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Decision Making for Air Ambulance Administrators

Recent U.S. transportation report offers recommendations for safety improvements to decrease accidents associated with rotorcraft air ambulance operations.

by
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The most critical administrative aeronautical decision areas for air ambulance or emergency medical service (EMS) administrators are: accident characteristics; pilot characteristics; weather restrictions; training needs; and risk management

Those were the conclusions stated in a report sponsored by the U.S. Department of Transportation, Federal Aviation Administration (No. DOT/FAA/DS-88-8, dated February 1990) and prepared by Systems Control Technology Inc., Arlington, Virginia, U.S. This report is one of a set of five Aeronautical Decision Making (ADM) manuals developed by the FAA in an effort to reduce the number of human factors-related helicopter accidents, improve safety, reduce risk and reduce the high cost of helicopter hull and liability insurance.

The primary goal of a helicopter EMS program is to provide rapid and safe transport for critically ill or traumatized patients to an appropriate care facility. Each helicopter flight requires an initial dispatch decision with full awareness of the risk factors for the mission. The decision to cancel, delay, launch or continue flying, once airborne, must be based upon sound and complete guidelines instituted and supported by the EMS program administrator.

The report defines ADM as, "The ability to search for and establish the relevance of all available information; evaluate alternative courses of action; and the motivation to choose and execute the course of action which assures safety within the time frame permitted by the situation."

Accident Characteristics

According to the report, the two predominant types of helicopter accidents resulted from wire strikes and spatial disorientation followed by a loss of aircraft control. Adverse weather was a major contributing factor.

Two years of accident data by the U.S. National Transportation Safety Board (NTSB) in 1987 indicated that 67 percent of EMS accidents were weather related and that the major factor was restricted visibility which reduced the pilot's ability to continue flight by visual references. NTSB also reported that 88 percent of commercial EMS flights operate under FAA's visual flight rules (VFR) only.

Many of the accidents happened in weather that required some degree of instrument flight, but most EMS helicopter operations are flown under visual flight rules regardless of the pilot's experience, qualifications or mission. The report attributes these accidents to five basic limitations associated with helicopter flying:

1. Many helicopters are not certified for IFR flight.

2. Helicopter pilots with instrument ratings often have difficulty maintaining currency due to a lack of flying in IMC or have inadequate currency training programs.

3. Local weather information is often impossible to obtain.

Helicopter operations are often conducted where reliable forecasts are not available due to the distance between weather reporting stations or the time between weather reporting intervals.

4. The slow speed and high maneuverability of helicopters induces some pilots to attempt to fly in weather conditions in which they should not operate, because the basic mindset is "I can always put it down somewhere." In turn, this "can do" attitude may increase client or supervisory expectations and result in extra pressure to fly in marginal conditions.

5. Working conditions often result in fatigue which impairs judgment and decision making skills.

The report emphasizes that human and equipment limitations, which contribute to the disorientation and loss of control accidents, are particularly important from a program administrator's viewpoint because they can be addressed through specific operating guidelines concerning go/no-go decisions in high-risk situations.

Pilot Characteristics — Motivation, Personality and Fatigue

Are helicopter pilots different that other pilots? Why do helicopter pilots continue to have accidents related to poor judgment and bad decision making under stress?

Some clues may be seen in a 1980 study, performed in Canada, of personality traits with the goal of developing tools to select pilot and air traffic controller candidates. Approximately 25 helicopter student pilots, 80 fixed-wing student pilots and 60 air traffic controllers were tested.

That study showed that early in the testing it became apparent that the helicopter pilots were indeed different than the other pilots tested. Helicopter pilots tended to be low in conformity. They expressed a need to control others. The author of the study suggested that persons with this type of personalty may be easily influenced. More specifically, they can succumb to pressures of the situation or be coerced into a high risk situation. In addition, helicopter pilots scored very high in their need for "achievement." This study indicated that the "can do" attitude is an inherent personality characteristic of the successful helicopter pilot.

Yet, those helicopter pilots involved in accidents have consistently proven to be mature, professional, experienced individuals. According to NTSB (1988), pilots having reduced visibility accidents had a median experience level of 5,500 hours. An earlier NTSB investigation of rotorcraft accidents (892 from 1977-1979) showed that 74 percent of the pilots involved were commercially rated, the average age was 37, they had 100-500 hours in the type helicopter flown in the accident and about 50 hours in the last 90 days.

The report suggested that pilot motivational factors could be driven by the economics of air ambulance operations where support contracts are often re-bid every one or two years. If a hospital is dissatisfied with the current operator from either a mission reliability or economic viewpoint, or some perception that a neighboring hospital is getting more of the transport business, the pilot's job could be jeopardized. Consequently, says the report, pilots feel either actual or self-imposed pressure to maintain high reliability and availability rates, to dispatch within the "maximum" time and complete each mission successfully.

The motivational factors, combined with the slow speed and high maneuverability of the helicopter and the mindset that the helicopter can land almost anywhere, strongly contribute to a chain of poor decisions which, unless broken, may result in an accident. In essence, the pilot's attitudes predispose him to making the go decision even when the situation, his training and standard operating procedures indicate that it is not a safe decision.

Fatigue is a major factor in helicopter accidents. Of 120 North Atlantic Treaty Organization (NATO) peacetime military helicopter accidents, fatigue was a major factor in 15 percent of them. A U.S. Army study covering a seven-year period and 1,270 accidents showed that fatigue-related accidents were four times more common in helicopters than in fixed-wing aircraft.

The report suggests that the first consideration to minimize both acute and chronic fatigue is to regulate the duty day workload taking into account short-term workload associated with crew size, noise levels, limited visibility and instrument flight (if applicable). A second consideration would be to assess long-term workload, scheduling of work and rest cycles, social and emotional factors, and morale in an equitable manner.

Among the recommended solutions are: development of a comprehensive safety program that considers program needs in light of the pilot motivational and personality characteristics that impact on safety; recognition of the impact of fatigue on pilot performance; and establishing duty cycles and pilot staffing levels appropriate to the program's flight frequency.

Weather — Regulations vs. Operations

"The helicopter is a great VFR machine," states the report, "but it should not be operated in marginal VMC or IMC unless you have IFR [instrument flight rules] certified equipment, IFR rated pilots and specified currency and training requirements."

Most EMS programs operate under U.S. Federal Aviation Regulations, 14 CFR Part 135, but the certification requirements are different for fixed-wing and helicopter operations. Helicopters

are assumed to normally operate in VMC, while fixed-wing aircraft are assumed to operate in both VMC and IMC. Under Part 135.243, the fixed-wing pilot in air taxi operations must have an instrument rating. However, a pilot operating a helicopter in an air taxi operation may fly day or night without an instrument rating. In FAA's Advisory Circular 135-14, October 1988, FAA recommended supplemental instrument training for EMS helicopter pilots on the chance that they may inadvertently enter instrument conditions. Nevertheless, FAA regulations and advisories allow commercial operators to hire a helicopter pilot who has limited training in the control of a helicopter under actual or simulated instrument conditions.

The report suggests that experience indicates the mere possession of an instrument rating by the pilot does not ensure that the effects of weather hazards are reduced. Of the 15 pilots involved in EMS weather-related accidents from 1978-86, 13 had an instrument rating, and the median flight time was 5,500 hours. However, only one of the 13 pilots was instrument current, meaning that the pilot had flown a minimum of six hours of actual or simulated instrument time, including six instrument approach procedures during the previous six months.

Among the administrative solutions offered in the report are to support no-go or abort decisions which are made by the pilot based upon the pilot's best judgment; use weather minimums that are at least as high or higher than those recommended by FAA Advisory Circular 135-14; be certain that operator's pilots are current in their ability to fly with reference to instruments whether or not they are instrument rated; specify, with the operator's concurrence, procedures to be used when inadvertent IMC is encountered; and be sure that pilots receive adequate training in local weather phenomena, weather data interpretation and decision making training.

Training — Situational Awareness And Pilot Judgment

The report concluded that a helicopter pilot training program that meets only minimum FAA standards may not adequately meet the demanding needs of the EMS mission. Current helicopter pilot training and certification requirements date back to U.S. Civil Aeronautics Administration (CAA) approval of the Bell 47 for civil use in 1946. At that time, pilots from the manufacturer's flight test staff and CAA established training and certification requirements based entirely on VMC flying.

According to the report, obsolete regulations, a decline in training resources and increased training expenses have caused helicopter flight training to lag behind fixed-wing airplane training programs. While FAA is beginning to require additional training for EMS pilots, its regulations require that a student training for a private pilot airplane certificate have more instrument training (FAR part 61.1076 (a) (6)) than is presently required for a commercial helicopter pilot flying a multi-engine helicopter carrying a highly qualified medical team along with one or more accident victims at night (FAR Part 61.131).

Among the administrative solutions recommended are: carefully review pilot training standards and practice before awarding a contract to an operator and also during the performance of the contract; ask tough questions about the budget for recurrency training and integration of the training into the performance of the contract; analyze safety requirements for each member of the air ambulance team; and review the appropriate FAA Advisory Circulars, NTSB recommendations and other available training guidelines.

Risk Management — Balancing Costs and Risk

The report suggests that risk management is comprised of two basic elements: Risk Management = Understanding the Problem + Vigilant Awareness.

Taking advantage of existing applicable efforts is one way to lower the cost of a risk management program. The Helicopter Professional Pilots Safety Program (HELIPROPS), developed by the helicopter manufacturers, has been endorsed by all of the U.S. and many of the manufacturers in other countries, and generates materials to support the "vigilant awareness" portion of the risk management equation.

The report recommends establishment of a safety committee and commitment to participation in committee meetings. The committee should include management, the chief pilot or flight operations manager, safety officer, maintenance officer, hospital administration, program director, flying medical crew and the non-flying EMS staff. Specific roles and responsibilities for safety committee members is defined in "Risk Management for Air Ambulance Operators" (DOT/FAA/DS-88/7).

According to the report, having helicopter crews provided by contract operators leads to major problems which influence pilot risk-taking behavior.

First, the pilot is exposed to two conflicting management structures with differing objectives. The contractor's objective is to provide safe and efficient transportation services at profit. The hospital's objectives are to provide a humanitarian service, enhance the hospital's image, provide a marketable service, increase its share of patients, and make a profit. Having a safety committee is one way of effectively dealing with issues that arise in trying to meet potentially conflicting objectives.

Second, since the contractor's management is usually at a distant location, whereas the hospital administration is on-site, the allegiance of the pilot to the people he sees every day becomes stronger than to the pilot's own management. The problem is exacerbated if issues arise between the contractor and the hospital. The pilots may wonder whether a remotely located management will support their operational decisions.

Among the administrative solutions recommended: provide aeronautical information and decision making guidance material for hospitals and eliminate complacency in the cockpit and in management.

The very nature of helicopter EMS operations creates multiple stress factors. The patient who is in need of immediate medical attention may not have the luxury of choosing the time or place for a helicopter to come to his aid nor can he dictate weather conditions. The time may be inappropriate, the location is difficult to land a helicopter and the weather may be terrible.

The "can do" EMS helicopter pilot wants to bring that patient to the hospital for a very simple reason — a person's life may be at stake and appropriate medical care may swing the balance in favor of the patient.

However, the pilot's determination to accomplish the mission must be tempered by reason, good judgment and quality decision making. Piloting skill can be developed through experience and training, but the thinking processes that lead to mental acumen appear to be more difficult to acquire.

"We can always put it down somewhere" is a mind-set that begs the addition of just one word at the end of the sentence to give it substance — "safely."

Fatigue is an underestimated accident factor, because it cannot be exactly measured and people do react differently when tired. Flight and duty time limitations are difficult to define for EMS operations but they must be determined. The combination of job stress with fatigue can turn the "can do" pilot into a "no-can-do" trembling hulk.

The safety committee concept is not new, but it can be effective if the people who are named to the committee are "can do" people too. The committee does not need figurehead appointees unfamiliar with the nature of the problems. Thoughtful people with the power to put ideas into being will make a committee the useful tool it should be. ♦

About the Author

John A. Pope established John A. Pope & Associates, an aviation consulting firm located in Arlington, VA, U.S., after retiring in 1984 as vice president of the U.S. National Business Aircraft Association. He specializes in developing comprehensive operation manuals for corporate flight departments.

Pope is a frequent contributor to Flight Safety Foundation's publications. He is equally at home as an aviation safety speaker.

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