Since helicopter emergency medical services (HEMS) took to the skies of America in the early 1970s, the accident rate has remained disproportionately high when compared with other segments of helicopter aviation. According to the Air Medical Memorial website, to date 374 people have lost their lives in air medical accidents, leaving more than 600 crash survivors who must daily deal with their physical and emotional pain. In February 2013, the electronic news media branded our industry “the most dangerous job in America.”

A more shocking reality in our HEMS accident statistics was uncovered in an extensive study of HEMS crashes led by noted HEMS safety expert Dr. Ira Blumen, medical director and program director at the University of Chicago Aeromedical Network. Dr. Blumen and his team of researchers discovered that 94% of all HEMS accidents have an element of human error. Take time to think about that statistic for one moment. When you hear of another HEMS accident, you can be fairly certain that there will be a 94% chance an element of human error contributed to its cause.

There is a proven cure used by the airlines that can reduce our HEMS accident rate. We know the cure exists because the airlines used it when it was administered 35 years ago to reduce their unacceptably high accident rate. The name for that cure is crew resource management (CRM). In HEMS, we call it air medical resource management, which is derived from the principles of CRM that are used religiously worldwide by every airline today.

There have been safety improvements in aircraft and equipment design over the years, yet the HEMS accident rate still remains high. Recently, operators are addressing the issue of pilots inadvertently flying into instrument meteorological conditions, a common cause of HEMS accidents over the years. They are committing to equip their aircraft with an autopilot and helicopter synthetic vision technology to help pilots maintain spatial orientation in the event they inadvertently fly into instrument conditions.

In my view, installing an autopilot and helicopter synthetic vision technology will certainly help to lower the accident rate, but as the airlines quickly discovered, technology is not the silver bullet that prevents accidents. Airliners with sophisticated computers and modern navigational aids still manage to crash because the technology has been mismanaged by the human element. The airlines know that CRM is a more powerful tool to prevent an accident than any item of technological wizardry that can be added to the cockpit.

I was extremely fortunate to be exposed to CRM nearly 30 years ago. In January 1985, I was headhunted to set up a country-wide HEMS program in the Sultanate of Oman. It was in Oman that I was introduced to the whole new aviation paradigm of CRM, a much safer way to fly.

As a uniformed major flying for the Royal Oman Police Air Wing, I teamed up with 12 highly experienced former British military pilots, everyone of them trained to practice effective CRM. When they left the service, they flew commercially on the North Sea in a 2-crew environment where they encountered some of the most challenging instrument meteorological conditions on earth. They performed safely and effectively by using good CRM.

What Is the Genesis of CRM?

In the 1970s, airliners were seemingly falling out of the sky at an alarming rate; no one could figure out why. The news media reported that it was as if a virulent disease had stricken the airline industry, causing numerous crashes.

For example, Eastern Airlines Flight 401 crashed into the Florida Everglades on the night of December 29, 1972, because the 3-man crew became distracted while trying to repair a burned-out landing gear indicator light. In the process, the captain inadvertently bumped the control column. This disconnected the autopilot and caused the aircraft to crash.

The deadliest accident in aviation history occurred on March 27, 1977, in Tenerife, Canary Islands. Two Boeing 747s collided on a foggy runway, killing 583 people. The pilot in command of KLM flight 4805, Captain Van Zanten, was in a rush to take off and mistook an after-takeoff clearance from an air traffic controller for a takeoff clearance.

Van Zanten had a reputation for being overbearing and not open to suggestions from his crew. After this accident, less experienced flight crewmembers were encouraged to be more assertive and challenge their captains when they believed something was not correct. Captains were instructed to listen to their crew and evaluate all decisions in light of crew concerns. The accident had a lasting influence on the aviation industry, particularly in the area of communication. The roots of CRM were beginning to form.

The crash that prompted government action and the sprouting growth of CRM occurred on December 28, 1978. United Flight 173 went down in a suburb outside Portland, OR, when a very experienced 3-man crew became preoccupied with an unsafe landing gear light. The crew lost situational awareness of their fuel state, giving all their attention to a faulty landing gear indication while the aircraft ran out of fuel.

After the results of the Portland crash were released to the public, a task force was formed by the National Transportation Safety Board to discover the reasons why so many airliners were crashing. Their findings shocked the aviation world.

Sixty airliners crashed from 1968 to 1976. All 60 shared 1 common element—human error. Furthermore, when the task force researched Boeing’s archives dating back to 1940, they found that nearly 80% of all airline accidents had an element of human error. It was not faulty flying skills that had brought down these airliners. Rather, the primary causes listed were faulty decision making, lack of leadership, loss of situational...
behaviors and most people do not like being instructed in because CRM is concerned with changing attitudes and style of delivery is the most successful for training CRM extremely important. It is widely accepted that the facilitation Classroom for Maximum Effect?

AMRM interchangeable terms. and lead to an accident. Therefore, consider CRM and then breaking links in an error chain before they can form CRM, AMRM can prevent accidents by first identifying and tailored for air medical operations. Using the principles of CRM is the applied science that studies people working together in concert with machines. AMRM is simply CRM incorporated the methods and principles of the "air medical resource management" (AMRM). As with CRM, AMRM incorporates the methods and principles of the behavioral and social sciences, engineering, and physiology. CRM is the applied science that studies people working together in concert with machines. AMRM is simply CRM tailored for air medical operations. Using the principles of CRM, AMRM can prevent accidents by first identifying and then breaking links in an error chain before they can form and lead to an accident. Therefore, consider CRM and AMRM interchangeable terms.

What Is the Essence of CRM?

CRM is the study of human factors that can cause human beings to make mistakes. By using tools learned in a CRM course, stakeholders are made aware of the human factors that can cause mistakes so they can take steps to avoid, trap, or mitigate the consequences of those mistakes.

Over the years, many entities and organizations have extensively studied how humans make mistakes. The National Aeronautics and Space Administration, the major airlines, aircraft manufacturers, international civil aviation authorities accident investigation units, and many universities around the world have all conducted research. They concluded that human performance is a causal factor in the majority of aviation accidents. In fact, it is now accepted worldwide that human error is a major factor in 75% to 80% of these accidents.

What Is Air Medical Resource Management?

Another term often used in the field of medical aviation is "air medical resource management" (AMRM). As with CRM, AMRM incorporates the methods and principles of the behavioral and social sciences, engineering, and physiology. CRM is the applied science that studies people working together in concert with machines. AMRM is simply CRM tailored for air medical operations. Using the principles of CRM, AMRM can prevent accidents by first identifying and then breaking links in an error chain before they can form and lead to an accident. Therefore, consider CRM and AMRM interchangeable terms.

How Should AMRM Be Delivered in the Classroom for Maximum Effect?

Research has shown that the method of delivery is extremely important. It is widely accepted that the facilitation style of delivery is the most successful for training CRM because CRM is concerned with changing attitudes and behaviors and most people do not like being instructed in how to behave and what to think. An individual's attitudes and behaviors are based on past experiences, values, and beliefs that are different from one person to the next, which is the reason CRM does not lend itself to being administered online, assessed in a computer-based program, or taught by an instructor who stands behind a podium in front of the class and lectures in the traditional fashion. Team member participation is essential; history has shown that giving a CRM course by lecture or computer-based programs alone is not effective.

As with any airline CRM class, no AMRM class is the same. Every course is constantly changing. One hot topic relevant to a particular airline or HEMS flight program might take a totally different tack with another.

Will Taking Only 1 AMRM Course Make Me Safe?

The airlines discovered that CRM training is a perishable skill. For example, American Airlines, where I was recently invited to attend several human factors courses, bring their staff in twice a year for refresher training. The airlines treat CRM as a "religion" that must be continually reinforced and practiced to ensure the concepts remain fresh in every team member's mind.

What Qualifications Should a CRM/AMRM Instructor Have?

At present, there is no Federal Aviation Administration (FAA) qualification or certification required for someone to teach and facilitate a CRM or AMRM class. With that in mind, in my opinion, having instructors who have been trained in the military to give CRM training is the current best option because they have been properly trained in facilitation techniques.

A successful CRM and AMRM experience relies heavily on delivery and the attitude of the instructor. It is important that the instructor understands that the course is all about the team members. Many CRM and AMRM courses are dry and uninteresting to the attendees. I often hear that a pilot will stand in front of the class and show pictures of crashed helicopters and discuss them and that's all. There is certainly a place for case studies, as post-mortem examinations are important in medicine, but it is customary to present the case studies as the last module of the course after the attendees have been given the CRM tools learned in prior modules. That way when it comes time to discuss case studies, team members are "armed" with the knowledge to come up with the answers themselves.

While flying overseas, I have been a CRM evaluator in a 2-crew cockpit for nearly 30 years. Still, I felt I needed a certification that would give me credibility to facilitate CRM courses in the classroom. The FAA in America does not have a CRM certification process, but in England certification is required. So, I enrolled in a CRM course at Global Air Training in Cheshire, England, titled "Train-the-Trainer." That institution has been teaching training courses to international airline and military pilots and cabin staff for more than 18
Your First AMRM Class

Your first AMRM class is an indoctrination class. This class is usually no less than 1 day long. In it the instructor supplies the team members with proven tools for effective AMRM. In the airlines, they schedule a week for indoctrination followed by sessions in the flight simulator to practice technical and CRM skills. We in the HEMS world are not there yet. I personally teach 1- and 2-day courses that cover the following 9 training modules: 1) Why CRM/AMRM/CRM History and Effect on Air Safety; 2) Human Error and Reliability/Error Chain/Error Prevention and Detection/Threat and Error Management; 3) Company Safety Culture/Standard Operating Procedures, SOPs/Organizational Factors; 4) Stress and Stress Management and its Effect on Decision-Making and a Person’s Health, Fatigue, and Vigilance; 5) Information Acquisition and Processing/Situation Awareness/Workload Management; 6) Decision-Making; 7) Communication and Coordination Inside and Outside the Cockpit/How Team Communication Can Affect the Outcome of the Task/Conflict Resolution; 8) Leadership and Team Building/Team Behavior/Group Synergy; and 9) Interactive Case-Based Studies.

Follow-up classes are no longer than 12 months apart. These classes are guided by a facilitator who usually talks less than the attendees because the goal is for the team members to come up with their own answers using the tools they learned in the initial indoctrination course. In doing so, they develop insight—that “Aha!” moment when the lightbulb illuminates and they finally start to understand what AMRM is all about.

Does CRM Work to Prevent Accidents?

The answer to that question is anecdotal. When the US Coast Guard decided it was time to embrace the principles of CRM, their accident rate fell 70%. The US Navy had 776 noncombat accidents in 1954. In 2010, they had 13 noncombat accidents, a fact the Navy attributed to the adoption of CRM practices. The US Air Force, Marines, and Army had similar results when they adopted CRM training.

According to a February 11, 2013, New York Times article, the airlines had the safest years in 2011 and 2012, respectively, since the dawn of the jet age. That unprecedented safety record was attributed in no small way to the power of CRM to prevent aviation accidents. We in the HEMS industry can do the same.

Because CRM has been so successful in reducing accidents in military and civilian aviation, other fields are adopting the principles. CRM techniques are being taught in many medical institutions as a way to prevent human error in health care.

What Is the Minimum Yearly Legal Requirement?

According to FAA regulations enacted in 2013, all Part 135 air taxi crewmembers must go through yearly CRM training. There is no legal requirement spelling out the minimum duration of a course, so a 1- or 2-hour computer course satisfies that requirement. Consequently, many of the air medical programs have adopted a “tick-the-box” mentality, satisfying the letter of the law but not the spirit of the law. By avoiding the spirit of the law, a crucial opportunity to prevent accidents is lost. With that thought in mind, think about how AMRM training is administered in your flight program. Do you feel your training really satisfies the spirit of the law?

Why Should You Fully Embrace AMRM?

Actively practicing what you learn in an AMRM course is your last line of defense against having an accident or incident. It is as simple as that.

CRM as Viewed by a Recently Retired Airline Pilot

I write a monthly column for Rotorcraft Pro magazine titled “My Two Cents Worth.” Many of my articles deal with flight safety, specifically HEMS safety. I wrote 1 column announcing that I was quitting my job as a simulator instructor and flight examiner with Abu Dhabi Aviation to come back to the United States to teach AMRM to team members at air medical programs. It is my personal way to try and help bring down an unacceptable accident rate. After that article was published, I received an e-mail from Captain Mike Brezden. Here, in part, is what Captain Brezden wrote:

I too flew as a pilot in a helicopter EMS program early in my career (1982-1984). Sadly, not much has changed in the industry. I left that position, got my fixed-wing ratings, and went on to a 23-year career with Continental Airlines. I consider CRM training at Continental the single most important training I’ve ever received in aviation. It works. But be warned, not all will welcome your message. It was my experience that those who resisted CRM the most were the ones who needed it the most.

If I could offer any advice it would be to try to get the message across that CRM is a radical change in lifestyle. It’s something that will take effort on the part of all involved and probably won’t come naturally, especially in stressful situations. At Continental Airlines it was a central part of our recurrent ground training every year. Additionally, once we “got it,” it was the only way we flew, both in the simulator and on the line.

And, most importantly, if someone speaks up, tell the people not to take it personally. There are some super-sensitive egos in this business, and they bruise easily. Team members must learn how to say things without sounding critical, and they also must learn how to accept and encourage such challenges. That’s by far the toughest part of this whole CRM concept.

Best of luck with your training, Randy. And know that you are making a difference out there. There is no way to know or measure...
how many accidents won’t happen because of what you’re teaching these folks, but know for sure that there is someone out there that will see their son or daughter get married because of you and your CRM course.

Mike Brezden
Captain, Continental Airlines (retired)

Reducing the HEMS accident rate in America is possible if all team members in your organization, from top management on down, fully embrace the spirit of AMRM. At the end of the day, we all want to work in a job we love—saving lives as safely as humanly possible. Practice what you learn in an AMRM course, and stay vigilant for a possible link in an error chain forming. We owe it to ourselves, our loved ones, and the patients we fly.

Further Reading

Randy Mains, ATP, CRMI, BA, EMT-P, is chief crew resource management safety instructor at Oregon Aero, Scappoose, OR.