Recommendation 15-8: Crew Resource Management (CRM) for Helicopter Air Ambulance (HAA) Operations

I. Submission

The recommendation below was submitted by the Air Carrier & Contract Training Workgroup (AC&CT WG) for consideration by the Air Carrier Training Aviation Rulemaking Committee (ACT ARC) Steering Committee on the May 29, 2015 Steering Committee Telcon (TEL-4). The ACT ARC Steering Committee adopted the recommendation with unanimous consent, and the recommendation is submitted to the Associate Administrator for Aviation Safety (AVS-1) as ACT ARC Recommendation 15-8.

II. Statement of the Problem

The Federal Aviation Administration (FAA) Helicopter Air Ambulance (HAA) II Rulemaking Team posed a series of questions to the ACT ARC to obtain industry input for a Congressionally-mandated rulemaking and development of the associated guidance material. The following questions related to crew resource management (CRM) for HAA operations were included in Part II of that tasking:

- What should be contained in guidance material for HAA CRM training?
- How is CRM for HAA different than airplane air ambulance operations?
- How is CRM for HAA different than other part 135 helicopter operations?

After the ACT ARC Steering Committee assigned the task to the AC&CT WG, the AC&CT WG formed the Helicopter Air Ambulance Training Action Team, which included industry subject matter experts to review, discuss, and propose recommendations in response to the questions posed.[1] The AC&CT WG previously proposed recommendations associated with Part I of the FAA tasking. (*See* ACT ARC Recommendations 15-3 and 15-4.) Those recommendations were adopted by the ACT ARC Steering Committee (with amendments) during the Steering Committee Meeting held in January 2015, and submitted to the Associate Administrator for Aviation Safety (AVS-1) on April 10, 2015. The FAA accepted Recommendations 15-3 and 15-4 and assigned them to the Air Transportation Division (AFS-200) for action. The recommendations were provided to the Commuter, On Demand, and Training Center Branch (AFS-250), which is the Office of Primary Responsibility (OPR) for the HAA II rulemaking and HAA policy.

[1] The HAA Training Action Team included subject matter experts representing operators and industry associations: Air Evac Lifeteam, Air Medical Operators Association (AMOA), Air Methods, California Shock Trauma Air Rescue (CALSTAR), Helicopter Association International (HAI), Metro Aviation, National EMS Pilots Association (NEMSPA), and PHI Air Medical.

III. Proposed Recommendations

The ACT ARC Steering Committee proposes the following recommendation for FAA consideration:

> The ACT ARC recommends the FAA develop guidance material that includes and emphasizes the following air medical resource management (AMRM)[2] and crew resource management (CRM) concepts for Helicopter Air Ambulance (HAA) operations, in addition to the requirements applicable to all 14 CFR Part 135 operators:
>
> a. Terminology
> b. Communication and Coordination between Flight Crew and Medical Personnel
> c. Sterile cockpit
> d. Medical Personnel Interface
> e. Critical patient induced operational pressures
> f. Hazardous Attitudes
> g. Threat and Error Management (TEM)
>
> (Reference Attachment A to this Recommendation for *Sample Helicopter Air Ambulance (HAA) Operations Crew Resource Management (CRM) Training Content (including Air Medical Resource Management (AMRM) concepts)* developed by the HAA Training Action Team.)

IV. Rationale

The HAA Training Action Team reviewed current regulatory requirements for Part 135 operators, the new requirements in 14 CFR Part 135 Subpart L, and current FAA guidance material, including Advisory Circular (AC) 135-14B, Helicopter Air Ambulance Operations (3/26/15) during the discussions that lead to the recommendation above.

The HAA Training Action Team developed the Recommendation after consideration of the differences regarding CRM for HAA operations versus airplane air ambulance operations and other Part 135 helicopter operations. The Recommendation takes into account those differences which primarily deal with the crew having different duties with helicopter operations and situations where medical personnel may be required to perform safety of flight functions (e.g., tail rotor clearing).

The HAA Training Action Team noted that Air Medical Resource Management (AMRM) concepts should be integrated into any suggested CRM content training for HAA operators. AMRM is designed to address certain CRM training requirements under 135.330 within the unique HAA operating environment.

AC 135-14B cites the purpose of an AMRM training program as creating a shared safety culture, between customer management and HAA operator management cooperatively bringing together HAA operators and medical organizations. Clearly defined and consistently implemented operating philosophies, policies, safety culture, best practices and procedures should be reflected in training to create an understanding of authority and responsibility of all levels of the involved personnel. (Refer to the current edition of AC 00-64, Air Medical Resource Management, to identify training issues.)

[2] AC 135-14B defines Air Medical Resource Management (AMRM) as "A dynamic process including pilots, medical personnel (not limited to those participating in HAA flights), maintenance technicians, operational support personnel and management staff that optimizes human–machine interface and related interpersonal issues, with maximum focus on communication skills and team-building curricula. (Refer to the current edition of AC 00-64, Air Medical Resource Management.)"

AC 135-14B goes further to emphasize that aviation and medical management personnel should collaboratively and explicitly define the safety responsibility and authority of managers and subordinates. Shared AMRM training provides a common language and understanding to enable appropriate safety communication, as well as responsibility and authority, within both HAA operators and medical organizations (and others as appropriate). Ideally, AMRM training should not be limited to the classroom but include engagement with high-level decisionmakers, including medical or hospital management.

The HAA Training Action Team members noted AMRM has become industry best practice and that most of their training programs already incorporate the suggested AMRM and CRM content included in the recommendation.

V. Background Information

ACT ARC Initiative:

ACT ARC Recommendation 15-8 addresses Part II of the tasking associated with the following Steering Committee Initiative:

Initiative #31: Develop guidance for Helicopter Air Ambulance (HAA) operations under 14 CFR part 135 with regard to:

- HAA Pilot Training Program curriculums
- Incorporating Line Oriented Flight Training (LOFT) into pilot training curriculums
- Crew Resource Management (CRM) training

Source Requirement:

Public Law 112-95, § 44730. Helicopter air ambulance operations

§ 44730(e). SUBSEQUENT RULEMAKING.—
(1) IN GENERAL.—Upon completion of the rulemaking required under subsection (b), the Administrator shall conduct a follow-on rulemaking to address the following:
(A) Pilot training standards, including—
(i) mandatory training requirements, including a minimum time for completing the training requirements;
(ii) training subject areas, such as communications procedures and appropriate technology use; and
(iii) establishment of training standards in—
(I) crew resource management;
(II) flight risk evaluation;
(III) operational control of the pilot in command; and
(IV) use of flight simulation training devices and line-oriented flight training.
(B) Use of safety equipment that should be worn or used by flight crewmembers and medical personnel on a flight, including the possible use of shoulder harnesses, helmets, seatbelts, and fire resistant clothing to enhance crash survivability.
(2) DEADLINES.—Not later than 180 days after the date of issuance of a final rule under subsection (b), the Administrator shall initiate the rulemaking under this subsection.
(3) LIMITATION ON CONSTRUCTION.—Nothing in this subsection shall be construed to require the Administrator to propose or finalize any rule that would derogate or supersede the rule required to be finalized under subsection (b).

Note: Reference *Helicopter Air Ambulance, Commercial Helicopter, and Part 91 Helicopter Operations Final Rule* (79 FR 9932 published February 21, 2014—effective date extended to April 22, 2015) for Congressionally mandated rulemaking required by P.L. 112-95 § 44730(b).

Attachment A: Sample Helicopter Air Ambulance (HAA) Operations Crew Resource Management (CRM) Training Content (including Air Medical Resource Management (AMRM) concepts)

Note: Sample content in this Attachment was extracted from AC 00-64, *Air Medical Resource Management* (9/22/2005).

a. Operational Environment. The operating environment comprises and demands interactions among:

(1) Chief Pilots,

(2) Chief Flight Nurses,

(3) Executive Administrators,

(4) Directors of Operations and Safety,

(5) Medical Directors,

(6) Maintenance Technicians/Aircraft Maintenance Staff,

(7) Communications Specialists including Medical, Dispatch, and Flight Following,

(8) Program and Operations Managers,

(9) Pilots,

(10) Flight Nurses,

(11) Flight Paramedics,

(12) Flight Physicians,

(13) Field Services, Local Agencies,

(14) Meteorology Services, and

(15) Support and administrative staff.

b. Communications. Communications training should include, but is not limited to:

(1) **Assertiveness.** Assertive people have personality characteristics that maintain higher levels of awareness of the issues or situation leading to more successful outcomes and better decision making. Assertiveness can increase an individual's confidence in analyzing situations and making good decisions.

(2) **Conflict Resolution.** Conflict can be useful when viewed as an opportunity for discussion and managing problems that are inevitable. Team conflict could be caused by personality, values, perspective, goals, or cultural differences. Steps to manage team conflict are to clarify the issue, set goals, consider options, remove barriers, make agreements, and acknowledge the solution.

(3) **Barriers.** Barriers result from the inability of team members to distinguish the various communication channels in which we speak. These channels include facts, feelings, values, and opinions. When two or more are in a discussion, any one of the channels can cause distortion.

(4) **Culture Change.** Embracing a culture that values all team members' input is necessary for effective Helicopter Air Ambulance Crew Resource Management (HAA CRM). Every member of the team must be valued for insight and input from top to bottom and bottom to top. Effective HAA CRM requires organizations to evaluate and often change their culture of decision making and their hierarchies. Organizations may be plagued with a high proportion of negative norms based within their bureaucratic cultures. An important step to take is for all cultural change work group members to discuss where the organization is headed and what type of cultural change behavior is necessary to move it forward. Even when a very dysfunctional culture is inherited from the past, individual employees are often aware of the cultural change needed in order for the organization to adapt and survive. Similarly, they are also aware of what work environment they prefer for their own sanity and satisfaction and how cultural change could achieve it. A certain amount of planning and problem solving may have to occur before any new directions can be articulated.

(5) **Feedback.** Giving feedback should be based on specific actions, be descriptive, not evaluative (describe actions in observable terms rather than judgmental terms), timely, and ongoing. Giving feedback reduces uncertainty, solves problems, builds trust, strengthens relationships, and improves work quality.

(6) **Communications Skills at Work.** Be aware of verbal and body language being used, how they are used, and their impact on others. Use validated techniques for giving/receiving as a tool for developing open channels of communication to enhance the flexibility and performance of the team members. It is important to remember that while new forms of electronic media can increase and speed communications, non-real time and faceless communication carry risks of increased misunderstanding.

c. **Team Building.** Team Building should include, but should not be limited to:

(1) **Definition of Team Roles.** A team is identified as a group of interdependent individuals working together to complete a specific task. A team works together in a way to address the challenge of optimizing the human/machine interface and accompanying interpersonal activities. These activities include team building, information transfer, problem solving, decision-making, and maintaining situational awareness.

(2) **Individual Competencies** are a complex combination of an individual's knowledge, skills, and abilities, as demonstrated to the team's members, which are critical to the effective and efficient function of the team or organization.

(3) **Commitment.** All team members must depend on one another's knowledge, skills, and abilities to complete the mission.

(4) **Inclusiveness.** An effective team has to take into consideration or account for all factors within its scope, including the specified extremes or limits as well as all areas between them.

(5) **Team Identification.** Taken together, a team is defined as a group of individuals working together to complete a specific task. All team members depend on one another's knowledge, skills, and abilities to complete the task in the safest manner possible.

(6) **Team Mission Statement**. The team mission statement should address the need to prevent aircraft accidents by improving team performance through better team coordination.

(7) **Briefing.** An effective briefing should be interesting and thorough and establish a "team concept" environment that will encourage open/interactive communications. Briefings should:

(a) Be interactive and emphasize the importance of questions, critique, and the offering of information by all team members,

(b) Establish a team concept encouraging all to participate and help with the flight,

(c) Cover pertinent safety and security issues,

(d) Identify potential problems such as weather, delays, and abnormal system operations,

(e) Provide guidelines for crew actions centered on standard operating procedures (SOP),

(f) Set expectations for handling deviations from the SOPs, and

(g) Specify duties and responsibilities of all team members.

(8) **Debriefing.** This would relate to the effectiveness of the group and/or individual performance on the mission. Debriefings deal with positive as well as negative aspects of performance. Debriefings should be:

(a) Specific,

(b) Objective,

(c) Usable,

(d) Constructively given, and

(e) Involve the whole crew interactively.

d. Decision Making. Decision making training should include, but is not limited to:

(1) **Judgment.** Judgment plays an important part in all phases of the operation. Knowing the goals, each team member involved should be trained to ensure that they are capable of making the best, most-informed decisions possible to ensure the mission is completed safely.

(2) **Situational Awareness.** Many common problems can be linked to situational awareness failures, which could include:

(a) Situational awareness for aviation crewmembers includes experience and training, physical flying skills, team work (CRM), spatial orientation, and health and attitude.

(b) Operational clues to loss of situational awareness include incomplete communications, ambiguity, unresolved discrepancies, use of undocumented procedures, preoccupation or fixation, no one flying, no one looking, confusion, deviations form SOPs or briefings, violations of limits and regulations, and failure to meet targets/goals.

(3) **Risk Management.** Establishment of a System Safety Risk Management Assessment Program optimizes safety by identifying operational hazards and related risk, then eliminating or mitigating them to a safe state by using established policies and procedures. The operator's procedures manual should contain clearly defined procedures for maintaining operational control during all phases of the EMS operation with total support from upper management. There is no "one size fits all" tool for developing a risk assessment program and operators should consider their own operational and environmental needs in developing its risk assessment tools and plan.

(4) **Aeronautical Decision Making (ADM).** ADM is a systemic approach to the mental process used by aircraft pilots to consistently determine the best course of action in response to a given set of circumstances.

(5) **Standard Operating Procedures (SOP).** To achieve consistent safe flight operations, SOPs must be clear, comprehensive, available, and understood by flight crewmembers. When flight crewmembers understand the underlying reasons for an SOP, they are better prepared to conduct a safe operation and provide feedback for improvements.

(6) **Evaluation of Options.** This training should focus on how to deal with last minute changes or conditions from the norm. Such changes could include a change in aircraft (backup ship), turning the mission over to another operation closer to the patient because of marginal weather conditions at your location, change of crewmember, or patient status change. Developing a Risk Assessment Matrix is one means for reducing crew anxiety.

(7) **Weather.** All regulations put forth in the federal aviation regulations must be met at all times, recognizing that available weather reporting and actual conditions encountered during flight may be quite different. The safety of the air medical crew members, passengers, and patients must never be compromised. Training should include at least the minimum weather conditions permitted for departure, where to access current weather reports, how to make a sound decision (go/no-go--whether to continue or not), and how to ensure the aircraft configuration is adequate for the intended flight (i.e., IFR vs. VFR).

(8) **Instrument Meteorological Conditions (IMC).** In addition to requirements in 14 CFR part 61, training for IMC should include instruction on the Instrument Flight Rules (IFR) regulatory requirements, IFR approaches, en route procedures, go-around procedures, flight planning, flight following, and emergency procedures, as examples. In addition, training should be provided for inadvertent IMC penetration to prevent Controlled Flight into Terrain (CFIT), which has been a major contributor to accidents, especially as associated with low light and marginal visibility conditions.

e. Human Factors. Human Factors training should include, but should not be limited to:

(1) Stress. While stress is normal and healthy, excessive stress may lead to "distress," a condition of command pressure experienced when a person perceives that demands exceed the personal and social resources the individual is able to mobilize. There are many proven skills we can use to manage stress and help us to remain calm and effective in high pressure situations. These include action-oriented skills to confront the problem causing the stress, emotionally oriented skills, which we do not have the power to change the situation but manage the stress by changing the interpretation of the situation and the way you feel about it. In the EMS environment, it's important that the dispatch of the aircraft should be examined as an air transportation decision free from the emotion of the "life-saver" decision. The development of acceptance-oriented skills where something happens over which we have no power and no emotional control, and where focus must be on surviving the stress, is essential in stress management.

(2) Critical Incident Stress Management. Critical incident stress management is the personal analysis of the various kinds of stress experienced by team members in air medical operations. The two types of stress related environments that exist while flying complex, time critical medical missions, and performing other crewmember duties, are the air transportation operation and the lifesaver environment. Par 7 Page 10 9/22/05 AC 00-64

(3) Fatigue Countermeasures. The term "fatigue" has been used to describe many different experiences: sleepiness, physical tiredness, and inability to focus mentally, time on duty, types and number of missions, prolonged stress, and other factors. The effects of fatigue, which concern the operational community, are those that affect crewmember alertness and performance. This type of fatigue stems primarily from sleep loss, circadian rhythm disruption, lack of fitness, inadequate food and fluid intake, and the interaction of these physiological variables.

(4) Flight Physiology. An understanding of flight physiology is crucial in aviation safety. Flight physiology involves the definitive effects on the human mind and body when exposed to the flight environment. Preventive measures must be used in order for flight crewmembers to cope with this environment and to understand the unique effects that can erode performance. Examples of physical effects on the crew are spatial disorientation, head position caused by looking out or down, and sitting sideways. The use of over-the-counter medications, caffeine, alcohol, drugs, etc., can also bring on detrimental effects.

(5) Flight Psychology. Flight psychology is the application of psychological principles to the unique environment of all aircrew members in order to enhance training, flight safety, and mission accomplishment. This has to be a cooperative effort between a clinical psychologist and the air medical services. The primary focus of the flight psychology program is stress management.

(6) Operational Implications of Stress. Operational implications for stress, which affect human performance, could include fixation, increased reaction time, reduced effective field of view, deterioration in cognitive performance and spatial processing, logical reasoning decrements, negative effects on attention and concentration, increased workload, etc.

(7) **Preparation/Planning/Vigilance.** These behaviors relate to crews' anticipating contingencies and the various actions that may be required to address a changing operational environment. Excellent crews are always "ahead of the curve" and generally relaxed. They devote appropriate attention to required tasks and respond without undue delay to new developments. Examples of good behavioral markers are sharing what is happening with all team members, sharing all relevant information, watching for performance degradation in other crewmembers, demonstrating awareness of the plan, including team members in planning, and ensuring all crew members are aware of any changes in the plan.

(8) **Workload Distributed/Distractions Avoided.** These behaviors relate to time and workload management. They reflect how well the crew manages to prioritize tasks, share the workload, and avoid being distracted from essential activities. Examples of workload behavioral markers could include crewmembers' speaking up when they recognize work overload, clear communication of task distribution and task priorities, and anticipation of potential distractions so that appropriate actions are taken.

(9) **Understanding of Basic Personality Types.** The type of personality defines "what" is important to an individual and significantly influences the way one makes a decision.

(10) **Understanding of Group Dynamics.** The "group" may have its own way of making decisions. The group should be aware that perhaps their "informal" structure does in fact work in a formal organization.

f. **Follow Up.** HAA CRM Training should include, but is not limited to:

(1) Initial,

(2) Indoctrination,

(3) Awareness,

(4) Recurrent Practice,

(5) Feedback, and

(6) Continuing Reinforcement and Evaluation.

g. **Fundamentals of HAA CRM Training Implementation.** HAA CRM training should be customized to accurately and consistently reflect the operating philosophies, polices, practices, and procedures of the organization. Managers need to ensure that these elements are clearly defined and consistently implemented in procedures, training, and operational practices. Research findings and air medical operational experience suggests that the greatest benefits are achieved by adhering to the following practices:

(1) **Assess/Evaluate the Status of the Organization Before Implementation.** It is important to know how widely AMRM concepts are understood and practiced before designing specific training. Surveys of air medical team members' experience and capabilities can provide essential guidance for program development.

(2) **Commitment from All Managers, Starting with Senior Management.** Air medical team members accept AMRM programs more positively when senior management, flight operations managers, and hospital management staff conspicuously support the basic concepts and provide necessary resources for training. Operations manuals should embrace AMRM training by providing necessary policy and procedures guidance.

(3) **Customization of the Training to Reflect Nature and Needs of the Organization.** Using knowledge of the state of the organization, priorities should be established for topics to be covered including but not limited to special issues, such as the effects of mergers, introduction of advanced technology aircraft, medical equipment, aircraft equipment, communications equipment, and new team members.

(4) **Define the Scope of the Program.** Implement special HAA CRM training for key personnel at each program, including developers/facilitators and supervisors. These individuals can be any member of each air medical flight program. Focus should be on their ability to instruct, facilitate, and teach the core elements of the program. It is also helpful to develop long-term strategies for program implementation.

(5) **Communicate the Nature and Scope of the Program before Implementation.** Air ambulance medical programs should be provided with a preview of the training, including the Train the Trainer Course, with plans for initial and continuing training.

h. **Presentation Skills Profile--"Train-the-Trainer Course."** To acquire a cadre of instructors, a Train-the-Trainer Course is the initial component of training for HAA CRM and provides an adequate number of qualified instructors as a resource for on-going/continuing training needs. It consists of classroom instruction on basic presentation skills and how to facilitate and instruct AMRM core components. Areas of inclusion for instructor training should be, but not limited to:

(1) **Objective.** What is your objective? Upon completion of this training, the student should be able to: Recognize and identify human factors elements by learning to:

(a) Understand human error and recognize contributing causes,

(b) Understand human error and recognize contributing causes,

(c) Identify the chain of events that led up to an accident,

(d) Learn to develop safety nets,

(e) Be aware of individual's differences and behavioral styles,

(f) Be aware of how written communication can reduce human error, and

(g) Learn to develop effective communication skills.