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REPORT of ARMY AIRCRAFT ACCIDENTS
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ARMY TOP LEADERS COMMITTED TO RISK MANAGEMENT

Following is a reprint of a message to the field from the Honorable Togo D. West, Jr., Secretary of the Army, and General Gordon R. Sullivan, Chief of Staff, Army.

Every day our Army responds to our nation's needs in uncertain and high-risk environments. Soldiers routinely perform complex tasks and missions at home station and throughout the world and are accomplishing these missions safer than ever before. Reportable Army accidents continue to decline, and our accident rate of 6.33 accidents per 1,000 personnel is the lowest on record. We can attribute much of our outstanding safety record to the hard work and dedicated effort of commanders, noncommissioned officers, and soldiers.

While taking pride in our accomplishments, we cannot become complacent to the high-risk nature of our business. The environment of our Army has changed. As we continue to reshape the force, turbulence increases while experience declines. And while the operational pace of our Army is at an all-time high short of war, soldier and unit training opportunities are less, due to competing priorities and declining resources. These and other factors have contributed to unprecedented turbulence, causing the loss of seasoned leaders and instability at the crew, squad, and small-unit level.

We have recently experienced a number of training accidents, making us painfully aware of the increased risks associated with our profession. These accidents should serve as "red star clusters," a warning signal to all who have the responsibility of caring for soldiers. While safety statistics continue to be favorable, there is no denying that certain risk factors have increased. We must recognize changing conditions and the role they play in risk assessment.

We urge all of our commanders, noncommissioned officer leaders, and great young soldiers to make a renewed commitment to increased safety awareness, more rigorous use of risk assessments, and improved adherence to SOPs and training policies, which are designed to minimize the risks associated with the way we work and train. People are our most valuable resource, and their safety and well being is one of our most important missions.

Confront the issue!

The day was clear and crisp. The aircraft had been preflighted and was ready to go. The commander was probably the best stick and rudder pilot I had ever had the pleasure to fly with, and we were ready to strap in and escape the "surly bonds of earth." Everything was just perfect, and we were feeling great.

Flying toward our intended destination, the commander decided to try a maneuver that we both knew was prohibited. Although we knew the aircraft could handle it, the standing operating procedures said **do not** perform this particular maneuver, and it listed the reasons why. Nevertheless, the commander put the aircraft through the maneuver and never asked my opinion. The maneuver was marginal at best, and when the aircraft was once again straight and level, I sighed with relief that we'd made it through. The remainder of the flight was flawless and we returned to base without any problems.

The very next day, the commander took a newly assigned aviator up on an orientation flight. They never came back. The accident investigation report read as follows:

> *After careful examination of the destroyed aircraft, combined with several eyewitness reports and other data, this board has determined that the pilot of the aircraft intentionally performed a prohibited maneuver, which resulted in the loss of flight control, causing the aircraft to impact the ground.*

Two people died in that crash and much of the blame was on my shoulders as well as the shoulders of several other pilots who had flown with the commander. There was a long history of "break room" war stories about things the commander had done while flying. It seems that everyone who had flown with him, at one time or another, had come back with a hair-raising tale of "nearly buying the farm." They laughed and thanked their lucky stars that they were alive and made comments like "that man can really fly that airplane" and "I wish I had half the flying skill he does." So if his flying ability was so great, why did he die? He died because his friends never said anything to him about his unauthorized, unprofessional, and unsafe flying practices.

"He was a good guy." "I like him and I don't want to make him angry at me." "He'll think I'm a troublemaker if I report him." These were typical of the excuses everyone used. Of course nobody wanted to be thought of as a "whistle-blower," so no one was willing to confront him or report him to his superiors for his reckless flying. Maybe if just one person had asked him to stop flying so recklessly, he might still be alive. And the pilot who died with him would have lived to fly another day. But they didn't and I didn't, and my commander is dead and I've lost a dear friend forever.

This story didn't happen, but how many of you can truthfully say you've never known anyone like this commander and the people in the unit who wouldn't confront him because they liked him and thought he was a "good guy."

A recent article in my local newspaper cited a military aircraft crash in the northeast U.S. The article called the pilot of the aircraft a "hot-dog pilot" and blamed his commanding officers for failing to recognize the pilot's "excessively aggressive" flying during previous flights dating back as far as 3 years. Three years! And like the fictional story about my commander, no one seemed to care enough or was leader enough to put a stop to this pilot's antics. I feel sure the pilot was an excellent flyer with several thousand flight hours to his credit. He probably had

a great track record as a team player and a superior reputation as an officer. He was probably a family man, whose family loved him very much and was proud of his accomplishments. But he's dead, and so are several other people who were on board his aircraft, because no one seemed to have the fortitude or leadership to confront him properly about the way he flew. Even worse, none of his friends seemed to care enough to tell him they feared for his welfare and those who might be flying with him during those "hot dog" flight episodes. **Nobody properly confronted the issue!** And even if they did, it is very obvious that no one initiated appropriate countermeasures to prevent the accident. The next question is **why?**

Many of us know pilots who seem to live a charmed life in the air. They are the envy of their fellow aviators. They're always on top of every situation, and they never have any problems meeting or exceeding the requirements for their position as a pilot. We sit around and marvel at their accomplishments, listen to their war stories, and laugh about the times they've "cheated death," hiding our envy of never having done any of the marvelous things they have done. Some of us have flown with these pilots and have seen them do things that were unsafe and against the rules, but we never say anything to them because we're afraid of what they might think of us. They might think we're too inexperienced to critique their flying or maybe they'll tell our peers that we're troublemakers, alienating us from the comradery that pilots so often enjoy. The reasons are many and varied, but the one common factor is that **we do not confront the issue**. Well, guess what, people? **We're wrong**.

Aviation is not the only field in which people do foolish things to try and impress others. It happens every day in almost every aspect of life, and every day people are injured or killed because they did not follow the safe and correct procedure to accomplish their task. People constantly exceed the boundaries of their ability in the interest of gaining favor with their peers. The sad and unforgivable aspect of this situation is the fact that when people see their friends and coworkers break the rules, they fail to take any action to prevent it from happening again. Once again, the question is **why?**

I have been accused of being a rigid and unrelenting SOB as an instructor pilot because I place a great deal of emphasis on precision. I don't mean the kind of precision that demands knowledge of how many rivets hold a wing together or explaining the lift equation but the kind of precision that will prevent you from flying into a situation that would result in your death. My attitude is devoted to "**safety of flight!**" When I see a fellow aviator doing something unsafe, I'm the SOB that will tell him. Maybe you should do the same. This is not to say that I am a perfect pilot. I make my share of mistakes like everyone else, but I do strive to perform as a superior pilot. In case you might think this attitude is somewhat egotistical, let's review the definition of "superior pilot." A superior pilot is one who exercises his or her superior judgment in order to avoid situations requiring the use of his or her superior skills. It doesn't sound so egotistical now, does it?

Some of you who read this article will form an opinion that I'm an overzealous "do gooder" trying to preach safety. Well, I'm doing exactly that! I'm preaching to you now, so your local chaplain or pastor won't have to preach *over* you later, so listen up! I care enough to speak up when safety is compromised, and you should feel the same way. So next time you see your coworker or fellow aviator doing something unsafe, care enough to at least confront him or her about the situation. A simple "Why did you do that?" or "Please don't do that!" might prevent an injury and may postpone a funeral. If the personal approach doesn't work, show you care by advising your immediate supervisor of the situation. If that approach doesn't work either, advise the "big bosses" and let them handle it, but at least **do something to confront the issue!** Amen.

—MW4 James F. Spiers, Jr., Aviation Safety Officer, 151st Medical Battalion, Georgia Army National Guard, Dobbins Air Reserve Base, GA, 404-421-5630

Keeping our skies safe

Air traffic control (ATC) is a system based upon pilot and controller communication and understanding. This is the basic component that makes the airspace system work. Another vital component is the regulatory guidelines that pilots and controllers follow to ensure the process goes smoothly and safely. When either of these components breaks down, the consequences can be devastating.

As air traffic controllers, we are charged with the responsibility of maintaining situational awareness at all times. The pilot's primary role in this process is to operate his or her aircraft in accordance with regulatory guidelines and controller instructions. When controllers and pilots

perform their roles as expected, a relationship of mutual trust is formed that makes our air traffic system safe.

Historically, accidents have revealed that communications and procedures are vitally important. Analysis of most accidents that occurred in terminal areas reveals that deviation from ATC procedures, outdated airfield policies, and lax ATC management and training were significant contributing factors.

There is a lot to be learned from aircraft accidents, and ATC managers should be proactive in analyzing these tragic events to determine if airfields are safe. Following are some of the basic requirements to ensure a safe airfield environment.

■ Review local operating procedures and flying rules to ensure that the procedures are in accordance with Army Regulation (AR) 95-3: General Provisions, Training, Standardization, and Resource Management and remain valid to meet current airfield requirements.

■ Write letters of agreement/operation in accordance with Field Manual (FM) 1-303: Air Traffic Control Facility Operations and Training to ensure all procedures outlined are pertinent and up to date for current operations. Ensure all controllers know the contents of these letters.

■ Night vision devices (NVD) and local training area procedures and requirements are mandated by AR 95-2: Air Traffic Control, Airspace, Airfields, Flight Activity, and Navigational Aids and FM 1-303. At those locations where NVDs are required, ensure that a training program is established and all controllers are instructed in the operational use of NVDs prior to commencing NVD operations.

■ Survey instrument flight rules/minimum vectoring altitude areas on current sectional charts and notify the Department of the Army regional representative of any changes in the area.

■ Establish a comprehensive training/proficiency program to keep ATC personnel abreast of all current procedural changes and policies affecting the facility, airspace, and airfield.

■ Ensure all controllers, including ATC facility chiefs, remain current and proficient in their facility. Inform airfield management of the requirements of AR 95-2 at those locations where currency requirements cannot be met.

■ Establish a rapport among members of the aviation community to resolve any problem areas and to educate one another on pilot/controller responsibilities.

As we perform our day-to-day duties as air traffic controllers and managers, it is imperative that we operate in accordance with regulatory guidance. Federal Aviation Administration Handbook 7110.65: Air Traffic Control prescribes procedures, phraseology, and correct pilot/controller terminology to be used by all air traffic controllers. Controllers are required to be familiar with and adhere to the provisions that pertain to their operational responsibilities and to exercise their best judgment for situations not covered in this handbook.

Shift supervisors, facility chiefs, and ATC chiefs should, as part of their duty, check the phraseology that emanates from their facility. They need to ensure that all controllers are using the correct pilot/controller terms and procedures.

Additionally, it is extremely important that members of a shift perform as a team. A shift's success depends on every member being cognitive of potential hazards. Complacency perpetuates accidents.

Teaching new controllers to control traffic is an art in itself. This is the prime time to instill values and basic principles of air traffic control. Start the crawl, walk, run theory with solid book work, transition through the different positions, and culminate with an evaluation of performance. Impress upon these new controllers the importance of memorizing call signs, knowing various aircraft maneuvers, sequencing and spacing techniques, and having the ability to conceptualize and visualize the execution of their plan to control aircraft.

The success of an airfield is built upon a mutual understanding between ATC, airfield operations, and aviators. AR 95-3 states that "an air traffic control representative will be a member of the aviation standardization committee." The committee's function is to review directives, provide guidance, and recommend changes to aviation literature. The ATC chief needs to be an active member of this committee to ensure air traffic control procedures are integrated into the airfield standards. They should also use this committee as a vehicle to enlighten the aviation community on ATC safety concerns and practices.

Another area that is vitally important but often overlooked is the operational hazard report (OHR) process. The OHR (DA Form 2696-R) is an outstanding tool that can be used to correct any condition or set of circumstances that could compromise the safety of aircraft, associated personnel, airfields, or equipment. The purpose of the OHR is not to air a technical gripe between ATC and pilots. Its purpose is to record information about hazardous acts or conditions so that corrective action can be taken. As a supplement to this process, the ATC chief and others in the aviation community need to foster a relationship that is based upon mutual support and education of each other.

This article is not intended to be all inclusive; rather, it is a sample of things that should be checked and working to ensure the air traffic system is operating safely. Time invested now will pay future dividends in the safety of Army aviation operations. As controllers, we must stand by our creed to be safe, orderly, and expeditious in protecting lives and preserving the Army's highly valued aviation resources.

—MSG Eddie L. Spivey, U.S. Army Air Traffic Control Activity, Fixed-Base Support Division, Fort Rucker, AL, DSN 558-1115/9067

Using safety NCOs to their full potential

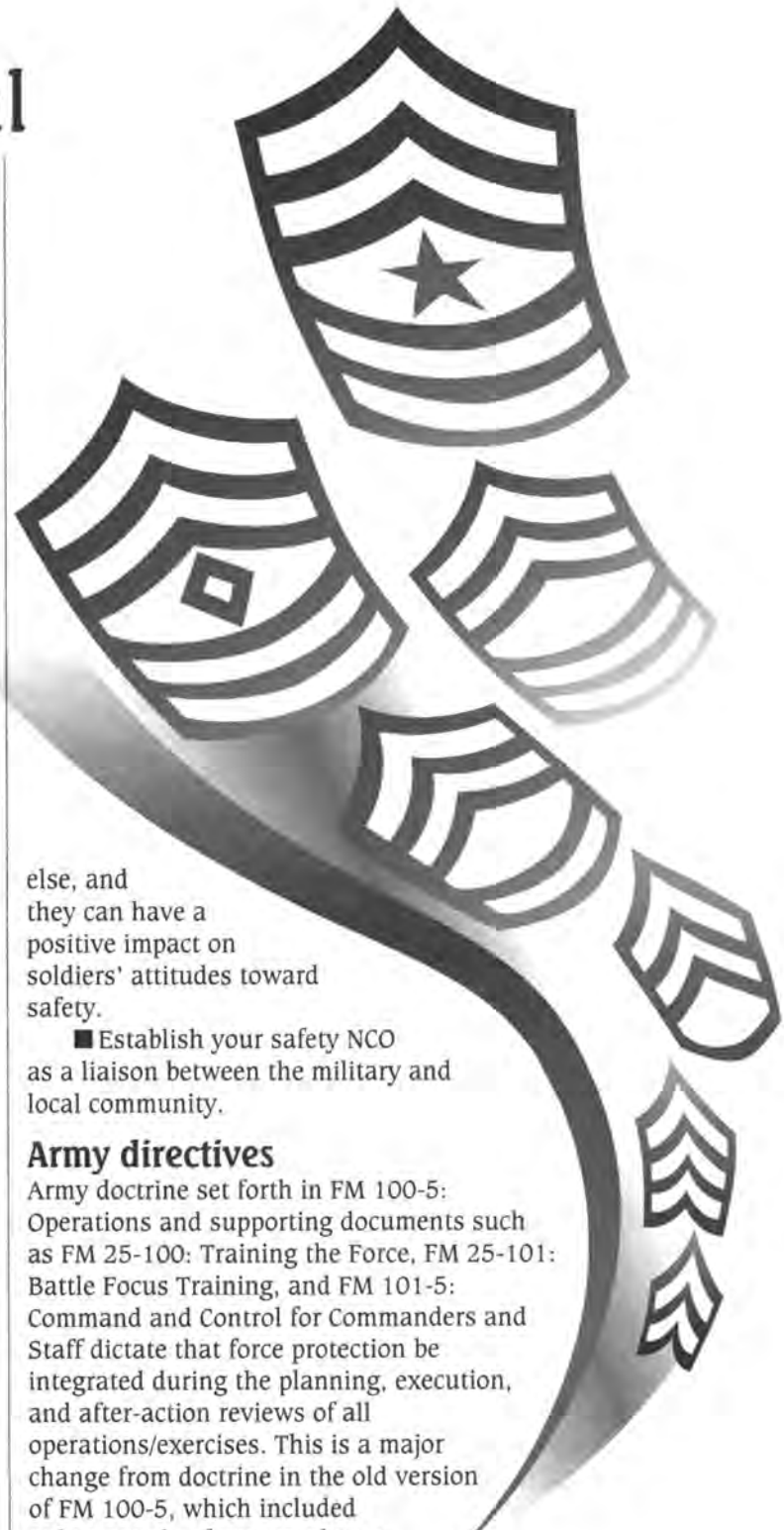
A good safety NCO is one of the greatest assets any commander, leader, or supervisor can have in his or her force protection (safety) program. But no matter how good safety NCOs are, if they aren't being utilized properly or, worse, aren't being utilized at all, they're just dead weight. In today's lean and mean Army with the kind of optempo we're facing, we simply cannot allow this to happen. Leaders who don't use all of their assets properly—and this certainly includes the safety NCO—contribute to the problem instead of being problem solvers.

AR 385-40: Accident Reporting and Records defines an accident as an unplanned event that causes personal injury, illness, or property damage. Those of us in safety are paid to put forth a valiant effort to prevent accidents or to assist in developing mechanisms to reduce them. But we must be allowed to do our jobs if we are going to help protect the force, accomplish the unit mission, and meet the Army's objectives.

Shared responsibility/authority

The key to a good safety program is to eliminate hazards and develop ways to reduce risk of injury to soldiers and damage to equipment. If you are using your safety NCO only to get ready for inspections, catch up on paperwork, or prepare for upcoming rotations or deployments, you're not getting your money's worth. In these austere times, we're having to do a lot more with less—less time, less money, and fewer personnel. We're all familiar with the old saying "work smarter, not harder," but there are still some people who believe they are the only one who can do it right and get it right the first time. Egos are sometimes hard to push aside while staying focused on mission accomplishment. There may be leaders who say "I have key responsibilities and authority, and I am not going to give any of it up." That's not working smarter. Sharing these responsibilities and authority with your safety NCO will allow you to—

- Double your exposure (mirror image). You can't be everywhere all of the time, but by properly utilizing your safety NCO, you *can* be effective in twice as many places a lot more of the time.
- Conduct safety surveys to determine your unit's safety climate.
- Capitalize on the expertise of your safety NCO to help identify accident causes and contributing factors and make recommendations to prevent future accidents.
- Have an NCO safety standard bearer (on and off duty). NCOs spend more time with soldiers than anyone else, and they can have a positive impact on soldiers' attitudes toward safety.
- Establish your safety NCO as a liaison between the military and local community.



Army directives

Army doctrine set forth in FM 100-5: Operations and supporting documents such as FM 25-100: Training the Force, FM 25-101: Battle Focus Training, and FM 101-5: Command and Control for Commanders and Staff dictate that force protection be integrated during the planning, execution, and after-action reviews of all operations/exercises. This is a major change from doctrine in the old version of FM 100-5, which included only a couple of paragraphs on protection as one of the elements of combat power. Every noncommissioned officer in the Army has a big part to play in the implementation of our new doctrine.

The first institutional exposure of an NCO to force protection is in the Primary Leadership Development Course (PLDC). Exposure to force protection continues in the basic/advance NCO courses, battle staff, first sergeant, and the Sergeants Major Academy. Why not include all of your NCOs in your safety program? Section/platoon sergeants, operations sergeants, first sergeants, and sergeants major are ideal safety NCOs because of their day-to-day and hour-by-hour interaction with every soldier in the unit. Using them as safety NCOs does not take away from your designated unit safety NCO's responsibilities. Rather, forming a coalition comprising the safety officer, safety NCO, and unit NCOs can do much to maintain the standards of force protection throughout the unit. The following are tasks and processes in which all NCOs should be routinely involved:

- Risk management (planning, execution, and after-action review).
- Developing a good command climate (soldier feedback should be encouraged and welcomed).
- Safety council member (serve as a sounding board and be candid).
- Serve as eyes and ears of the command.

Safety NCO functions

Safety NCOs should—

- Detect problems/hazards early in training management and operations and make recommendations to control or eliminate them (risk management).
- Keep the command advised and informed of current program effectiveness.
- Support the command's accident prevention program by enforcing standards.
- Maintain contact with and provide assistance to members of the command's staff, commanders, and other leaders concerning integration of risk management.

Safety NCO training

To be effective and enable them to make the maximum contribution to the unit safety program, safety NCOs must be properly trained. Training provided at the Safety Center's Aviation Accident Prevention Course includes the following areas:

- Accident causation
- Job hazard analysis
- Range safety
- Shop and flight line safety
- Airfield operations
- Ground-accident reporting
- ALSE
- Risk management
- Safety publications
- Army Oil Analysis Program
- Unit operations
- Aviation POL operations
- Toxic hazards

The Safety Center is currently developing the program of instruction for a ground-safety course. The first course is planned for 23 January 1995. Watch for future class dates on the Army Training Requirements and Resources System (ATARS).

Summary

This article is not intended to tell anyone all they ever needed to know about utilizing safety NCOs. But it does include some of the things that have proved successful in aviation units throughout the Army. I hope they will prove helpful to other units. Remember that force protection (safety) is everyone's responsibility, and for it to work as it should, we must make it a way of life every day, on and off duty.

POC: SGM Charlie L. Mahone, USASC, DSN 558-3575 (205-255-3575)

JP-8 fuel conversion

The initiative to replace JP-4 fuel began in the early 1970s and was primarily driven by safety concerns. U.S. Air Force studies conducted during the Vietnam War revealed that aircraft fueled with JP-4 experienced much greater fire-related combat losses than aircraft used in Naval air operations, which used JP-5 fuel.

The critical difference between the hazardous nature of JP-4 versus JP-5 is the flash point. Flash point is defined as "the lowest temperature at which a fuel will ignite given sufficient oxygen and an ignition source." JP-4 is a blend of naphtha and kerosene, and, much like gasoline, it is ignitable over a very wide range of normal ambient temperatures. Unlike gasoline, the kerosene portion of JP-4 lessens the tendency of the fuel to release vapors, otherwise known as vapor pressure. Suppression of vapor pressure creates a dangerous condition where the environment above the fuel surface is nearly always ready to ignite. This condition has been the cause of many JP-4 fires from even the smallest ignition sources such as static electricity discharge.

JP-5 and JP-8 are both straight kerosene-type fuels that have little or no vapor pressure and minimum flash points of 140°F and 100°F respectively. Although similar to JP-5, JP-8 is more widely available from commercial supply sources as it is almost identical, except for military additives, to commercial aviation fuel. Due to improved safety, availability, and interoperability with allies, JP-8 was chosen by the Air Force to replace JP-4 within NATO.

OCONUS conversion began in 1979 at air bases in the United Kingdom and was expanded to include all U.S. forces in NATO by 1988.

Single fuel for the battlefield concept

Additional research performed in the mid-1980s confirmed the feasibility of using JP-8 in diesel-powered combat vehicles and ground equipment. Following coordination with DOD during April through September 1987, DOD Directive 4140.43, which addressed fuel standardization, was issued on 11 March 1988. The directive specified JP-8 conversion for all overseas land-based air and ground forces. This concept became known as the "single fuel for the battlefield" by replacing diesel and JP-4 with JP-8 as the primary fuel. All overseas unified commands have now converted or are in the process of converting to JP-8 as a single fuel for aviation and ground equipment.

Advantages of single-fuel concept in CONUS

Along with the increased safety advantages of JP-8, there are significant logistics advantages to the single-fuel concept. Among these are the procurement of only one fuel and the consolidation of previously segregated fuel distribution systems used for diesel and JP-4. Due largely to these benefits, plans were made to continue the JP-8 single-fuel concept in CONUS. However, the ground-fuel phase of CONUS conversion was preempted by EPA restrictions on sulfur levels in diesel and diesel substitutes such as JP-8. The EPA low-sulfur mandate became effective on 1 October 1993. Ongoing comparative exhaust emissions testing by the TACOM Mobility Technical Center may determine whether ground-fuel conversion in CONUS will ever be fully implemented. (See sidebar for status of aviation conversion phase of this program.)

Disadvantages of JP-8 conversion

Although the advantages favor JP-8 conversion, there are some disadvantages. JP-8 has caused cold-start problems with some older aircraft models when used in extremely cold climates. Ignition problems occur due to the higher flash point of JP-8 and because it is a slightly heavier and more viscous fuel than JP-4, especially at colder temperatures. UH-1, OH58A/C, and AH-1S aircraft begin to experience cold-start problems at -25°F using JP-8. No Army aircraft are presumed capable of unassisted starts at temperatures of -50°F or below. Alaska is the only state where this problem has been reported on a common recurring basis. The most practical and economical solution for this problem to date has been to continue using JP-4. Alaska will continue to use JP-4 or the commercial equivalent (JET-B) until other solutions or aircraft replacement can be achieved.

Problem areas

Due to environmental or logistics reasons, plans for ground fuel conversion to JP-8 may be eliminated or only partially completed. If this occurs, the activities that do not convert may experience complications when having to repeatedly convert in CONUS at training sites or upon deployment to an OCONUS staging area where only JP-8 is available.

The likelihood of problems such as filter plugging upon conversion from diesel to JP-8 is directly related to the cleanliness of the fuel system. This type of problem has been most prevalent with Army Guard and Reserve components that subject their fuel and equipment to long periods of inactivity between training periods. Long periods of inactivity tend to worsen fuel contamination conditions that may already exist. The U.S. Army Petroleum Center (USAPC) is currently formalizing a contingency plan that involves the use of a diesel fuel biocide/stabilizer additive that can enhance unit readiness by conditioning diesel fuel and fuel systems prior to deployment.

Summary

Historically, the biggest problem with petroleum logistics in previous wars has been the ability to maintain sufficient quantities of fuel to keep pace with our extremely mobile ground forces. By consolidating multiple fuel and fuel handling assets to JP-8 and exercising diesel contingency options, we will improve our battlefield logistics capability and provide a much safer fuel to handle under peacetime and battlefield conditions. For updates and assistance on the JP-8 conversion program, contact Mr. Del Leese at the USAPC, DSN 977-8580/7258 (717-770-8580).

CONUS Aviation Fuel Conversion Program

Region	Status of Conversion
West Coast	Completed October 1993
Gulf/East Coast	Completed April 1994
Midwest	Began October 1994

ASO CORNER

Accident causation: a father's perspective

Having spent several years of my life teaching accident causation and corrective action in the aerospace industry as well as accident prevention at my National Guard squadron, it wasn't until my 4-year-old daughter ran into her own mishap scenario that I realized the military and civilian fields have a great deal in common.

Andrea's pre-school was located just across the street from our house. One afternoon as I picked her up from school and she raised her arm to take my hand, I noticed a cartoon-decorated bandage adorning her right elbow. Once we had crossed the street, I asked her what had happened. Her one-word explanation was a simple "Swing." The next day, as she raised her left arm for our journey across the street, I noticed she now had a matching pair of bandages. Again, her one-word response to my query as to the cause of her scrape was "Swing."

On Wednesday, as we stepped off the curb, I noticed yet a third bandage—this one adorning her left knee. My mind now boggled at the possibilities: Was Andrea collecting bandages? Was she, at the ripe old age of 4, becoming accident prone? Would the school's supply be able to keep up with her demand for bandages? I squatted down so that I was eye-to-eye with my small daughter. My query to Andrea now became more indepth: What were the proximities and conditions under which each of these injuries occurred? How did each of these proximities culminate into a single root cause, and what form would corrective action have to take to adequately prevent a recurrence? What Andrea heard me say, however, was "Show Daddy how you got the booboos, Sweetheart."

We walked back through her classroom and onto the playground behind the school. Andrea ran toward a mammoth suspension assembly that I was convinced McDonnell Douglas had used to drop-test static DC-9 fuselages from. Beneath the center of the gargantuan A-frame were suspended dual strands of chains, culminating in simple leather saddles that would adequately serve as the most important part of the swingset.

Andrea climbed into one of the saddles and began pumping back and forth, propelling herself faster and faster. I was convinced it wouldn't take much more of this for her to get into compressibility! Not yet understanding how this swinging led to her bandages, I looked around the playground. It didn't take long for me to spot the playground sandbox, strategically placed over 75 feet from the swingset. This was no ordinary sandbox, no sir! This desert was twice the size of any golf course sandtrap I had ever had the dubious pleasure of playing into.

The sandbox was enclosed by 2- x 12-inch planks. The approach path from the swing showed three skid marks, each successively closer to the sandbox. Returning my attention to Andrea, I noticed her nearing terminal velocity, on the verge of actually wrapping herself in a loop around the upper bar of the swing. Her eyes were as large as saucers, and her dream of actually being able to propel herself across the playground and into the sandbox was on the verge of becoming a reality. However, unless assisted by some rocket propulsion, my concern was the sandbox planking serving as an effective speedbrake should she fail to reach her goal! Quite needless to say, I didn't lose a moment in arresting Andrea's further efforts to launch herself in a fourth attempt to make playground history.

In performing a little accident causation analysis, it didn't take a rocket scientist (or even an ASO) to determine that each of Andrea's scrapes were, in this case, merely proximate causes. While a bandage had been applied to each, nothing had yet been done to arrest yet a fourth scrape from occurring. It was apparent that no one had yet identified the root cause—Andrea was tasked to reach an unachievable goal given her current suite of propulsion equipment.

Having identified the root cause, I could now work on a corrective action plan. While having the school served with an injunction to preclude children from using the swing would have certainly prevented a recurrence, this was akin to hunting butterflies with a howitzer. And moving Andrea to another school would have been merely rearranging the deck chairs on the Titanic.

Too often in the military, as well as industry, we tend to inadequately perform three significant steps in accident causation:

- Correctly identify the problem.
- Correctly identify its proximate causes and root causes.
- Adequately identify and perform a correct and adequate corrective action.

Allow me to leave you with a parting thought: If Andrea, at the age of four, could grasp the concepts of keeping herself from getting hurt again, imagine how dynamic an understanding of these concepts could be in the hands of a full-grown soldier!

—CW3 Mark W. Grapin, ASO, B Company, 1-211 Attack Battalion, Utah ARNG

STACOMs no longer used to publish publication changes

In accordance with U.S. Army Aviation Center message 011500Z Sep 94, publication change information contained in STACOMs 154, 155, 158, 159, and 160 is considered official and will be retained until formal changes are incorporated into affected publications. In the future, STACOMs will be used only for information purposes. Official changes to publications will be accomplished by other means. STACOMs will continue to reference these official changes in informative articles.

Facts about STACOMs

Some confusion still exists about STACOMs. The following questions and answers should clear up the confusion.

Q. Are STACOM files required?

A. No. But we highly recommend that *FlightFax*, which publishes STACOMs, be a part of the unit's aviation safety publications library. Libraries should retain copies of *FlightFax* from the previous 12 months.

Q. Are STACOMs regulatory?

A. No. STACOMs are published in *FlightFax* as information. STACOMs are a convenient means of disseminating up-to-date information to aviation personnel, allowing correction of deficiencies and misunderstandings regarding Army aviation programs and publications. *FlightFax* is a more responsive and rapid means of reaching more people than messages or letters.

Q. Does the aviation library have to contain all of the STACOMs that have been published?

A. No. As a minimum, the library should maintain a file of STACOMs that have been published in the previous 12 issues of *FlightFax*.

STACOM 162 **December 1994**

Prepared by the Directorate of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5208, DSN 558-1098/3504. Information published here generally precedes the formal staffing and distribution of Department of the Army official policy. This information is provided to all commanders to enhance aviation operations and training support.

William H. Bryan
Colonel, Aviation
Director of Evaluation and Standardization

Accident briefs

Information based on preliminary reports of aircraft accidents

Utility

UH-1 Class C

V series - While returning to airfield, crew heard loud bang and metal-on-metal grinding noise, and engine failed. Pilot executed autorotation to clearing in subdivision. Rear skids spread and WSPS broke. Suspect internal failure of compressor section. Engine sent to CCAD for teardown and analysis.

UH-1 Class E

H series - During postphase test flight, MP entered autorotation. Right tail rotor pedal movement became restricted and then moved past restriction. As throttle was advanced, pedal stuck momentarily as it moved through restricted area. Tail rotor trunnion spindles were worn excessively by needle bearings.

V series - On short final after .3-hour flight, PC noted fuel indicator at 1,200 pounds. Fuel needle did not respond when PC pressed test button. After landing, circuit breaker was found to be out. When reset, circuit breaker kicked out again. Inspection revealed burned wires and bad fuel gauge.

V series - While conducting MOC, MP felt unusual control response in cyclic during takeoff. Aircraft landed and maintenance determined hydraulic pump was beginning to fail.

UH-60 Class C

A series - During engine start sequence, No. 2 engine starter would not stay engaged. Start control valve had malfunctioned, shorting out cannon plug and allowing starter to fall off line. Believing start switch was out of rig, IP attempted second start, using pencil to actuate starter microswitch. Starter indicated proper operation, No. 2 PCL was placed to idle position, and TGT began to increase normally. Between 400° and 500°C TGT, IP noted starter had dropped off line, NG was decreasing, and TGT was increasing rapidly. IP performed emergency engine shutdown procedure, but TGT increased to 960°C before shutdown was complete. Start control valve had failed again. No. 2 engine's power turbine, gas generator, nozzle, and combustion liner had to be replaced due to engine overtemp.

A series - Aircraft had been engaged in NVG refresher training and an NVG annual evaluation, requiring numerous approaches to unimproved areas in local training area. Crew noticed nothing unusual during flight. During postflight, damage was found to stabilator, and main rotor blades had contacted infrared countermeasure transmitter.

A series - PI reported tail transmission chip light. PC took controls. Power was available upon descent, but no apparent tail rotor. Aircraft landed hard, damaging stabilator, tailboom, tail wheel, and left main gear. Suspect tail rotor gearbox malfunction.

UH-60 Class D

A series - Aircraft was conducting NVG training to unimproved tactical landing area containing muskeg (frozen ground). High

temperatures had resulted in thinner than normal ice for time of year. As aircraft landed, skis broke through ice. PC picked aircraft up to hover, and no damage was noted. Postflight revealed radar warning antenna had been broken off.

A series - Suspect passenger pulled emergency jettison handle during NVG mission, causing window to jettison. Window was not recovered.

A series - While on downwind for landing, master caution and left accessory module chip lights came on. PC took controls, notified tower of emergency, and decided to conduct a roll-on landing. Crew failed to conduct a before-landing check. PC landed aircraft with parking brake set, damaging left and right main tires. Main tires and left accessory module were unserviceable.

UH-60 Class E

A series - During serviceability check for main transmission module chip light, master caution and transmission oil-pressure-low lights illuminated as PCLs were advanced from idle to fly. Transmission oil pressure dropped to zero, and burning odor entered cockpit. When emergency shutdown was performed, transmission seized within 30 seconds. Suspect failure of main transmission planetary gear.

L series - During pickup of two A22 bags, CE noticed additional cargo net attached. Flight was aborted, and load was re-rigged by ground unit. Shortly after takeoff, load was lost. Sling remained attached to aircraft. Grab hook keeper was missing from sling assembly. Suspect ground personnel failed to recognize improper sling arrangement.

L series - During postflight, crew found 8-inch tear in bottom of aircraft. Aircraft had been operating in poor illumination and dusty conditions. Suspect crew failed to recognize object on ground.

L series - Door was left unsecured during preflight. Nearby aircraft took off, causing door to open rapidly and damage inside forward door post.

L series - While on ground, No. 1 power control lever was placed in idle position to conserve fuel. PI executed immediate takeoff before PC could complete before-takeoff check. To avoid drooping rotor RPM and entering trees, PC moved power control lever back to fly position, inadvertently placing it in ECU lockout. Crew suspected compressor stall and landed.

L series - Chalk 2 in flight of five aborted takeoff after M60 machine gun discharged single round into cabin floor, penetrating Kevlar floor and making 2-inch exit hole on underside of aircraft. Caused by failure to properly clear weapon.

Attack

AH-1 Class E

F series - Aircraft was in cruise flight at 90 KIAS during redeployment to home station after NTC rotation. Master caution and engine oil bypass lights illuminated, and engine oil temperature increased to 110°C. Engine oil pressure remained within limits. After landing, inspection revealed oil leaking at quick-disconnect on oil debris detection system. Coupling was replaced.

AH-64 Class C

A series - Aircraft was flying NOE in desert terrain. During movement to contact at altitude of less than 6 feet, PC accelerated to airspeed in excess of 100 knots. As aircraft entered 10-degree right turn, crew heard a thump. Blades had contacted yucca plant.

A series - Aircraft was trail in flight of six AH-64s. Unit was flying training mission at contour flight (25 to 80 feet AHO) while also conducting wire hazard reconnaissance. PI, who was flying from back seat, transferred controls to PC while changing radio frequencies. PI resumed controls; aircraft crossed into a depression and hit a set of wires at 33 feet AGL, running perpendicular to route of flight. Aircraft remained controllable and crew landed in a field. Two rotor blades, four pitch change links, and ASE antennas were damaged.

A series - While performing normal shutdown with engines at idle and cyclic displaced forward, PI heard noise overhead. During postflight, main rotor head damage was found. Caused by droop stop pounding.

AH-64 Class E

A series - ENCU began blowing hot air during flight. Aircraft landed at field site, and a CE climbed into turtle back prior to engine shutdown and without crew approval. He tapped throttle valve, and ENCU began working properly. As CE closed cowlings and straightened up, main rotor blades struck his head. No serious injuries or damage to aircraft.

A series - During night training flight, crew heard loud noise followed by fumes in cockpit. Crew determined there was no fire and returned to airfield. Caused by failure of No. 2 transformer/rectifier.

Cargo

CH-47 Class C

D series - Aircraft was on approach to LZ with external load consisting of an M998 HMMWV. During final, nonrated crewmember slid winch/hoist control, causing cargo hook release switch to strike hardware on passenger seat. Load was released at 100 feet AGL and 20 knots airspeed. Crew landed aircraft in LZ and performed normal shutdown.

CH-47 Class E

D series - While in cruise flight with external load consisting of MREs in cargo net, load was inadvertently dropped. Slings remained attached to aircraft. Load had been rigged with all chain legs attached to one keeper, causing keeper to fail in flight. No damage to aircraft; MREs recovered.

D series - During insertion of external load consisting of single HMMWV into dusty LZ, crew selected clearing separate from main LZ. After load touched down, aircraft began rearward drift. CE called out rearward drift and released load. HMMWV rolled onto its side.

D series - En route to LZ, utility hydraulic light illuminated. Crew executed emergency procedures. CE checked maintenance panel and found utility hydraulic reservoir empty. Caused by loose fitting.

D series - Aircraft was in MTF status following depot level application of five MWOs. After uneventful runup, aircraft was 10 minutes into ground run when OR informed MP he was not receiving reliable vibration data. Shortly afterwards, CE reported oil leaking into ramp area from aft pylon, and within seconds, a high-pitched squeal was heard from forward pylon area. MP began shutdown, and No. 1 hydraulic flight control light illuminated as engines were being shut down. No hydraulic temperature limits were exceeded. Postflight revealed failure of seal on upper portion of aft swiveling actuator, which resulted in loss of most of No. 1 flight boost system hydraulic fluid. Actuator was within 50 hours of TBO time and had been seeping prior to this incident. Seepage was within allowable limits.

D series - While on search and rescue mission in mountains, FE was performing control closet check when he discovered a large hydraulic leak but could not find source. During landing, No. 1 flight hydraulic system and No. 1 advanced flight control system (AFCS) caution light illuminated. Maintenance panel showed low pressure and low fluid level in No. 1 system. AFCS was switched to No. 2 system and aircraft was shut down. Leak was located at upper roll ILCA crossover tube. Caused by possible packing failure.

D series - During tandem load hookup with clevis in forward hook, aircraft was

repositioned for aft hookup. Aircraft drifted and descended, and left landing gear struck aft hookup man, pinning him to load and bruising his chest.

OH-58 Class B

D series - Aircraft tail stinger became entangled in netting on side of ship. Aircraft landed hard, skids spread, and belly contacted deck. Damage to tail rotor blade, tailboom, drive shaft, and skid mount hard points.

OH-58 Class C

A series - After landing at port, PC was told to reposition to rinse facility. After aircraft was moved, PC reduced throttle to engine idle. At rinse facility he was told to increase throttle to operating RPM. As throttle was advanced through 90 percent, engine flamed out because of water ingestion. PC was told to restart engine. During restart, he noted TOT below 200° and N1 at 15 percent. PC advanced throttle to engine idle and TOT rose to 900°C. When it reached 927°, PC initiated engine hot start procedures. TOT exceeded 1,000°C.

Fixed wing

C-12 Class C

F series - Aircraft was descending out of FL 240 for 16,000 in moderate precipitation. Clouds were of stratus formation with no cumulus buildup. At about FL 210, lightning struck aircraft. Aircraft was landed, inspected, and no damage found. All systems operated normally, and mission continued. When mission was completed, more detailed inspection revealed arcing on both propeller systems, radome, left outboard wing flap, and right aileron. Static discharge wick on right elevator was burned off, and paint burns were found on elevator surface. When radome was removed, arcing was found on radar antenna.

C-12 Class E

H series - Crewmembers smelled fumes after takeoff. Air mode switch and vent blowers were turned off, masks donned, cabin pressure dumped, windows opened, and aircraft returned to home base. Caused by vent blower malfunction.

C-31 Class D

A series - Two employees were directing PI during parking at civilian airfield. Pilot and front ground handler received a thumbs-up from left wing guide. As pilot continued right turn, left wing tip struck hangar.

OV-1 Class E

D series - During after-takeoff checks, PC placed gear handle in up position. Nose wheel gear indicator showed gear down. PC recycled gear handle with same results. PC made normal landing at airfield. Wire on taxi light chafed against airframe and grounded out, causing false indications from nose wheel gear.

D series - After ILS approach and go-around, No. 1 engine started to surge and run erratically. Torque, EGT, N1, oil temperature, and oil pressure fluctuated rapidly. PC retarded power lever and conditions remained unchanged. PC attempted single engine ILS and did not break out. PC executed single engine go-around and noticed RMI and gyros had failed. PC conducted no-gyro PAR approach to uneventful landing.

U-21 Class C

A series - Aircraft departed with loose oil reservoir cap, and oil pumped overboard. Crew noted fluctuation in torque and decrease in oil pressure reading. Engine was secured and precautionary landing executed. Engine required replacement.

U-21 Class E

A series - While performing airspace surveillance, crew made normal descent from 9,000 to 7,000 feet with autopilot engaged. Aircraft made uncommanded right yaw, autopilot disengaged and audio sounded. All electrical and associated lights illuminated. PC took controls and re-established controlled flight. Electrical fire appeared in area of landing gear extension handle and burning odor was detected. PI initiated emergency procedures, and PC continued descent, turning toward airport 35 miles away. Critical electrical systems were re-established for communications, landing gear, lights, and flaps. Aircraft made normal landing at airfield.

Messages

■ Aviation safety action maintenance mandatory message concerning one-time inspection of all AH-64 aircraft for chafing of wire harnesses W102 and W119 (AH-64-95-ASAM-01, 071510 Nov 94). Summary: A Category I deficiency report identified wire harness W102 chafed against the aft mast base support strut (FS 230) and shorted out, causing a malfunction of the crossfeed valve. The harness was burned extensively and resulted in an engine flameout. The purpose of this message is to direct a one-time inspection of wire harnesses W102 and W119 for damage, chafing, and proper clearance; and application of anti-chafe material to both wire harnesses. Contact: Mr. Lyell Myers, DSN 693-2438 (314-263-2438).

■ Aviation safety action maintenance mandatory message concerning requirement for re-shimming of tail rotor pivot bearings on all UH-60 aircraft per revised procedures and inspection of certain blade assemblies for specified serial numbered tail rotor blades that contain composite pivot bearing retainers (UH-60-95-ASAM-03, 261645Z Oct 94). Summary: Recently manufactured tail rotor pivot bearing retainers were changed to a composite material instead of aluminum. This material change resulted in an increase in bond failures due to the change in adhesive used with the composite. In addition, the pivot bearing is installed with a compressive preload through the use of shims. It has been determined that the current procedures in TM 55-1520-237-23 allow installation of the pivot bearing with less than optimum preload. The purpose of this message is to inform UH-60 users of the revised procedures to determine correct bearing shim thicknesses to attain the correct assembly preload and to require that this new shimming procedure be implemented within 500 flight hours. In addition, this message will identify specific serial numbered tail rotor blades manufactured with composite retainers. These blades will require shim correction within 150 hours and once identified to the logistical POC will be corrected by a Sikorsky field service team. Contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

■ Safety-of-flight technical message concerning replacement of P/N MS17825-10, NSN 5310-00-455-6881 nuts on scissors and sleeve assemblies, P/N 209-010-401-11, NSN 1615-00-168-5863 in stock for AH-1S/E/F/P series aircraft IAW AH-1-94-01 (AH-1-95-01, 261900Z Sep 94). Summary: AH-1-94-01 required replacement of suspect MS17825-10 nuts in nine locations on aircraft. One of these locations is the scissors and sleeve assembly, P/N 209-010-401-11, NSN 1615-00-168-5863. Scissors and sleeve assemblies in stock were not required to be inspected/replaced per AH-1-94-01. The purpose of this message is to require units and depots with scissors and sleeve assemblies in stock to replace MS17825-10 nuts IAW instructions in AH-1-94-01. Contact: Mr. Brad Meyer, DSN 693-2085 (314-263-2085).

■ Aviation safety action maintenance mandatory message concerning inspection of fuel quantity and low-fuel caution systems on OH-58A/C helicopters (OH-58-95-ASAM-02, 011933Z Nov 94). Summary: An accident has occurred where the engine quit as a result of fuel starvation.

After the accident, the low fuel caution system was found inoperative and the fuel quantity system indicated fuel remaining although the tank contained only one-half gallon of fuel. The purpose of this message is to institute a recurring inspection of the fuel quantity and low-fuel caution systems for proper function. Contact: Mr. Lyell Myers, DSN 693-2438 (314-263-2438).

■ Aviation safety action operational message concerning requirement to operate the fuel tank submerged boost pumps on all H-60 aircraft, at all times, with all fuels, during ground and flight operations (UH-60-95-ASAM-02, 131557Z Oct 94). Summary: The H-60 aircraft fuel system was designed as a suction fuel system with the engine-driven low-pressure suction pump sucking the fuel from the fuel tank. For high-altitude/hot-temperature-extremes operation, it was supplemented by positive pressure fuel tank submerged boost pumps. The fuel tank boost pump usage was then based on the volatility property of JP-4 aviation fuel. JP-4 fuel volatility is represented by the percentage of vapor to liquid (V/L) present in the fuel lines during suction operation. Further testing with JP-4 fuel identified fuel system trapping of vapor/air bubbles after prolonged nose-down attitude operation. Nose-down operation includes either ground flat pitch idle or cruise; i.e., ESSS/EFRS installed. When the aircraft is pitched up to level attitude, the bubble trapped in the fuel system high spot moves up the fuel line into the engine suction fuel pump. The time required for the bubble to accumulate was measured at around 25 or more minutes' operation. Nose-down ground operation generates the largest bubble due to the low fuel flow rates during flat pitch operation. If the bubble causes the suction fuel pump to cavitate, the cockpit low-fuel-pressure caution light will illuminate. In most cases, the caution light self extinguishes because the engine low-pressure boost pump will re-prime itself with the help of the engine HMU high pressure pump and the engines will continue operating normally. Engine malfunction that could occur can be either a torque roll back or an engine flameout. Recent testing with JP-8 confirmed the same problems could occur with respect to nose-down operation. Engine flameout events in H-60 aircraft have been attributed to bubbles in the aircraft fuel system. Events occurred immediately following takeoff, i.e., pitch-up attitude. Those aircraft were not operating with fuel boost pumps on. ATCOM is taking action to modify the fuel system and restore the suction fuel system operating envelope with JP-4, JP-5, and JP-8. In the interim, it is a requirement to operate the tank-mounted submerged fuel boost pumps at all times with all fuels. This will prevent any fuel bubbles from being accumlated in the aircraft fuel system that could affect engine operation. The purpose of this message is to implement a change to the UH-60A/L, EH-60A, and MH-60K operator's manuals to operate the fuel tank submerged boost pumps "on" at all times with all fuels. Contact: Mr. Lyell Myers, DSN 693-2438 (314-263-2438).

■ Aviation safety action maintenance mandatory message concerning aft-facing seats on all C-12/RC-12 aircraft (C-12-94-ASAM-01, 081717Z Nov 94). Summary: The C-12 aircraft were procured with all seats facing forward. The seats were designed and tested to meet the Federal Aviation Regulation (FAR), which requires an occupant weight of only 170 pounds. The Army levied an additional requirement for the seats to withstand a 250-pound occupant, except for the aft facing direction. Years later, the Army modified the C-12 aircraft with tables and seats arranged around the tables (forward/aft facing). This came to be known as "club seating." Beech Aircraft Corporation placarded the seats, limiting occupant weight to 170 pounds in the aft-facing position, and the operators manual reflects this limitation. Recently, the awareness level rose within the C-12 community and this limitation was enforced. Engineering has reviewed contractor data and can substantiate by test data and by similarity the seats' ability to withstand a 250-pound occupant in the aft-facing direction. The purpose of this message is to authorize the use of aft-facing seats without the 170-pound occupant limitation in all C-12/RC-12 aircraft. The aft-facing seats listed below are authorized for use in the aft-facing direction for a 250-pound occupant.

Nomenclature	Part No.
Chair assembly	101-530195-1/-2
Chair assembly	101-530294-23/-24/-31
Chair assembly	127-530026-1/-2/-3

Contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

For more information on selected accident briefs, call DSN 558-2119 (205-255-2119).

In this issue:

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- Keeping our skies safe
- Using safety NCOs to their full potential
- JP-8 fuel conversion
- ASO corner—
  Accident causation: a father's perspective
- STACOM

Class A Accidents through November

		Class A Flight Accidents		Army Military Fatalities	
		94	95	94	95
1ST QTR	October	2	0	0	0
	November	3	0	0	0
	December	2		2	
2D QTR	January	1		2	
	February	2		0	
	March	0		0	
3D QTR	April	5		2	
	May	0		0	
	June	0		0	
4TH QTR	July	4		5	
	August	1		0	
	September	1		0	
	TOTAL	21	0	11	0

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