that the pilot obtained before the accident flight, but actual weather conditions reported by the pilot, as well as information associated with the operations center's approval of the flights, indicated that visual meteorological conditions had prevailed when the operation began and during the early portion of the flight.

When the operations coordinator spoke with an MUSC communications specialist at 2242, the coordinator said that if the pilot called OCC before takeoff from Charleston, they could review the weather for the return flight. The pilot did not call, and OCC did not contact him, the report said.

The Omniflight base manager at Savannah, Georgia, who also was operating a helicopter in South Carolina the night of the accident, said

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that, although the weather was deteriorating, the forecast called for it to remain "well above minimums" for his return to MUSC. He said he spoke with the accident pilot, who warned him about "bad thunderstorms" near Georgetown and expressed concern that he might not be able to return that night to his base at HYW.

Witnesses who saw the helicopter shortly before the accident said it was flying northbound toward the Georgetown airport about 1,000 ft above ground level (AGL) in moderate to heavy rain, "with its searchlight turning on and off," the report said.

"Although the pilot encountered an area of deteriorating weather and IMC, this did not have to occur, as the pilot did not have to enter the weather and could have returned to Charleston Air Force Base/International Airport or landed at an alternate location," the report said. "The pilot, however, chose to enter the area of weather, despite the availability of safer options.

"Based on the pilot's statement to the Savannah-based pilot regarding bad thunderstorms in the area, he was aware of the weather and still chose to fly into it. In addition, the pilot's inability to maintain a steady state cruise altitude during the flight and the declining altitude throughout the flight likely reflected his attempt to stay below the cloud level. These cues should have indicated to the pilot that it was not safe to continue flight into IMC. This decision-making error played an important causal role in the accident."

In its final report on the accident, the NTSB noted two safety recommendations it had issued after previous crashes.

One, issued in February 2006, called on the FAA to require EMS operators to use "formalized dispatch and flight-following procedures that include up-to-date weather information and assistance in flight risk-assessment decisions." The FAA responded with a pending notice of proposed rulemaking.

The second safety recommendation, issued in September 2009, asked the FAA to require that EMS helicopters be equipped with autopilots and that pilots be trained to use them when flying without a copilot. The FAA said it would study the "feasibility and safety consequences" of requiring either an autopilot or a second pilot.

'Beat the Storm'

The second crash occurred at the end of the pilot's 12-hour overnight shift at 0600 local time March 25, 2010, near Brownsville, Tennessee. He had dropped off a patient at a hospital helipad in Jackson at 0534, and called the flight-following center MedCom and the company pilot whose shift began at 0530 — both times to ask about weather conditions, including a nearby storm system.

He told the other pilot that he was waiting on the helipad for the flight nurses to return and that he "wanted to get the helicopter out" and return to Haywood County EMS Heliport in Brownsville. The other pilot said that he checked a computer-based radar weather depiction and saw a front about 65 mi (105 km) southwest and approaching the heliport at 25 mph 40 kph).

The accident pilot told the other pilot that he believed he had "about 18 minutes to beat the storm and return to home base, so he was going to leave the flight nurses behind and bring the helicopter back," the report said.

The helicopter took off from the helipad about 0551. Both flight nurses had arrived in time to board. Satellite-recorded data showed that the helicopter was flown about 1,000 ft MSL for most of the flight segment; the last recorded altitude was 752 ft MSL (about 350 ft AGL), with the helicopter flying at 105 mph (91 kt).

The accident pilot ... believed he had 'about 18 minutes to beat the storm and return to home base.'

Arrival in 30 Seconds

After their conversation, the other pilot again checked weather radar and saw that the line of thunderstorms was about 18 mi (29 km) from the helicopter's base. When he went outside, he could not see the helicopter and telephoned one of the flight nurses, who told him that they "had the weather beat" and would arrive at the heliport in about 30 seconds.

"At the time of the conversation, the oncoming [other] pilot observed that it was raining lightly but that the wind had picked up, perhaps to about 20 kt," the report said. "Then, just after hanging up, he heard an 'immediate' loud clap of thunder and saw lightning that made him jump. He looked out, saw no helicopter and tried to call the nurse without success. He then called MedCom and ran up the hill to contact the ambulance service located there."

Rescuers found the helicopter in a field about 2.5 mi (4.0 km) east of the helicopter's base.

The pilot, 58, had a commercial pilot certificate with ratings for single-engine and multiengine land airplanes, rotorcraft helicopter, instrument airplane and instrument helicopter. He had about 4,000 flight hours in March 2009, when he received his second-class medical certificate; records indicated he had about 2,615 hours of helicopter flight time.

'The pilot made a risky decision to attempt to outrun the storm in night conditions.'

He completed his most recent airman competency/proficiency check in August 2009 and his most recent instrument competency check in February 2010.

The day before the accident, the pilot had flown 0.4 hour at night. The previous day, he had flown 0.2 hour during the day, 0.2 hour at night without night vision goggles (NVGs) and 0.5 hour at night with NVGs. He had been off duty the previous day.

The helicopter was an AS350 B3, manufactured in 2008 and delivered to the operator — Memphis Medical Center Air Ambulance Service, doing business as Hospital Wing — in May 2009; it had accumulated 248 hours total time, and the most recent 200-hour and annual inspections were performed March 1, 2010. It was equipped with NVGs and NVG-compatible lighting, an autopilot and an enhanced ground proximity warning system.

The accident investigation revealed no sign of pre-impact problems with the helicopter.

Line of Storms

Weather radar showed that, about the time of the accident, a line of thunderstorms was moving through an area that included the accident site. Radar showed IMC, heavy rain, lightning and wind gusts of up to 20 kt; the area immediately in front of the system would have been prone to extreme low-level wind shear, the report said.

Witnesses reported lightning and thunder near the accident site, along with high winds and bands of heavy rain. Information from two organizations that gathered lightning-strike data showed a number of lightning strikes from 0545 and 0615 but none within 90 seconds of the accident.

At the time of the accident, Hospital Wing used a formal risk assessment program that called for an evaluation, at the beginning of a pilot's duty time, of a number of risks, including low pilot experience, inoperative aircraft equipment, poor weather and lack of night lighting. Numerical values were assigned in each area, and higher numbers indicated higher risks; a score of more than 14 meant the flight could not be conducted. The evaluation allowed for subtraction of points in acknowledgment of high levels of pilot experience, use of NVGs and other factors.

The accident pilot calculated a total risk of "3"; two points had been subtracted for pilot experience and NVG use.

The NTSB said that the encounter with deteriorating weather conditions "did not have to occur, as the pilot could have chosen to stay at the hospital helipad. … The pilot made a risky decision to attempt to outrun the storm in night conditions. … This decision-making error played an important causal role in the accident."

The report added that although the accident occurred near the end of a 12-hour overnight duty shift, accident investigators lacked complete information about the pilot's sleep and rest activities and could not determine whether fatigue contributed to his "faulty decision to attempt to outrun the storm."

This article is based on NTSB accident reports ERA-09FA537 and ERA10MA188 and accompanying documents.