National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: November 13, 2009

In reply refer to: A-09-134 through -136

Major A.J. McAndrew
Commander
Maryland State Police Aviation Command
3023 Strawberry Point Road
Baltimore, Maryland 21220-5577

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendations in this letter. The NTSB is vitally interested in these recommendations because they are designed to prevent accidents and save lives.

These recommendations address screening of pilots for obstructive sleep apnea, the expertise required to be an incident commander for aircraft mishaps, and the need for dispatcher training on cell phone "pinging." The recommendations are derived from the NTSB's investigation of the crash during approach to landing of a Maryland State Police (MSP) helicopter in District Heights, Maryland, on September 27, 2008. As a result of this investigation, the NTSB has issued nine new safety recommendations and reiterated three previous recommendations. Three of the new recommendations are addressed to MSP. Information supporting these three recommendations is discussed below. The NTSB would appreciate a response from you within 90 days describing the actions you have taken or intend to take to implement these recommendations.

The NTSB also issued safety recommendations to the Federal Aviation Administration (FAA), 40 public helicopter emergency medical services operators, six organizations whose members are involved in search and rescue operations, and Prince George's (PG) County, Maryland.

On September 27, 2008, about 2358 eastern daylight time, an Aerospatiale (Eurocopter) SA365N1, N92MD, call sign Trooper 2, registered to and operated by MSP as a public medical evacuation flight, impacted terrain about 3.2 miles north of the runway 19R threshold at Andrews Air Force Base (ADW), Camp Springs, Maryland, during an instrument landing system (ILS) approach.[1] The commercial pilot, one flight paramedic, one field provider, and one of two automobile accident patients being transported were killed. The other patient being transported survived with serious injuries from the helicopter accident and was taken to a local hospital. The helicopter was substantially damaged when it collided with trees and terrain in Walker Mill Regional Park, District Heights, Maryland. The flight originated from a landing zone at Wade Elementary School, Waldorf, Maryland, about 2337, destined for Prince George's Hospital Center, (PGH) Cheverly, Maryland. Night visual meteorological conditions prevailed for the departure; however, Trooper 2 encountered instrument meteorological conditions en route to the hospital and diverted to ADW. No flight plan was filed with the FAA, and none was required. The MSP System Communications Center (SYSCOM) was tracking the flight using global positioning system data transmitted with an experimental automatic dependent surveillance-broadcast (ADS-B) communications link.[2]

When the pilot received the request for the flight from the SYSCOM duty officer (DO), he specifically mentioned the weather conditions at College Park Airport, College Park, Maryland, and Ronald Reagan Washington National Airport (DCA), Washington, DC. The weather reports for both of these locations met the MSP criteria for acceptance of a night medevac flight. However, College Park Airport was at the 800-foot minimum ceiling[3] for acceptance of a flight and was reporting a 0° temperature/dew point spread. The pilot’s conversation with the DO indicated that the pilot was hesitant to accept the flight, as he was unsure he could make it to PGH due to deteriorating weather conditions. However, despite his misgivings, the pilot decided to accept the flight. The pilot remarked that he had just heard a medevac helicopter operated by a private company complete an interhospital transfer flight in the same area, and then said, “if they can do it we can do it.”

It appears that the pilot based his decision to launch solely on the weather observations at College Park Airport and DCA and the suitable conditions implied by the other medevac helicopter’s completed flight. Other pertinent weather information, such as the low temperature/dew point spreads at ADW and College Park Airport, an AIRMET[4] for instrument flight conditions encompassing the route of flight, and the continuing deterioration of the weather conditions as the evening progressed, was either not obtained or discounted by the pilot. If the pilot had obtained and reviewed all of the available weather information, it is likely he would have realized that there was a high probability of encountering weather conditions below MSP minimums on the flight and this would have prompted him to decline the flight.

---

[1] The National Transportation Safety Board’s full report, *Crash During Approach to Landing of Maryland State Police Aerospatiale SA365N1, N92MD, District Heights, Maryland, September 27, 2008* (NTSB/AAR-09/07), will be available online at <http://www.ntsb.gov/publictn/A_Acc1.htm>.

[2] ADS-B is a surveillance system in which an aircraft is fitted with cooperative equipment in the form of a data link transmitter. The aircraft periodically broadcasts its global positioning system-derived position and other information, such as velocity, over the data link, which is received by a ground-based transceiver for use by air traffic control and other users.

[3] The cloud ceiling is the height above the ground of the base of the lowest layer of cloud covering more than half the sky.

[4] AIRMETs are weather advisories issued concerning weather phenomena that are of operational interest to all aircraft and potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications. An AIRMET for instrument flight conditions is issued when ceilings of less than 1,000 feet and/or visibilities less than 3 miles are forecast to affect a widespread area.

When the pilot was unable to reach PGH due to deteriorating weather conditions, he appropriately made the decision to divert to ADW and request ground transport for the patients. When the pilot contacted ADW tower, he reported to the controller that he was “on the localizer for runway 19R.” At this time, the helicopter was about 6 nautical miles from the runway and tracking the localizer course at an altitude of 1,900 feet msl. Approximately 1 minute and 20 seconds after his initial call to ADW tower, the pilot reported that he was “not picking up the glideslope.” The controller responded that her ILS equipment status display was indicating no anomalies with the equipment.

Radar and ADS-B data indicated that at the time of the pilot's transmission, the helicopter was maintaining a descent consistent with following the glideslope. Additionally, a postaccident flight test conducted by the FAA revealed no anomalies with the instrument approach equipment, and NTSB testing of the helicopter’s navigation equipment found no deficiencies that would have precluded the pilot from capturing the glideslope. The NTSB was unable to determine which navigational frequencies the pilot had selected or what the pilot was seeing on his instruments. No evidence was found that suggests that the glideslope was not functioning properly.

Even if the glideslope had failed, the accident pilot could have continued the approach, following the localizer-only guidance and assuring terrain clearance by remaining at or above the localizer-only minimum descent altitude (MDA) of 680 feet mean sea level (msl). However, the pilot requested an airport surveillance radar (ASR) approach, which the controller stated that she was unable to provide because of her lack of currency on the procedure.[5] Once the controller denied the ASR approach, the pilot still had many options available to conduct a safe landing in instrument conditions. He could have declared an emergency, which would have prompted the ADW controller to provide assistance, possibly including the surveillance approach. Also, he could have executed a missed approach and attempted the ILS approach a second time to determine if the glideslope failure was a perceived failure or a legitimate one. Additionally, there were 11 other instrument approaches at ADW, any of which he could have requested.

About 27 seconds after the controller stated that she was unable to provide a surveillance approach, upon the helicopter reaching an altitude of about 1,450 feet msl on the glideslope, and at a distance of about 4.0 miles north of the runway threshold, the helicopter’s rate of descent increased rapidly from about 500 feet per minute to greater than 2,000 feet per minute. The helicopter continued the descent, passing through the MDA for the localizer approach (407 feet above ground level [agl]), the alert height set on the radar altimeter (300 feet agl), and the decision height for the ILS approach (200 feet agl), before impacting trees and terrain about 3.2 miles north of the runway threshold. Data recovered from the power analyzer and recorder computer[6] indicate that the helicopter impacted with the engines near idle power, the main rotor system at 100 percent rpm, and an indicated airspeed of about 92 knots. No evidence was found to indicate that the pilot made any attempt to arrest the helicopter’s descent before impact.

[5] The FAA requires controllers to complete three ASR approaches every quarter, including one no-gyro approach, to remain current (qualified) for that type of approach.

[6] The power analyzer and recorder computer monitors and records turbine engine parameters for engine health trending and maintenance diagnostics.

The NTSB determined that the probable cause of this accident was the pilot's attempt to regain visual conditions by performing a rapid descent and his failure to arrest the descent at the MDA during a nonprecision approach. Contributing to the accident were (1) the pilot's limited recent instrument flight experience, (2) the lack of adherence to effective risk management procedures by MSP, (3) the pilot's inadequate assessment of the weather, which led to his decision to accept the flight, (4) the failure of the Potomac Consolidated Terminal Radar Approach Control (PCT) controller to provide the current ADW weather observation to the pilot, and (5) the increased workload on the pilot due to inadequate FAA air traffic control handling by the DCA Tower and PCT controllers.

Obstructive Sleep Apnea

Police and air traffic recordings from the accident period revealed no gross deficiencies in alertness or pilot responsiveness. (In fact, the pilot was sufficiently responsive to correct an air traffic controller's deficiencies in his handling.) However, the pilot made an improper decision to deviate from the published instrument approach procedure. Fatigue, in combination with the high workload the pilot was experiencing, could explain this uncharacteristically deficient decision.

The pilot was off duty for 2 days before the accident, and evidence indicates that his activities, behavior, and sleep schedule were routine. On the day of the accident, he woke about 0800, conducted routine activities, and began the accident shift at 1900. There was no evidence available to determine if the pilot napped or drank coffee before he was notified about the accident mission at 2302, although both rest facilities and coffee were available and either would have benefited the pilot as a fatigue countermeasure.[7] The accident occurred around the pilot's normal bedtime of midnight, about 16 hours after he had woken from his nighttime sleep. Both the late hour and length of time awake are factors that could have produced fatigue.

Untreated sleep disorders such as obstructive sleep apnea could have been an additional potential cause of fatigue for the accident pilot. Obstructive sleep apnea is a medically treatable sleep disorder in which an individual's airway is repeatedly blocked during sleep, resulting in daytime decrements in alertness and cognitive functioning. The accident pilot displayed two significant risk factors for obstructive sleep apnea: obesity and loud snoring.[8] However, he had not been treated for sleep apnea. If he did suffer from a sleep disorder such as apnea, the pilot may have benefited from education, screening, and treatment.

On August 7, 2009, the NTSB issued three recommendations to the FAA about the need to provide pilots with education about and screening and treatment for obstructive sleep apnea. Specifically, the NTSB recommended that the FAA do the following:

> Modify the Application for Airman Medical Certificate to elicit specific information about any previous diagnosis of obstructive sleep apnea and about the presence of specific risk factors for that disorder. (A-09-61)

---

[7] According to his wife, the pilot was normally able to nap during the day and regularly drank coffee.

[8] Medical literature suggests that loud snoring and obesity are significant risk factors for the presence of obstructive sleep apnea. See O. Resta, et. al. (2001). Sleep-related breathing disorders, loud snoring and excessive daytime sleepiness in obese subjects. *International Journal of Obesity*, 25, 669-675.

> Implement a program to identify pilots at high risk for obstructive sleep apnea and require that those pilots provide evidence through the medical certification process of having been appropriately evaluated and, if treatment is needed, effectively treated for that disorder before being granted unrestricted medical certification. (A-09-62)
>
> Develop and disseminate guidance for pilots, employers, and physicians regarding the identification and treatment of individuals at high risk of obstructive sleep apnea, emphasizing that pilots who have obstructive sleep apnea that is effectively treated are routinely approved for continued medical certification. (A-09-63)

These recommendations are currently classified "Open—Await Response."

The NTSB recognizes that the implementation of a comprehensive FAA program to educate pilots about, and screen and treat pilots for, obstructive sleep apnea will take time. In the meantime, the NTSB recommends that the MSP implement a program to screen and—if necessary—treat its pilots for obstructive sleep apnea.

Incident Commanders

According to MSP operational policy at the time of the accident, the troopers at each barrack were to manage any incident that happened within their geographic area of responsibility. Thus, the shift supervisor on duty at the Forestville barrack became the incident commander for the helicopter search after the accident until the barrack commander arrived about 0100 and took over. Both the shift supervisor and barrack commander were unfamiliar with aviation. The shift supervisor was not familiar with the flightpath inbound to ADW and was unable to tailor the search to the area directly along the flightpath. The barrack commander called MSP Forestville at 0154:39, almost 2 hours after the accident occurred, asking for Aviation Command units to respond to the command post at Forestville because, as she said, "we've got questions that we need them to answer about how things work." If these Forestville troopers had been more knowledgeable about aviation, it is likely that MSP resources could have been used more effectively in searching for the missing helicopter. The NTSB concludes that the incident commander's lack of aviation knowledge diminished the effectiveness of search and rescue activities.

The NTSB recognizes that it is not feasible to provide aviation-specific training to every trooper in a barrack who might serve in a supervisory capacity. Therefore, the NTSB recommends that the MSP revise its policy regarding incident commanders to specify that, in any event involving a missing or overdue aircraft, an Aviation Command trooper will serve as the incident commander.

Dispatcher Training

The search for the helicopter began almost immediately after radar contact was lost. About 0021:45, the SYSCOM DO provided PG County dispatchers with Trooper 2's last ADS-B coordinates by reading a string of numbers, "three eight five two one seven, north was seven six five two two six." The DO did not indicate that the numbers were in the form of degrees, minutes, seconds.

PG County dispatchers plotted the coordinates using an online mapping program, but the dispatchers assumed the coordinates were in the form of degrees, decimal minutes because that was the format to which they were accustomed. They entered the coordinates in that format. The location returned by the software program was near Calvert Cliffs, Maryland, located about 30 miles southeast of the accident site. This location raised confusion among PG County personnel.

As the search continued, PG County personnel offered to “ping” the troopers’ cell phones and possibly provide a better location to search. MSP accepted the offer, and PG County personnel contacted the cellular service provider, who “pinged” the cell phones and provided the street address of the closest cell phone tower. The cellular provider did not initially provide a distance or bearing from the tower to the cell phone, but instead just the street address of the tower. The street address location was immediately provided to PG County officers and MSP Forestville barrack troopers, and numerous officers responded to that location. Releasing the street address of the cell phone tower to all units without a distance and bearing only served to distract and confuse units that were already searching a more accurate location.

The NTSB concludes that neither PG County nor MSP dispatchers fully understood the importance of obtaining distance and bearing information, as well as the cell tower location, before releasing a location obtained from cell phone “pinging;” this lack of understanding led dispatchers to provide a simple street address of the cell phone tower without context to all units involved in the search. This distracted and confused units already searching a more likely location. Therefore, the NTSB recommends that MSP provide additional training to its dispatchers on the use of cell phone “pinging” and include instruction about how to integrate the data obtained from cell phone pinging into an overall search and rescue plan.

Recommendations

The National Transportation Safety Board therefore recommends the following to the Maryland State Police:

> Implement a program to screen and—if necessary—treat your pilots for obstructive sleep apnea. (A-09-134)
>
> Revise your policy regarding incident commanders to specify that, in any event involving a missing or overdue aircraft, an Aviation Command trooper will serve as the incident commander. (A-09-135)
>
> Provide additional training to your dispatchers on the use of cell phone “pinging” and include instruction about how to integrate the data obtained from cell phone pinging into an overall search and rescue plan. (A-09-136)

In response to the recommendations in this letter, please refer to Safety Recommendations A-09-134 through -136. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Chairman HERSMAN, Vice Chairman HART, and Member SUMWALT concurred in these recommendations.

[Original Signed]

By: Deborah A.P. Hersman
Chairman