

Log 2836B



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

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In reply refer to: A-88-16 through -18

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The National Transportation Safety Board investigated and evaluated 59 emergency medical service (EMS) helicopter accidents that occurred between May 11, 1978, and December 3, 1986. While exploring this rapidly growing commercial EMS industry and its operations, the Safety Board concentrated on the influence of weather on EMS operations, EMS helicopter operations under instrument flight rules/visual flight rules (IFR/VFR), pilot and medical personnel training requirements, and EMS helicopter design standards and aircraft reliability. In addition, the Safety Board reviewed EMS helicopter crashworthiness and its influence on accident survival and the influence of EMS helicopter program management on safety. 1/

The Safety Board used a variety of information sources in conducting the study. All commercial EMS helicopter accidents investigated by the Safety Board were reviewed to identify common elements in accident causation and severity. The Safety Board visited and flew with nine selected EMS helicopter programs across the country to observe operations and to receive input from pilots, program administrators, and medical personnel. The Safety Board also examined the influence of current Federal regulations on EMS helicopter operations, reviewed EMS industry-recommended guidelines and standards, and conducted an extensive literature search and review.

In early 1987, the Federal Aviation Administration (FAA) conducted a 60-day review of all commercial EMS helicopter programs nationwide. Based on its findings and information from EMS helicopter industry representatives, the FAA has developed a proposed draft Advisory Circular (AC) dealing with EMS helicopters titled "Helicopter Emergency Medical Evacuation Services." (ACs are only advisory in nature--compliance is not required.) The FAA anticipates that the AC will be published in the Federal Register for public comment in early 1988. The FAA has indicated the AC will address many EMS operational concerns including guidelines for EMS helicopter operators on how to develop program VFR weather minimums.

Approximately 88 percent of all commercial EMS programs in the United States operate VFR-only. According to the American Society of Hospital-Based Emergency Aeromedical Services (ASHBEAMS) survey, the vast majority of operators use VFR minimums that are higher than the FAA minimum requirements (300 feet over congested areas and 1/2 mile visibility during the day, and 300 feet over congested areas and 1 mile at night).

1/ For more detailed information, read Safety Study--"Emergency Medical Service Helicopter Operations" (NTSB/SS-88/01).

The fact that a program has officially set higher weather minimums, however, does not guarantee that these minimums will be followed in all cases. Official program weather minimums are subject to interpretation by both pilots and program management itself, and these interpretations sometimes differ.

The difference between a pilot's perception of the operating limitations and those stated by the program administrator could arise through misunderstanding, poor communication, or other factors. Regardless of the reason, it is likely that the pilot will not be disciplined or penalized for breaking the program minimums since there are no records of weather conditions at the time of dispatch. The only way a violation of the program minimums would be discovered would be if the pilot had an accident or incident or if someone reported such a violation. A pilot may even be encouraged, unofficially, not to abide by the program minimums. A pilot's option to use discretion to break the program minimums was, in fact, contained in one operator's Title 14 Code of Federal Regulations (CFR) Part 135 operations manual.

The Safety Board determined that in some EMS helicopter programs, communication and compliance with basic safety practices, such as program weather minimums, may be deficient. This is one area that should be made clear to all involved. The effect on safety by the misunderstanding or misinterpretation of weather minimums is hard to measure; however, according to the ASHBEAMS safety survey, 30 percent of the programs surveyed allow some variation from the program minimums.

The Safety Board believes that pilot management is responsible for ensuring accurate understanding of the program's weather minimums. These weather minimums should be developed in conjunction with the hospital program management. The operator should not set VFR minimums for a program and then allow or even encourage pilots to break these minimums. The pilots are operating without close management supervision and are being asked to make difficult decisions. By not providing clear guidance and supporting the pilot on such an important issue as weather minimums, management seriously compromises the intent of setting weather minimums.

VFR EMS helicopter programs can be and are operated safely; however, marginal weather conditions and inadvertent flight into instrument meteorological conditions (IMC) remain the most serious hazards that VFR EMS helicopters will encounter. Program VFR weather minimums should be used for the local weather patterns that are likely to be experienced and should be understood and enforced. The risk of an accident due to inadvertent flight into IMC is too great for safety-conscious programs to compromise this very important standard.

EMS helicopter program management for most hospital-based programs is a hybrid combination of two management structures that provides few advantages and many potential problems. Most EMS helicopter programs lease a helicopter and its pilot crews from a Part 135 commercial operator. The hospital, when it awards this contract, receives a helicopter, the pilots to fly the helicopter, and, in theory, none of the associated problems of owning and running a commercial helicopter business. The hospital relies on the operator to take care of these issues. The hospital, in turn, provides the medical personnel and the facility for the helicopter and takes care of the administrative tasks associated with running an emergency medicine department with an EMS helicopter as part of that service.

One method used by some EMS helicopter programs to improve communication between the two management structures and staff is the formation of a committee that meets monthly. Normally, the lead pilot or a designated safety officer (usually a pilot) represents the operator during these meetings. The administrator of one program reviewed by the Safety Board which had a functioning safety committee stated that it helped to improve communication. She felt that the process could be improved further by the participation of an operator management representative, such as the chief of operations or chief pilot, on a quarterly or semiannual basis. There is no regulation requiring safety committees, but many EMS helicopter programs have recognized their benefit and are incorporating such committees in their programs.

The FAA has recognized that safety can be influenced by management perspectives and has initiated a program to provide guidance on issues that need to be considered by EMS management. The FAA has awarded a contract to an aeronautical training consulting firm to develop a training package for aeronautical decisionmaking for air ambulance helicopter operations. Training manuals will be developed for EMS helicopter risk management, hospital program administrators, and EMS helicopter pilots. The risk management manual will address administrative policies regarding flight operations, helicopter operator procedures, and pilot/crew interpersonal skills. Those elements that have been identified as common EMS risk elements will be defined and discussed. This manual will be designed for EMS operator management and hospital program administrators.

The aeronautical decisionmaking manual for hospital program administrators will address hazardous administrative policies, procedures, and attitudes as well as the risk elements present in EMS helicopter accidents. The responsibility of the hospital program administration and sharing of liability for decisions impacting safety will also be discussed. Additionally, incentives and impediments to safe flight operations will be evaluated. This manual will provide hospital administrators with information on EMS helicopter safety and how they can improve it.

The pilot decisionmaking manual will be optimized for the EMS helicopter pilot. It will focus on evaluating typical accident scenarios and on defining risks relative to mission purpose and various flight segments. The goal of this manual will be to educate EMS pilots to the factors that can negatively influence their judgment and to highlight those situations where this is most likely to happen. The manual will supplement the current aeronautical decisionmaking manual for helicopter pilots. ^{2/} The FAA expects all these documents to be available by the fall of 1988.

EMS helicopter safety is related directly to management's commitment to safety and the emphasis placed on running a safe program. If an EMS program has two separate management structures with poor communication between them, the pilots can be put in an untenable position of having to make judgments concerning EMS flights based on concerns other than flight safety (such as pressure of competition from other EMS programs). The hospital EMS program management has a significant role in ensuring the program is run safely, since the EMS operator management is only required to meet the safety regulations specified by the FAA (minimum requirements) unless the hospital specifies otherwise. The hospital's specifications for minimum levels of "safety performance" are usually contained in the contract signed with the EMS helicopter operator.

^{2/} Aeronautical Decision Making for Helicopter Pilots, February 1987, DOT/FA/PM-86/45, available from the FAA.

The Safety Board believes that for EMS programs to operate safely when two separate management structures are involved, effective and regular communication on safety issues between separate managements and the employees is mandatory. One method to achieve this goal is a monthly safety meeting in which safety-related issues are discussed and resolved.

The Safety Board also believes that hospital EMS program management should become knowledgeable about safety issues in EMS helicopter operations because they often become de facto management for the pilots when the pilot management structure is located away from the hospital. Additionally, the Safety Board believes it is necessary for both management teams to develop procedures to isolate flight operation decisions from medical decisions.

EMS helicopters seldom fly without medical personnel (sometimes called medical crewmembers) on board. The medical personnel historically have not been considered required crewmembers either by the FAA when reviewing a CFR Part 135 certificate holder's training program or by the Safety Board when an accident occurs. The FAA defines the term crewmembers in CFR Part 1 as "a person assigned to perform duty in an aircraft during flight time." Medical personnel have normally been considered passengers, since they have no direct responsibility for the operation of the helicopter or for its control during flight.

Actual experience, however, indicates that medical personnel do assume crewmember functions and assist the pilots in their duties. EMS-industry sources indicate that medical personnel often help the pilot avoid obstacles on approach and departure; scan for other air traffic while in cruise flight; conduct routine radio calls to hospital dispatch on aircraft position; shut down aircraft power and fuel in the event of pilot incapacitation after an accident; and conduct "Mayday" communications to the dispatch center if an emergency endangering the crew occurs in flight.

Since the medical personnel on EMS helicopters are not considered crewmembers by the FAA, they are not required to receive the training specified in Part 135 for nonpilot crewmembers. Part 135 specifies that the operator must provide training to nonpilot crewmembers on their basic duties, including basic aircraft indoctrination and emergency procedures. It also requires instruction in the following areas:

- o location, function, and operation of emergency equipment, (ditching equipment, first-aid equipment, portable fire extinguishers);
- o fire in flight or on the surface, and smoke control procedures;
- o ditching and evacuation;
- o illness, injury, or other abnormal situations involving passengers or crewmembers; and
- o hijacking and other unusual situations.

Part 135 also requires review of the operator's previous aircraft accidents and incidents involving actual emergency situations. Additionally, each crewmember is required to gain practical experience during training in: ditching, if applicable; emergency evacuation; fire extinguishment and smoke control; operation and use of emergency exits; and donning and inflation of life vests and the use of other flotation devices, if applicable. Crewmembers must receive recurrent training in these topics every 12 months.

The Safety Board believes that all medical personnel who routinely fly on EMS helicopter missions need to receive specific training on their functions and duties in the helicopter since they often assume many of the responsibilities of crewmembers. This training, in addition to their medical training requirements, should address those items required by Part 135.331, Crewmember Emergency Training. This training should also address, as applicable, those areas of responsibility that are nonmedical, such as medical personnel and pilot communications, aircraft fuel and systems shutdown, landing zone obstacle avoidance, air traffic avoidance, landing zone safety, and radio communications. This training program should be developed jointly by the hospital EMS program management and the EMS helicopter operator management.

Therefore, the National Transportation Safety Board recommends that the Helicopter Association International:

Encourage all members who operate commercial emergency medical service (EMS) helicopters to develop visual flight rules weather minimums for each EMS helicopter program based on local terrain and weather patterns. These weather minimums should be communicated to the pilots in writing, and deviation below the program minimums should be prohibited. (Class II, Priority Action) (A-88-16)

In coordination with the American Society of Hospital-Based Emergency Aeromedical Services, encourage members that operate commercial emergency medical service (EMS) helicopters to establish safety committees at each EMS program, composed of representatives from the hospital EMS program administration, the commercial EMS helicopter operator, the pilot and medical personnel, helicopter dispatch (if applicable), and local public safety/emergency response agencies. One objective of the safety committee should be the elimination of any negative influence caused by competition between EMS helicopter services that operate in the same area. (Class II, Priority Action) (A-88-17)

Develop guidance for members who operate commercial emergency medical service (EMS) helicopters on recommended training for medical personnel who routinely fly on EMS helicopter missions. This guidance should be developed in conjunction with the Federal Aviation Administration and the American Society of Hospital-Based Emergency Aeromedical Services. Topics that should be addressed include:

- o Flightcrew and medical personnel coordination and communication including terminology to be used;
- o Helicopter emergency fuel and systems shutdown, landing zone safety and obstacle avoidance, air traffic recognition and avoidance, and radio communications; and
- o Emergency training on the topics listed in Title 14 Code of Federal Regulations Part 135.331, Crewmember Emergency Training.

(Class II, Priority Action) (A-88-18)

Also as a result of its investigation, the Safety Board issued Safety Recommendations A-88-1 through -11 to the Federal Aviation Administration, A-88-12 through -15 to the American Society of Hospital-Based Emergency Aeromedical Services, and A-88-19 to the National Aeronautics and Space Administration.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . . to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations A-88-16 through -18 in your reply.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, NALL, and KOLSTAD, Members, concurred in these recommendations.


By: Jim Burnett
Chairman