Aviation Human Factors Industry News

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Hello all,

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In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:

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Just Culture Stories: The Good, the Bad, and the Ugly

BY DR. BILL JOHNSON

The author tells three stories about voluntary reporting and just culture. Fitting for this month's international theme, the stories reflect cultures from North America, Europe, and Asia.A colleague from a U.S. university called and asked me for example stories related to the implementation of just culture. We spoke for a while as my memory and inclination for story-telling churned up a few examples. At the end of the conversation, the colleague said something like "Bill, those stories are great, you should write them down." Read below and decide for yourself if they have value to you. The stories are as true as my memory permits.

Generally Recognized Attributes for a Just Culture

The term "just culture" is a household word in aviation safety. The concept advocates responsibility and accountability for each worker. It extends that accountability to the entire organization. Sometimes error is a function of human frailty, or even misfortune. Sometimes the root cause of an error goes beyond human performance and rests with the work environment, the expected activity, and the resources necessary to complete work safely, effectively, and efficiently.

Elements of just culture usually include clear communication and trust between labor and management, shared value of safety, shared desire to know about errors and to prevent reoccurrences, a system to report and investigate events, and a cooperative National Aviation Authority. The just culture policy is usually documented and well understood. Everyone must be "on board" to achieve the just culture.

Just culture programs can be complemented with investigative tools like Boeing's MEDA (Maintenance Error Decision Aide) and analytic tools like the Outcome Ingenuity Just Culture Algorithm or the Baines Simmons FAiR System.

Regulatory programs like the Aviation Safety Reporting System (ASRS), the Aviation Safety Action Program (ASAP), and other voluntary disclosure programs support just culture.

With that said, this article is about stories. It is not a Just Culture lecture.

The Good Story: Just Culture Before It Was Cool

A large German engineering company had expanded its MRO around Europe (West and East), into the Americas, and then to Asia, both via organic growth and via acquiring existing MRO facilities. Typically, the German company would rotate executives from the parent company into local management roles. The role would be held for a few years. This story is about the first rotation of a German executive into the Asian work environment.

On one of the German executive's first days on the job at a newly acquired MRO facility, there occurred a significant maintenance error. An engineering crew damaged a large engine cowling during removal by using the hangar lift. The damage to the cowling was extensive. All employees fully expected termination of the lift operator, who appeared to be the most responsible party. It was likely that other licensed engineers would also lose their long-time jobs.

The new German expatriate executive took the lead on the investigation. There had not been an explicit just culture policy since this event preceded popular adoption of such a concept. Immediately, the executive looked at the work environment, how the workers were trained for the engine cowl removal task, the clarity of the procedures, the adequacy of support equipment, and more. He and his team concluded that some aspects of the work environment – procedures, training, human factors approach, etc. – had not positioned the workers for success and that the maintenance error had been an honest mistake. In a quest for justice, the executive did not fire anyone. They addressed all the contributing factors and installed a replacement cowl.

Later on, the German executive asked the same engineer to operate the lift for the new cowling installation. That was just! The entire workforce learned of the "damaged engine cowl event" and the fair treatment of the worker. That show of just culture influenced the new German-Asian cooperation in a manner that has had an extraordinary long-term impact on safety and efficiency.

The moral to this story is that you do not need a lot of process and procedures to achieve justice. While written policy is very important, a just attitude is most important.

The Bad Story: A Small Error During Training Can Be Costly

This story goes back nearly eight years, when Airlines for America (A4A) cooperated with the FAA to design, develop, and implement a ground/maintenance version of the Flight Ops Line Operations Safety Audit (LOSA). The maintenance LOSA development process and all related products are available at www.humanfactorsinfo.com.

LOSA is a peer-to-peer assessment that takes place during normal operations. It does not have to be triggered by an event. LOSA permits observers to identify the strengths and weaknesses in the organization. Observations are absolutely non-punitive because no names or identifying characteristics are recorded. Using a threat and error system, the observer may look at safety threats and whether the workers are managing the threats, or not.

Training is critical for LOSA programs to succeed. All employees must understand the LOSA concept. The general population of employees must know that LOSA observations are nonthreatening. LOSA observers require about eight hours of training to ensure that protocols are followed and that data is somewhat consistent among observers.

The negative story occurred during initial testing of the LOSA observation training. The LOSA team and trainers were preparing to launch LOSA at a package carrier for ground observations. In order to start the LOSA testing, there were extensive deliberations between labor and management. It was further complicated by FAA LOSA involvement. It took nearly nine months for all to agree to the LOSA test.

Because it was still in testing, necessary critical LOSA training was not delivered to all employees. The workforce merely saw people with clipboards walking around ground operations. That is seldom a welcome sight. The labor leaders told employees not to worry because it was a test and, in any case, no one would record names.

As fate would have it, one of the LOSA observation trainees noticed that a worker was not wearing protective shoes. Of course, that is a threat to worker safety. It was a valid LOSA observation and the observer noted it.

Coincidently, the observer trainee was a friend and next-door neighbor of the manager of that area. During a coffee break the trainee saw the manager in the hallway and casually mentioned the improper footwear observation. The manager proceeded to send the worker home for the day without pay! That small incident negated nine months of planning and set the LOSA implementation back at least an additional year.

The lesson learned is that you cannot half-way implement a critical program. The observer was not ready, the manager was not ready, and what little the workforce knew was wrong on the very first day. That was bad!

The Ugly Story: Be Sure that the Policy is Clear to Everyone

Just culture implementation is not without growing pains. As early as the mid-1990s some airlines were listening to James Reason. Early adopters saw the safety, efficiency, and fairness merits of a voluntary reporting system based on just investigations. One such large carrier decided to test the voluntary reporting concepts. It was a large company with a powerful labor union. The top labor leaders and senior managers saw the potential benefits. When an event occurred everyone wanted to determine the root cause and find corrective actions.

The company went to great lengths to establish reporting procedures and just culture policies. The combination of the union and management delivered training to everyone. Since it was a radically new program, not all managers were convinced of its value and were concerned that it might lessen accountability. Many workers were fearful that a reported error would trigger disciplinary action.

Most just culture champions were at corporate headquarters where the largest repair facility was based. Leadership decided that the initial implementation would be at a satellite repair facility. The reasonable expectation was that it would be easier to ensure 100 percent training coverage for all of management and labor at the smaller facility.

Very early in the just culture implementation there was a maintenance event that would require expensive rework. The workers made a mistake. The supervisors and middle management understood the error and did not take action against the errant workers. When the top manager at the satellite facility saw the cost of the error he took immediate disciplinary action against not only the workers but also the managers who followed the just culture policy.

The union at all company facilities justifiably pulled out of all just culture participation. It was years before confidence in just culture was restored. That was ugly!

Summary

When it comes to voluntary reporting, there are many good, bad, and ugly stories. As you read this article, I am sure you thought of examples from your own experience. As I wrote this article and this summary, I thought of many more. Let me end on a positive note please. I went to an ASAP Event Review Committee meeting. It was like a courtroom hearing. A representative of the errant mechanic admitted that the mechanic did not follow a procedure. He reported the error. In this case, the company representative felt that there should be a stiff penalty. The labor representative felt that a mild letter of reprimand would be acceptable. The FAA member was the last to vote to achieve the necessary unanimous vote for action against the employee. He firmly stated: “I worked at an airline just like this one, with the same aircraft, for 20 years. Nearly everyone ignored that procedure. Let’s stop blaming the worker and fix the procedure.” The end!

http://www.humanfactorsinfo.com/

Supporting the Industry on Maintenance Investigation: Boeing MEDA in the Last Decade

by Dr. Maggie J. Ma

Maintenance Error Decision Aid (MEDA) is a structured process for investigating events caused by maintenance technicians and inspectors. As a jointed effort by Boeing maintenance human factors experts and industry in the early 1990s, MEDA was intended to help airlines shift from blaming maintenance personnel for making errors to systematically investigating and understanding why the errors had occurred. MEDA offers an organization means to learn from its mistakes. Since its inception in 1995, MEDA has been adopted by more than 800 organizations around the world.

The MEDA process has set the standard worldwide for maintenance event investigation and has been recognized for its significant contribution to aviation safety (e.g., The Sir Frank Whittle Safety Award by the International Federation of Airworthiness).


Maintenance Error Decision Aid (MEDA) Results Form

Section I—General Information

Section II—Event

Section III—Maintenance System Failure

How Does MEDA Work?

MEDA is based on the philosophy that errors and violations result from a series of contributing factors (anything that can affect how the mechanic does his/her job) in maintenance operations, such as misleading or incorrect information, design issues, inadequate communication, time pressure, and so on. Most of them (as high as 90 percent) are under management's direct control. Once they are identified, the organization can take actions to eliminate those contributing factors to prevent similar events from happening again.

Visually, this is how the MEDA process works. It's a reactive process. The event occurred, a maintenance organization has to decide the event was caused by mechanic/inspector performance, and then find the mechanic/inspector who did the work or who observed the work being done to interview them. The investigator typically knows what the system failures are before he/she conducts the interview. For example, mechanic did not connect the hose correctly and the system started leaking. There was a bolt missing on the side of the pump. Through the interview the investigator talks to technicians to get the contributing factors and their ideas for process improvement. Some follow-up interviews may be needed. For example, mechanic said "I went to the store but a part was not available. There is another part that was compatible, so I used it. Later on I found that the part was not compatible." So in this situation, the investigator may want to go to the store to find out how they determine the part compatibility. Maintenance event database is helpful for identifying and tracking patterns. Sometimes MEDA investigations reveal problems that need to be fixed right away. Sometimes it is reasonable to wait and see if a common theme will emerge out of multiple MEDA investigations, especially if the corrective action is a costly investment.

It is also important to let the employees know what the company is doing with MEDA investigation findings. System improvements through MEDA will be the best promotion to foster trust and willingness to participate in any future MEDA investigations.

Key MEDA References

There are two main MEDA references:

(1) MEDA Results Form — used during the investigation, and also a template for writing an investigation report

(2) 70-page-long MEDA User's Guide — a "how-to" manual on carrying out a MEDA investigation.

The main references complemented by practice scenarios and training, are updated on a regular basis.

The most important section in the MEDA Results Form is a checklist of 10 categories of contribution factors, which explain why errors and violations occur and result in system failures, which eventually resulted in an event.

Most of the causal relationships discovered in event investigations are probabilistic in nature (e.g., existence of contributing factors increases the likelihood of an error). Six rules of causation help to guide MEDA investigators to collect more, better data and be more effective in authoring investigator reports:

1. Each human error must have a preceding cause.

2. Each procedural deviation (violation) must have a preceding cause.

3. Causal statements must clearly show the "cause and effect" relationship.

4. Negative descriptors (such as poorly or inadequate) may not be used in causal statements.

5. Failure to act is only causal when there is a pre-existing duty to act.

6. Causal searches must look beyond that which is within the control of the investigator.

MEDA Investigators Apply Cognitive Interviewing Techniques

The primary method to gather data in MEDA investigation is through conducting interviews with technicians or inspectors who were involved in the event. MEDA investigators are trained to apply some specific techniques to help the person being interviewed to remember and communicate while following a structured process during the interview.

An Important Tool in a Safety Management System

Safety management systems (SMS) at airlines and maintenance organizations around the world have advanced rapidly in the past decade. Risk management, one major component of an SMS, requires that safety of flight hazards be identified, that the hazards be assessed for risk, and that unacceptable risk be mitigated to acceptable levels. Among the three approaches for identifying hazards (reactive, proactive, and predictive), event investigation is mainly responsible for identifying and communicating human performance issues within an organization. Boeing MEDA has been an important tool in the SMS reactive hazard identification process. It helps an organization systematically determine the hazards or contributing factors to events, and, based on these findings, allows the organization to develop and monitor a comprehensive fix.

A Connection to Managing Human Behaviors in a Just Culture

Both errors and violations can contribute to maintenance events. They often occur together to produce an unwanted outcome. MEDA investigators are trained to recognize errors, violations, and different types of violations (routine, situational, or exceptional), and investigate the preceding cause(s) to the errors and violations. In the next revision of MEDA Results Form, a new section will be added to help to document errors and different types of violations, which require different mitigation strategies. This new addition will offer a connection to how different human behaviors should be managed within a Just Culture:

1. Human errors – “To err is human …”

Human errors should be managed through consoling and other actions such as changes in processes, procedures, training, design, and environment. Upon close examination, repetitive human errors may warrant punitive actions.

2. At-risk behaviors (routine and situational violations) – “To drift is human …”

At-risk behaviors should be managed through coaching and the following:

• Removing incentives for at-risk behaviors

• Creating incentives for healthy behaviors

• Increasing situation awareness

Upon close examination, repetitive situational violations may warrant punitive actions.

3. (Occasional) Reckless behavior

Accountability rests wholly with the individual who chooses the reckless act.

Harness the Power of Visual Communication

A map or a diagram offers a level of information density that words and sentences alone cannot offer. For example, the amount of information that is captured and easily communicated on a single street map. Traditional written investigation reports do not illustrate causal relationships well. In the past few years, Boeing has been recommending a MEDA best practice – upon completion of an investigation, use a diagram to visualize and document causal relationships discovered in the investigation and produce “the big picture view.” The diagram is also a great communication tool and helps to preserve the learning through the investigation.

In the next revision of MEDA Results Form, a new section will be added to offer a template for constructing the causal relationships discovered in the MEDA investigation.

MEDA Best Practices

Several factors contribute to MEDA’s wide adoption and acceptance:

· The Boeing Company has been offering continuous and consistent support. For instance, between January 2012 and March 2018, 75 sessions of MEDA investigator workshops were offered to Boeing customers and maintenance organizations around the world, which trained and retrained over 2,300 investigators.

· MEDA is a systematic and comprehensive yet highly customizable investigative process/tool; it can be easily integrated with other existing investigative programs.

· MEDA helps a maintenance organization to fulfill the “event investigation” requirement by national aviation authorities for maintenance human factors program.

· Airlines and other maintenance organizations are not required to share data.

· MEDA is supported/endorsed by labor unions/groups.

Boeing works closely with safety programs with Lufthansa Technik (LHT) and provided MEDA support to seven different LHT sites and Lufthansa Airlines around the world between April 2013 and March 2018.

How Lufthansa Technik Uses MEDA within Its SMS

At the beginning of 2000, Lufthansa Technik (LHT) started to use the MEDA concept for error management within line maintenance, which enabled LHT to support transparent analysis and error solutions, and consequently created conditions for sustainable improvement. Soon after, LHT became interested in making this standard usable for the entire product range of the LHT Group. In addition to the standardized risk assessment, the collection of error and cause categories helps to identify systematic issues. So it was natural that the MEDA methodology was integrated as a part of the LHT’s SMS.

Due to the variety of products (e.g., line, base, shop maintenance), it was necessary to adapt the MEDA concept to the needs of LHT. In the MEDA concept the error categories are focused on maintenance system failure (Section III in the MEDA Results Form). This is perfectly designed for the needs of line maintenance and was easily transferred to base maintenance. For the component and engine service, however, it was necessary to expand the categorization. The same applied to the requirements of the design and production organization of LHT. There are similar considerations in the industry today that have led to the discussion about Component Error Decision Aid as a counterpart to MEDA. However, since LHT conducts the investigations worldwide using a standard IT system called q/star, the error categories were simply extended to meet LHT specific needs. For this reason LHT uses the term “error categories” instead of “maintenance system failure.”

To make specific extensions of MEDA concept transparent, the LHT investigation process in q/star is called MEDA^{plus}, which is considered an important tool in its quality/safety toolbox.

LHT experience in collecting investigation data has shown that the categorization of contributing factors or cause categories (as LHT named it), is commonly applicable. When combined with the product or process data, the categories are informative, allow quick detection of systematic vulnerabilities, and thus help to ensure better product and process stability (see Figure 2). On this basis, appropriate significant improvements can then be demonstrated within a reasonable period of time.

Dr. Maggie J. Ma is a Certified Human Factors Professional (CHFP) who specializes in maintenance human factors. She is an associate technical fellow at Boeing where she enjoys supporting Boeing customers and other maintenance organizations on safety programs such as MEDA and Maintenance Line Operations Safety Assessment (M-LOSA) around the world.

Ms. Anja Koschinski is head of quality monitoring and reporting at Lufthansa Technik AG, Ms. Koschinski has a diploma in business education and is a Certified Systemic Consultant. She is responsible for the central processes of the LHT Group around SMS as well as the associated IT applications.

Accidents that changed aviation: Improving cockpit communication

Aviation's worst disaster occurred on March 27, 1977, when two 747s collided on a runway in Tenerife, Canary Islands. Five hundred and eighty-three people were fatally injured in an accident that should not have happened.

The next year, a United DC-8 landed short of the runway near Portland, Ore., out of fuel. Tragically, 10 passengers lost their lives.

Neither accident should have happened because some of the crewmembers knew things were going wrong but could not persuade the captain. Both captains continued in their mistaken belief that things were going fine. Both ended in catastrophe.

On a foggy day in March 1977, KLM Flight 4805 began its takeoff roll on a flight to Amsterdam. The flight engineer and first officer were unsure if they were cleared for takeoff or only to line up on the runway awaiting further clearance. The captain was sure they were cleared for takeoff. He overruled the other two pilots and the big jet began to accelerate. They were not cleared for takeoff because a Pan Am 747 was taxiing on the runway as instructed by the controllers.

As the KLM jet neared flying speed they saw the Pan Am plane in the fog and attempted to fly over it. The airplanes collided, killing all aboard the KLM flight and many on the Pam Am jet. Aviation had just suffered its worst accident.

A little more than a year later, United Flight 173, a DC-8, was flying from Denver to Portland, Ore. As they approached the Portland airport and extended the landing gear, something went wrong. One of the main landing gears malfunctioned, causing the pilots to abort the landing. Once at a safe altitude the pilots attempted to fix the problem. Soon it became apparent there was a chance that the landing gear might not support the airplane on landing and an evacuation might be necessary. After advising the flight attendants to prepare the cabin for a possible evacuation, the captain continued to work with the first officer and flight engineer to resolve the problem. Fuel was becoming an issue.

It took longer than expected to get all the passengers prepared, and the jet consumed fuel at a high rate due to the drag of the extended landing gear and low altitude. The first officer and flight engineer were growing concerned. As the captain methodically checked with the flight attendants on their progress, the first officer and flight engineer again expressed their concern about the amount of fuel remaining. The captain overruled them, finishing the discussion with the flight attendants.

Finally, he asked for a turn toward the airport but there was not enough fuel remaining to make it. The four-engine jet ran out of fuel 6 miles from the airport. Two crewmembers and eight passengers died.

Both accidents had captains overrule other crewmembers with catastrophic consequence. Aviation had to create a way for crewmembers to effectively communicate safety concerns. Crew Resource Management (CRM) was born. The concept of CRM is that everyone is responsible for safety. While the captain is in command, he or she must take into account safety concerns from fellow crewmembers. We began to build better teams flying the airplanes.

In 1989, United Flight 232 had an engine explode, crippling the DC-10. The explosion sent shrapnel through the tail, severing hydraulic lines in all three systems. The jet was uncontrollable. Using CRM, the captain and crew, along with a DC-10 instructor that was flying as a passenger, managed to gain limited control of the badly crippled airliner. They landed in Sioux City, Iowa, destroying the airplane but 185 survived. CRM built the team that flew a nearly unflyable jet.

Today, CRM is a major component of every airline safety program. Every pilot is taught the skills of leadership, followership and effective communication. CRM is a contributor to the lower accident rate we see today.

Going beyond 'human error'

HUMAN FACTORS AND ERGONOMICS SOCIETY

Failures in highly technological environments, such as military aircraft, can be investigated using known tools like HFACS, the U.S. Department of Defense's Human Factors Analysis and Classification System. However, because of some limitations, HFACS does not always highlight the deeper causal factors that contribute to such failures. In what might be the first application of the Bayes' theorem probability formula to an HFACS dataset, Andrew Miranda examined data from 95 severe incidents to pinpoint external influences behind so-called human error.

"Understanding Human Error in Naval Aviation Mishaps" discusses the three potential influences on performance-based errors that Miranda found: sensory misperception (for instance, spatial disorientation), mental awareness (cognition, attention), and the technological environment (e.g., design of cockpit displays and controls).

In addition, factors that likely contributed to judgment/decision-making errors included supervisory or organizational influences that may have placed aviators in situations of increased risk that taxed, if not their skills, then their decision-making abilities.

Digging deeper into external influences in the 95 mishaps, Miranda, an aerospace experimental psychologist at the Naval Safety Center, used content analysis. Themes drawn from the mishap reports helped to explain how and why the failures occurred. These themes could be classified as involving teamwork and organizational/supervisory influences. For example, there was evidence that crewmembers were unexpectedly put in a position of shared expectations that someone else was responsible for a particular task. When this occurred during circumstances with slowly increasing risk, individual crewmembers did not speak up or intervene because the social and technical conditions unintentionally encouraged it. Slowly but surely, an unsafe situation would emerge.

Miranda notes, "This project was essentially the extension of human factors work spanning 70 years: examine beyond the label 'human error' in favor of more careful considerations about the general conditions of aviation accidents. There were 95 severe mishaps in our dataset. To those of us on the outside, it's easy to look back with hindsight at each one of those accidents and wonder why the people involved did (or didn't) do what they did (or didn't). But we won't learn much with that approach. Instead, we made the effort to take an insider perspective. Each of these mishaps is an intricate story of people and technology under changing, dynamic circumstances that ultimately lead to an aircraft being destroyed or even lives being lost. The people involved made decisions and actions that made sense to them at the time. Human factors principles and methods are uniquely capable at both uncovering how conditions foster pilot error, as well as suggesting how to improve those conditions for future aviators."

Miranda's work has the potential to reveal ways in which HFACS or similar incident analysis tools can be used in other complex systems, such as health care, oil and gas, transportation, and maritime operations.

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To receive a copy of "Understanding Human Error in Naval Aviation Mishaps" for media-reporting purposes, please contact HFES Communications Director Lois Smith (310/394-1811).

The Human Factors and Ergonomics Society is the world's largest scientific association for human factors/ergonomics professionals, with more than 4,500 members globally. HFES members include psychologists and other scientists, designers, and engineers, all of whom have a common interest in designing systems and equipment to be safe and effective for the people who operate and maintain them. "Human Factors and Ergonomics: People-Friendly Design Through Science and Engineering."

http://journals.sagepub.com/doi/10.1177/0018720818771904

Nonfatal injury rate for air transportation workers rises

Air transportation workers had 6.7 cases of nonfatal workplace injuries and illnesses per 100 full-time equivalent workers in 2016, up from 6.2 cases in 2015, according to data released Monday by the U.S. Bureau of Labor Statistics.

That was more than twice the rate of 2.9 cases per 100 full-time workers for all private industry workers, the bureau posted on its website.

Among the three largest occupations in scheduled air transportation, flight attendants experienced injuries and illnesses that involved days away from work at a rate of 515.3 cases per 10,000 full-time workers in 2016. The rate for reservation and transportation ticket agents and travel clerks was 145.2 cases. The rate for airline pilots, co-pilots, and flight engineers was 39.3 cases.

Those rates compare with a rate for all private industry workers in 2016 of 91.7 cases per 10,000 full-time workers, according to the new data.

The 2015 rate for air transportation workers had been the industry's lowest rate on record before rising in 2016. This increase was due mostly to an increase in the scheduled air transportation industry from 6.6 to 7.3 cases per 100 full-time workers, according to the bureau.

Safety of medical helicopters draws scrutiny after crash

The safety of helicopter ambulances is under scrutiny after three crew members were killed in a crash in a wooded area of northern Wisconsin recently.

The National Transportation Safety Board is investigating, and the cause of the crash is not yet known. However, the conditions -- late at night in a remote rural area -- make it "the classic case" of a crash involving a medical helicopter, said Kevin Durkin, an aviation lawyer in Chicago.

Medical helicopter crashes

From 1990 through 2015, 217 people died in 81 fatal accidents involving medical helicopters, according to the NTSB. The worst year was 2008, when 28 people died.

There were 220 accidents, including those without fatalities, during the 1990-2015 period. There were at least 10 crashes every year from 1999 through 2008, as the use of helicopters to ferry patients grew.

Helicopter numbers

There are about 10,600 helicopters of all types operating in the U.S., according to a group made up of government and helicopter industry representatives. In 2017, there were about 3.5 crashes for every 100,000 hours of flying, roughly the same as the year before but down from nearly 5.0 per 100,000 hours in 2013 and 4.3 in 2014.

In recent years, helicopters overall have had a lower rate of fatal accidents than small planes for the same amount of flying, according to figures from the Federal Aviation Administration.

"Generally it is very safe," said Dan Sweet, a spokesman for the Helicopter Association International in Alexandria, Virginia. "It's safer than automobiles, but automobile crashes don't have the same news value."

Bigger is safer

However, helicopters and small planes are far more likely to crash than bigger planes. US airliners had not suffered a single passenger death due to an accident from 2009 until this month, when an engine explosion on a Southwest Airlines jet killed a passenger.

Helicopters do more takeoffs and landings -- the most dangerous parts of flight -- than most planes. Most have only a single engine, so a mechanical problem can quickly turn deadly. They land on many kinds of surfaces, not just runways, and fly at lower altitudes, exposing them to dangerous obstacles including power lines, buildings and mountains. Weather may also be a factor, especially for air ambulances.

When the weather is bad, hospitals will call several air ambulances until they find a pilot willing to fly, said Ladd Sanger, an aviation lawyer in Dallas.

"There is pressure on the providers and the pilots to go because they want to be known as the guy that always goes and not the one that says no," Sanger said.

Helicopter designs

Safety experts say more could be done to make the aircraft safer, including expanding a requirement on new helicopters to have fire-resistant fuel tanks.

In just one case, a flight nurse who was badly burned in the crash of a medical helicopter in Colorado reached a settlement this year with Airbus Helicopters and Air Methods Corp. for $100 million, according to the nurse's lawyers. The pilot was killed -- his daughters reached a settlement of undisclosed terms with Airbus Helicopters -- and another nurse injured. Investigators believed that the crash was survivable, but the helicopter did not have a crash-resistant fuel system.

Durkin said he faults the manufacturers, the helicopter operators and the FAA for not requiring more helicopters to have safer fuel systems.

Pilot training

Most helicopter pilots learn the craft at a flight school or in the military. The requirements are similar for flying airplanes, and it's possible to get a private operator's certificate after 40 hours of flying time. Commercial helicopter pilots, however, have far more time in the air.

"EMS pilots generally are very experienced," Sweet said. He said operators frequently demand at least 1,500 flight hours before considering an applicant.

Unnecessary trips?

A ride in an air ambulance can be very expensive, and critics say they have become far too common.

"They can be very good tools for people that are injured or sick in remote areas to get to the hospital," said Sanger, the aviation lawyer. "The vast, vast majority of helicopter transports are not medically necessary. You would get to the hospital faster and way cheaper if you used a ground ambulance."

Naval aviation plagued by 'disturbing' trend of ground mishaps

The Navy's air boss announced that "Class C" ground mishaps in naval aviation have doubled in the past decade, and he's made eliminating the mistakes his current No. 2 priority - behind the continued efforts to eliminate cockpit physiological episodes.

Class C mishaps are those in which total property damage falls between $50,000 and $500,000, or an incident that causes a sailor injury the warrants missing a day or more of work.

Vice Adm. DeWolfe Miller, head all naval air forces, identified the increase of the mishaps in this year's annual aviation safety message to all aviation commanders and commanding officers on May 3.

He also announced the requirement for every aviation unit to conduct their annual one-day safety standdown before the Memorial Day holiday.

Navy Times obtained a copy of the message and Naval Air Forces confirmed its authenticity.

In the message, Miller called the rise in mishaps a "disturbing trend."

"Since 2012, Class C [ground] aviation mishap rates have more than doubled - 9.86 mishaps per 100,000 flight hours in FY12 steadily rising to conclude FY17 at 20.25," Miller wrote.

"Almost all Class C mishaps are preventable and a significant number of these occur during routine maintenance evolutions."

Miller pointed to the combination of inexperience among aviation maintenance sailors and diminished flight hours across the board in naval aviation over the same time period as the most likely culprits, and noted that "experience and proper supervision" are the best prevention methods for such mishaps.

But at least half of that formula for success is harder to come by in today's Navy, he said, and it's something that requires more attention to detail from commanders.

"Studies show that naval aviation's average E-5 has 1.5 years less experience as compared with 5 to 10 years ago," he wrote.

"We also know that with reduced flight hour execution, sailors receive fewer reps and sets performing their maintenance actions."

Miller called on units to recognize this lack of experience and ensure sailors are qualified and properly supervised during maintenance evolutions.

"Therefore, we need to ensure all evolutions, no matter how routine, procedurally follow the book and are performed by qualified sailors who are properly supervised.

"As an enterprise, we owe it to the American people to be good stewards of their money," he continued. "We also take great pride that we plan, brief, execute, and debrief every flight. Ensure your entire team does the same with maintenance evolutions."

Despite the initiative, the number one safety priority in naval aviation remains the rash of physiological exposes plaguing aircrews in flight.

"We are making great strides in mitigating PE, however, much work remains," Miller wrote.

"Strict adherence to procedures and maintaining a sense of urgency at all levels with all activities are critical as we aggressively tackle PE across affected...aircraft and aircrew."

Hit-and-Run Crashes, Deaths on the Rise: AAA Foundation

"Hit-and-run crashes in the United States are trending in the wrong direction," said Dr. David Yang, executive director of the AAA Foundation for Traffic Safety. "Our analysis shows that hit-and-run crashes are a growing traffic safety challenge, and the AAA Foundation would like to work with all stakeholders to help curtail this problem.

"Hit-and-run crashes are increasing on U.S. roads, that the point that more than one occurs every minute, according to recent research from the AAA Foundation for Traffic Safety. Hit-and-run crashes caused 2,049 deaths during 2016, the highest number on record and a 60 percent increase since 2009, according to AAA, which is urging drivers to be alert on the road and always remain on the scene if a crash occurs.

The organization reported that its researchers examined common characteristics of hit-and-run crashes and found that an average of 682,000 hit-and-run crashes occurred each year since 2006, and deaths due to them have risen by an average of 7.2 percent annually since 2009. Nearly 65 percent of people who died in hit-and-run crashes were pedestrians or bicyclists.

Per capita, New Mexico, Louisiana, and Florida have the highest rate of fatal hit-and-run crashes, while New Hampshire, Maine, and Minnesota have the lowest rates.

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During the past 10 years, nearly 20 percent of all pedestrian deaths were caused by hit-and-run crashes. AAA encourages drivers to:

- **Be aware:** Pedestrians may act unpredictably and can walk into the path of travel at any point.
- **Be cautious:** Look out for small children and be alert to areas where there are likely to be more pedestrians. These include school zones, playgrounds, bus stops, and intersections.
- **Be patient:** When trying to pass a pedestrian or cyclist, give plenty of space and keep them in your line of sight.
- **Be vigilant:** Drivers should always yield to pedestrians, even if they walk into the road from an area other than a crosswalk.

"It is every driver's legal and moral responsibility to take necessary precautions to avoid hitting a pedestrian, bicyclist, or another vehicle," said Jennifer Ryan, director of state relations for AAA. "While no one likes being involved in a crash, leaving the scene will significantly increase the penalties for drivers- whether they caused the crash or not."

The AAA Foundation for Traffic Safety was established in 1947 by AAA. It is a not-for-profit, publicly funded, 501(c)(3) charitable research and educational organization.

https://aaafoundation.org/

https://newsroom.aaa.com/2018/04/hit-run-deaths-hit-record-high/