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Flightfax

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REPORT OF ARMY AIRCRAFT ACCIDENTS

Your flight helmet
wear it properly or lose it

The head can tolerate a focused impact of about 30 Gs for the nose or 100 to 200 Gs for 1 square inch of frontal bone without fracture. However, the skull can sustain up to a 300-G impact force without fracture if the force is spread over a larger surface area.

Flight helmets are designed to distribute and attenuate crash forces to the head. However, a flight helmet can provide protection only if it remains on the crewmember's head throughout the crash sequence. If the helmet rotates excessively or comes off, the head can be exposed to initial impact and subsequent head injuries, which is the most common cause of death in helicopter accidents.

Prior accident studies show that typically one in five crewmembers lose their helmets during a severe crash. These losses were most frequently traced to chinstrap snap failures (63 percent), which resulted in the addition of a second snap on the chinstrap of the SPH-4 and finally the elimination of snaps on the SPH-4B helmet. In addition, the initial chinstrap strength of 300 pounds has been increased to 440 pounds in the new SPH-4B and HGU-56/P flight helmets.

Recent accidents

The front-seat occupant of an AH-64 suffered severe head injuries when he struck the optical relay tube. He sustained two severe blows to the front and rear of his integrated helmet and display sight subsystem (IHADSS) helmet. One of the blows caused the snaps to pull out of the chinstrap assembly, and the helmet came off the pilot's head. The U.S. Army Aeromedical Research Laboratory (USAARL) evaluated the helmet and found that there were 8 Velcro fitting pads in the front, 11 fitting pads in the rear, and 2 fitting pads at each earcup of this extra-large helmet. Obviously, an extra-large helmet is required when an aviator has a large head; but this aviator had more than 4.3 centimeters of thickness in fitting pads in his helmet. He should have been issued a smaller helmet.

To determine what it took to tear the snaps from the chinstrap, another IHADSS chinstrap was stretched to failure in a standard test device. More than 400 pounds were required to bend and tear the snaps from the chinstrap.

In another accident, an MH-60 struck water at a velocity in excess of 120 knots. All of the helmets—including flight helmets and troop helmets—came off the wearers' heads. USAARL evaluated the helmets and found that all of the chinstraps were fastened. Although it could not be conclusively determined, it is suspected that improper fit resulted in the helmets coming off.

Four of the helmets involved in the MH-60 accident were the Army's newest SPH-4B helmets. Of these four, only one had damage to the retention system—a grommet was torn from the shell as the shell tore.

The sole survivor of the mishap was wearing an SPH-4B helmet. Fortunately, this crewmember survived even though his helmet came off. Like the IHADSS wearer, this aviator, who had an average-size head, was wearing an extra-large shell with the retention system placed at the largest setting. In addition, the tiedown strap for the yoke assembly at the rear of the helmet was tucked up into the helmet rather than holding onto the nape strap as designed.

Lessons learned

Your flight helmet is your best bet in preventing a severe head injury in an aircraft accident. However, for the helmet to do its job, it must be properly fitted, properly maintained, and properly worn.

Does your flight helmet require a large number of fitting pads, is it loose on your head, or does it rotate when you pull on the edge? Many of the yoke assemblies can be adjusted in the helmet to accommodate unique head shapes. You don't need to wear a helmet that doesn't fit because it was the only one available. Go to your ALSE shop and have them check the shell size and fit.

The chinstrap and yoke assembly are very strong, but they can fail. Make sure the nylon straps are clean since oil or grease can weaken the nylon. If the retention system has snaps, be sure they aren't damaged (this includes bending of any part of the snap) or torn from the nylon webbing. Our newest helmets have stronger chinstraps with Kevlar tape to minimize stretch of the nylon and no snaps to fail.

Finally, the nape strap and chinstrap should form a ring at the base of the skull. The tighter the ring, the more likely the helmet won't rotate forward and come off the head. Wear your helmet with the nape strap pulled tight and the chinstrap snugged up against your neck. This is your best bet that your helmet will be there when you need it most! ❑

POC: Mr. Joseph R. Licina or MAJ James E. Bruckart, USAARL Biodynamics Research Division, DSN 558-6893/6897, commercial 205-255-6893/6897

Operational safety: a personal perspective

This article was written by COL William G. Stolarcek, former Director of Operations and Investigations and Deputy Commander of the Army Safety Center. COL Stolarcek is retiring after 32 years of military service. He has been a valuable asset to Army safety. Although we wish him well in his new life, his guidance within the safety community will be missed.

It's hard to believe; but retirement is right around the corner. It seems such a short time ago that I chose soldiering as my life's work. As I look back over the years, I'm reminded of the many missions undertaken and lessons learned during each assignment—from boot camp to my last assignment as Deputy Commander of the Army Safety Center.

The safety mission

Agencies throughout the Army are tasked with many diverse and important missions, but I can think of none more important than the mission of the Army Safety Center as portrayed in this illustration. Protecting the force is a heavy responsibility—a responsibility so great that no one part of the Army can do it alone. It's a responsibility that must be borne by every individual within the Army.

The cost of accidents

Even a quick glance at the numbers shown in figure 1 tells us that the costs of accidents in terms of fatalities, injuries, and destroyed equipment are staggering. But numbers cannot begin to measure the grief of the families of those killed or the pain experienced by soldiers injured in accidents.

Category	3-yr avg*	FY91	FY92
Soldiers killed	360	353	236
Soldiers injured	6,801	6,578	4,697
Training man days	93,702	90,908	64,648
Aircraft damaged	102	115	93
Aircraft destroyed	35	45	22
Tracked vehicle damaged	88	88	37
Wheeled vehicle damaged	549	608	339
Dollars (million)	$397.21	$417.97	$252.70

*FY89, 90, 91 (updated 10 April 93)

Figure 1. FY92 loss in warfighting capability

These losses all represent severe drains on our warfighting capability—losses that we cannot afford for many reasons, one of which is that we don't budget for accidents within the Army. The task of reducing these disturbing numbers cannot be taken lightly. Protecting the force requires a full commitment from **everyone.**

The "best" have accidents too

The Safety Center's centralized accident investigation teams investigate all Class A and selected Class B aviation accidents and selected ground accidents. These accident reports along with those sent in from units in the field are then analyzed to identify common causes of accidents and determine profiles of similar accidents.

Analysis often reveals some vexing themes and trends. For example, a common theme in many of the reports has to do with the type of person who had or caused the accident: the "best" in the Army. The best driver, the best soldier in the unit, the most professional sergeant in the company, the best aviator or instructor pilot, the best tank crew, and on several occasions even the best commander in the squadron, battalion, regiment, brigade, and so forth.

Analysis also reveals that many of our accidents are caused by hasty decision making (not having all the facts), poor planning, and taking unnecessary risks—causes that *are not* characteristic of the "best." Very seldom do our

investigators find any extenuating circumstances—such as financial, marital, social, drug or alcohol, or psychological problems—surrounding the person or persons who incurred the accident. Typically, a human factors profile describes the individual who incurred the accident as "highly respected by subordinates, peers, and seniors; no known marital or financial difficulties; and the model soldier or officer."

So, why do so many of the accidents involve some of the "best" in the Army? Why do so many of our officers, noncommissioned officers, and soldiers become involved in poor decision making, poor planning, and so on? Why do they take shortcuts to proven practices and procedures or skip steps in the maintenance or preflight checks? Is pressure, real or imagined, a cause factor? Or could pride, professional arrogance, or overconfidence in their abilities be the reason they choose to disregard by-the-book procedures?

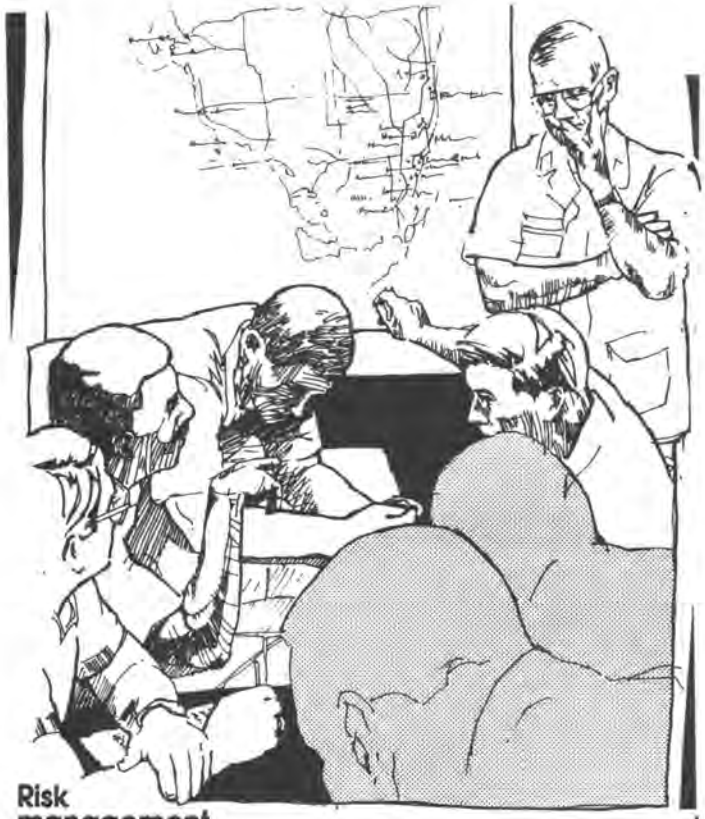
In many of the accidents, some of these basic questions can never be adequately answered. For whatever reason these "best" soldiers chose to ignore the known standard, it cost them their lives. And we're left to speculate on the "why."

The consequences

After the Gulf War ended, a highly experienced explosives expert attempted to move volatile ammunition without properly packing or handling it. A box ruptured, the ammunition fell through, and the explosives expert and two other soldiers were killed.

When the supervisor was shown photos and learned how the soldiers had packed and moved the ammunition, he was shocked, along with the rest of the EOD community in the area. The investigators heard comments of disbelief and dismay from all who knew the explosives expert. After all, he was one of their best!

Unfortunately, we will never know why this highly qualified professional did what he did. We can speculate about fatigue, heat, pressure, and a sense of urgency contributing to a highly trained expert letting his guard down, but all we know for sure is that he did it. Just once, he took unnecessary risks and it cost him his life and the lives of two other soldiers. Similar examples can be found in all branches within the Army.



Risk management

Our warfighting doctrine, albeit changing with the times, *is* compatible with operational safety and force protection. We must have leaders who are "audacious" and who are risk takers, but that doesn't mean leaders who take unnecessary risks or gambles. It means leaders who can make *smart risk decisions*. It means leaders who are aware of and sensitive to personal and unit weaknesses when operating on the edge of capability. And it means leaders who know when their units should drop back into the crawl mode if they are not proficient enough to be in the walk or run mode. It also means leaders who are willing to allow this to happen.

Risk management training is not for wimps. It isn't an excuse for not accomplishing a mission. It is a means to ensure the mission is accomplished as safely as possible. Many commanders who have experienced tragic accidents within their commands wish they had taken more time to understand and practice risk management and teach it to their soldiers.

When I briefed operational safety at the pre-command course, I told those future commanders about a Desert Storm commander who decided not to conduct a massive night air assault because the threat didn't warrant such an operation. After considering the operational precision that would be required, the desert environment, the poor visibility, and so on, this commander decided the risk was much greater than the benefits from doing the mission. That

fits squarely into the moral courage block on the Officer Evaluation Report. It takes courage to make that kind of decision, and we need more of this kind of courage.

One of the students commented that risk management works well at the level I had described, but attempting to apply the risk management process becomes more difficult at battalion, company, platoon, or squad level. But does it?

Assessing risks in a given situation and making a decision applies to individuals at all levels—even if the risk decision requires elevation to the next level of command. Consciously assessing the hazards associated with doing or not doing something—whether it be as simple as wearing a seatbelt or as difficult as conducting a night attack—is the basis for prudent decision making.

I'm not trying to teach risk management in this short article; I'm only trying to point out how you, regardless of where you are in the chain of command, can use risk management to enhance your own safety and the safety of others. If you're confused about risk management or if the subject hasn't been addressed in your unit, take the time to seek out the information, study it, and assess the philosophy and principles. You'll find it a real help in meeting your responsibility for protecting the force.

Command involvement

Although people at the Safety Center work hard to develop and design accident prevention policies, procedures, and programs, they can't make it happen by themselves. Preventing avoidable accidents is a team effort, and it takes every member of the team to make it happen. Accident prevention works when commanders at every level are personally involved. And commanders need direct contact with their safety managers—not information and recommendations that have been filtered through the staffing process.

I recall one incident when the Director of Army Safety was visiting a major command (MACOM) to discuss accident-reduction initiatives. With some embarrassment, he found himself introducing the MACOM safety manager to the MACOM commander. Although the safety manager had been on the staff for a number of years, the commander didn't know him or even recognize his name.

Getting involved starts at the top. Personal involvement in your unit's safety initiatives and risk management will yield results. Try it; your accident rate will drop! You'll be able to avoid many of the preventable accidents that are injuring and killing your soldiers and destroying your equipment. Our Army will be safer, and our warfighting capability will be preserved.

To all whom I've known and worked with in the safety community over the past several years, thank you for your support and dedication to our force protection efforts. In spite of all the changes our great Army is facing, the challenge is for you to keep the operational safety momentum going in the right direction. You can do it; you must do it—soldiers' lives depend on your ability to meet this challenge. ❑

Systems managers

Like the rest of the Army, the Safety Center's Aviation Branch has felt the effects of downsizing and restructuring, which has made some internal moves and reorganization necessary. Currently, the Aviation Branch is organized by aircraft system.

Systems managers and their phone numbers are listed below. DSN is 558-XXXX; commercial is 205-255-XXXX. The FAX number for all members of the Aviation Branch is 5318.

- **Branch Chief**—LTC William A. Tucker, 2119
- **Utility Aircraft**—MAJ Richard C. Young or MSG Robert E. Price, 3262
- **Attack and Observation Aircraft**—CW5 Robert A. Brooks or SFC Alcides Santana-Cruz, 3262
- **Cargo and Fixed Wing Aircraft**—CW4 Daniel O. Baxter or SFC John M. Morthole, 3262
- **Night Vision Devices**—CW5 Robert A. Brooks, 3262
- ***Flightfax***—Ms. Jane D. Wise, 2119

The address for members of the Aviation Branch is Commander, U.S. Army Safety Center, ATTN: CSSC-PMA (individual's name), Building 4905 5th Avenue, Fort Rucker, AL 36362-5363. ❑

(Editor's Note: The Army has two separate programs that qualify selected Army aviators as aviation safety officers: a 6-week resident course and a correspondence course with a 2-week resident phase. The program of instruction (POI) for these two courses has always been closely related but not identical. Information in the following article pertains to the 6-week resident course.)

Aviation Safety Officer Course update

Recent changes to the Aviation Safety Officer Course (ASOC) place increased emphasis on the daily duties and responsibilities of company and battalion aviation safety officers (ASOs). The shift in focus in the POI was generated by ASOC student critiques, ARMS team inspections, and input received from company-through MACOM-level field safety officers.

From these wide-ranging sources, the response was virtually unanimous: we were spending too much time teaching things new ASOs don't do and we weren't teaching those things they should be doing.

Course modifications

Emphasis on the detailed technical aspects of an aircraft accident investigation has been reduced. The course still includes nearly 40 hours of accident investigation subjects, but the focus is now on unit-level actions rather than centralized accident investigation (CAI) techniques and procedures. This was done because company and battalion safety officers generally do not investigate Class A or B accidents where CAI skills are needed.

Safety officers do, however, find themselves involved with the day-to-day activities of running a unit's accident prevention program; for example, holding safety meetings, participating in safety councils, writing an SOP, managing a safety awards program, and maintaining the safety office files. To assist safety officers in learning to perform these duties, many new classes, hands-on demonstrations, practical exercises, and briefings have been added to the course.

New classes

■ *Risk management*. Training in risk management—the Army's process to ensure force protection while supporting mission accomplishment—has been increased significantly. ASOC students are now given indepth training on the risk management process and are expected to return to their unit and serve as the commander's advisor, subject matter expert, and unit trainer on risk management.

■ *Speaking and writing*. Field ASOs also strongly emphasized the need for new safety officers to be able to speak and write effectively. In response, each student is now required to prepare and present a 25-minute safety class. Preparing and presenting a safety class gives the student an opportunity to talk about a safety topic before a "friendly audience," as well as providing fresh ideas and experiences for the whole class.

Classes added to Aviation Safety Officer Course

Class	*Hours*
Risk management	**14.0**
Total quality management	**2.0**
Introduction to duties and responsibilities	**1.0**
Commander's aviation accident prevention plan	**1.0**
Unit aviation safety program	**1.0**
Unit ground safety program	**1.0**
Safety SOP	**1.0**
Safety office administration/awards program	**1.0**
Safety meetings	**1.0**
Student safety classes	**10.0**
Aviation safety council	**1.0**
Foreign object damage	**1.0**
Aviation accident prevention survey	**1.0**
Pre-accident plan	**2.0**
Hazard communications program	**4.0**
Field duties of the aviation safety officer	**1.0**
Aviation Branch Safety Office	**4.0**
Aircrew coordination	
Crew endurance	
ARMS briefing	
Accident reporting procedures	**2.0**
Effective writing, Flightfax/Countermeasure	**3.0**
Fire prevention and protection	**2.0 (2.0)**
HEMTT tanker/FARP demonstration	**(2.0)**
Altitude physiology/altitude chamber exercise	**1.0 (2.5)**
USAARL briefing/tour	**(2.0)**
Air Force safety program briefing	**(2.0)**
Navy safety program briefing	**(2.0)**
9D5 helicopter underwater egress trainer	**(5.0)**

Note: Time in parentheses is for practical exercises or field trips.

A class that stresses the importance of effective written communications as a means of sharing safety information has also been added. And each student is required to write a draft article for either *Flightfax* or *Countermeasure*, the Safety Center's ground accident prevention publication. The writing requirement and subsequent editorial assistance from the Safety Center writing staff are designed to show the students how easily safety ideas and experiences can be shared so that others in the field can also benefit from the ideas, information, or lessons learned. (The article on FOD in this issue of *Flightfax* was written by a student in the ASOC 93-3).

■ *Other.* A list of other topics recently added to the course are shown in the sidebar. In addition, several other subject areas are being modified to orient on the ASO's role in a given subject area; for example, providing an opportunity for the students to learn techniques for monitoring their unit's hearing conservation program.

Demonstrations

One of the interesting and productive additions to the course is due to the invaluable assistance and cooperation of the 2d Battalion, 229th Aviation Regiment (Flying Tigers), their commander LTC Ken Travis, and their safety officer CW3 Will Chance. SGT Paul Madrid and members of the 3/5 Platoon, conduct an excellent demonstration of a forward area refueling point (FARP) using a heavy expanded mobility tactical truck (HEMTT) tanker.

Practical exercises

■ *Survey.* The 2-229th also hosts the ASO class on two modified safety surveys of their hangar and flight line. The initial survey is conducted during the first week before the technical portion of the course begins. The second survey is conducted during the last week of the course and is used to see how much the student has learned during the course. Any safety discrepancies noted during these surveys are provided as a courtesy to the 2-229th's safety officer. This program has been well received by the students, and the 2-229th is benefiting as well.

■ *Hazard Communications Program.* Hazard communications training has changed from a 1-hour lecture to a 4-hour exercise in which students use an actual hazard inventory log to develop a Hazard Communications Program. Students access the hazardous material information system on CD-ROM, print out the necessary material safety data sheets and warning labels, and complete the project by briefing the class on hazardous chemicals in the workplace. This exercise gives the ASOC student the hands-on training to effectively operate a Hazard Communications Program.

■ *Briefings.* The most recent major change in the ASOC is the addition of briefings on the safety programs of the Air Force and Navy and helicopter underwater egress training in the 9D5 dunker at the Pensacola NAS. Not only do the ASOC students get an onsite briefing about water egress procedures, they actually participate in dunker training. ASO Class 93-3 was the first group to go through this training. And from their responses and the responses from the ASO class instructors (see article on page 8), it was time well spent.

Note: Students attending future 6-week ASOCs will be required to participate in all scheduled training, including dunker training. Students weak on swimming skills are encouraged to seek training and practice before arriving at Fort Rucker for the course. All students must bring their individual medical records, a current upslip, a swimsuit, and a towel.

Each of the last several courses has been modified and has, in turn, been a major learning event for both the ASOC students and the instructors. To continue to provide field commanders with the best-trained aviation safety officer, the instructors and staff at the Safety Center will continue to modify the ASOC POI as we receive input from you, our customers. ❑

POC: CW4 Stephen V. Rauch, Training Division, DSN 558-6510/3367, commercial 205-255-6510/3367

Want to attend the Aviation Safety Officer Course?

The Army Safety Center conducts the Aviation Safety Officer Course. However, all assignments, including shortfalls, are made by the soldier's personnel assignment organization.

■ Active-duty soldiers should contact their assignment officer at The Army Personnel Command. Active-duty commissioned officers should call DSN 221-5974 or commercial 703-325-5974. Active-duty warrant officers should

call DSN 221-5223/5228/5284 or commercial 703-325-5223/5228/5284.

■ Army Reserve troop program unit personnel should go through their chain of command to the appropriate Army Reserve Command.

■ Individual Ready Reserve (IRR) and Individual Mobilization Augmentee (IMA) personnel are assigned to the ASO Course by the Army Reserve Personnel Center. Both IRR and IMA personnel should call DSN 892-3565 or commercial 800-325-4382.

■ National Guard officers must coordinate with the National Guard Bureau when requesting the ASO Course. National Guard officers, both commissioned and warrant, should call DSN 327-7349/7342 or commercial 703-607-7349/7342.

When an individual is selected to attend the ASO Course, the reservation is entered into the Army Training Requirements Retrieval System (ATRRS). Remember that selection of an individual for attendance in the ASO Course and updating the ATRRS is the responsibility of each individual's personnel assignment organization.

Although we at the Safety Center are here to help you and can assist you in many ways, the only way to be selected for the ASO Course is through the normal assignment process. ❑

POC: CW4 Stephen V. Rauch, Training Division, DSN 558-6510/3367, commercial 205-255-6510/3367

That sinking feeling

We were over the water, it was pitch black, and I was strapped in a troop seat. There was a moment of silence, a sinking feeling, and then the impact as we hit the water. There were no lights, little sound, and barely enough time to gulp in air before the sudden inrush of water. I held on to my seat with one hand and reached for my seatbelt with the other as we started settling. Without warning, everything went crazy and we rolled inverted, completely submerged and still sinking.

Disoriented and with what felt like a gallon of water up my nose, I held on to the seat as I felt others rush past me. I waited a moment longer and then released my seatbelt. Floating weightlessly, I groped hand-over-hand in the blackness toward the door and pulled myself through. Free, I shot to the surface, gasped for breath, and looked to see if everyone else had gotten out.

Five bobbing and splashing figures were there. We had made it —made it through the fourth and final drop in the Navy's 9D5 helicopter underwater egress training device at the Pensacola NAS. Through it all, we had been in the very competent hands of Petty Officer Davy Jones (that's what I thought he said anyway) as we participated in one of the newest additions to the Army's Aviation Safety Officer Course.

Before participating in the "dunker" training, we received detailed briefings on water survival, water egress situations, and all aspects of the training we were about to become involved in. Everyone participating in the training then went through a swimming test that involved floating/treading water and both surface and underwater swimming while in full flight gear, including helmet, vest, and boots.

Those who made it went on to the 9D5 "dunker," a giant green metal barrel suspended by wires and winches over a 20-foot-deep pool. To complete the training, we had to successfully egress four times, two of which were conducted blindfolded.

It was everything I was told to expect and more. It was mentally demanding and physically exhausting, it was disorienting, and there was no way to keep the water out of your nose once you were inverted. It was well organized, well supervised, and safe. And, yes, it was even fun!

My hat's off to the professionals at training tank No. 1 at the Pensacola NAS who teach underwater egress training. The water-survival briefings and egress training they provide could help aircrews successfully egress a sinking aircraft should they ever be forced to ditch over water. ❑

POC: CW4 Stephen V. Rauch, Training Division, DSN 558-6510/3367, commercial 205-255-6510/3367

Streamlined submission requirements and procedures for PRAMs

Draft AR 385-40: Accident Reporting and Records and DA Pam 385-40 (now DA Pam 385-95) are currently being staffed with major Army commands and staff elements. Both are scheduled for publication during the October-November 93 timeframe and contain the following streamlined accident or incident notification requirements and procedures that will become mandatory upon publication.

■ **Class A through C aviation accidents.** Immediately report the accident telephonically to the U.S. Army Safety Center (USASC) Operations (DSN 558-2660/3410, commercial 205-255-2660/3410) in accordance with the current AR 385-40. No hard copy followup notification is required; the completed accident report is considered the followup. The accident investigation board president will notify USASC Operations of any Army safety-of-flight issues discovered during the investigation.

■ **Class D accidents and Class E and FOD incidents.** Mail or fax (FAX DSN 558-5318, commercial 205-255-5318) a legible handprinted or typed preliminary report of aircraft mishap (PRAM) worksheet with the data elements specified in the current AR 385-40 to Commander, USASC, ATTN: CSSC-ITD, Fort Rucker, AL 36362-5363. Special attention must be placed on legibility when faxing the worksheets.

Units or installations providing aviation accident or incident notification either telephonically (Class A through C) or by mail or fax (Class D, E, and FOD) to the Safety Center should continue to notify their chain of command in accordance with existing procedures and policies.

The Safety Center is presently set up to accept accidents and incidents reported using the above notification procedures. In addition, the Safety Center will electronically notify the appropriate addressees with information provided in both the telephonic notification (Class A through C) and PRAM worksheets (Class D, E, and FOD). Organizations may begin using these procedures now as an alternate method to the requirements outlined in the current AR 385-40. ❑

POC: Mr. Lee McCown, Policy, Installation, & Evaluation Division, DSN 558-3759/3913, commercial 205-255-3759/3913

The two meanings of FOD

FOD is a recurring problem for aviation units Armywide. It can cause something as serious as a Class A accident or as minor as a Class E, but the good news is it's preventable. The best place to start is to define what we mean by FOD. Then we need to identify the sources of FOD and understand why it exists so that we can develop ways to prevent it.

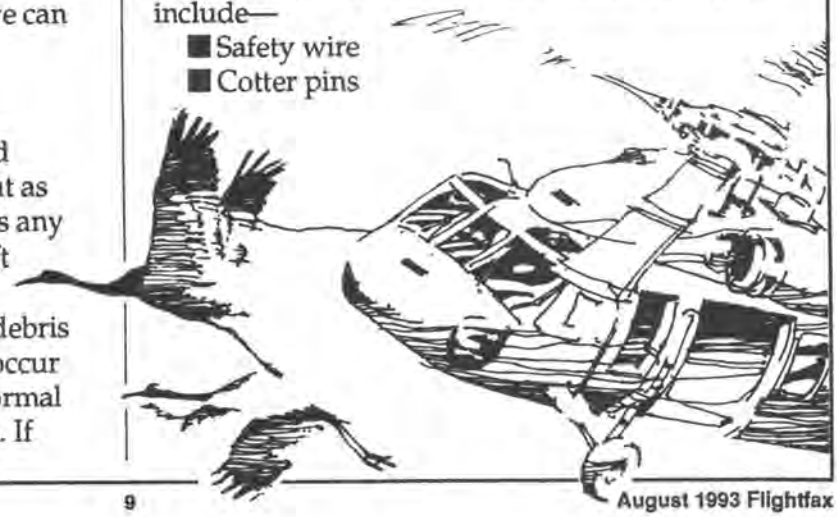
FOD defined

FOD can mean both foreign object *debris* and foreign object *damage*, but it always starts out as foreign object debris. Foreign object debris is any loose object not part of the aircraft or aircraft system that can interfere with the normal functioning of the aircraft. If foreign object debris is not removed, foreign object damage can occur when the loose debris interferes with the normal functioning of the aircraft or aircraft system. If foreign object debris is found and removed, foreign object damage won't happen and FOD accidents can be prevented.

Sources of FOD

The sources of foreign object debris are just about unlimited. A few of the more common examples include—

- Safety wire
- Cotter pins



- Nuts and bolts
- Tools
- Small pebbles, rocks, and twigs
- Pin-on insignia
- Watches and rings
- Bird and insect nests
- Shop towels

Anything that isn't part of the aircraft and can interfere with its normal operation can be considered as foreign object debris.

Since every crew chief and pilot should be able to easily recognize foreign object debris, why does it end up on aircraft where it can cause foreign object damage? The answers are just about as varied as are the sources of foreign object debris. The following are just a few reasons why foreign object debris is not policed up before it has a chance to cause foreign object damage.

- No SOP directly dictating proper procedures to use around aircraft
- Leaders not enforcing procedures and guidelines in SOPs
- Individuals willfully neglecting to follow known procedures
- Lack of proper tool accountability

Even small rocks and debris lodged in the grooves of boot soles can become foreign object debris when dislodged during maintenance or preflight checks on the aircraft. Objects dropped or blown onto the flight line can be picked up by the rotor system or sucked into engine inlets.

FOD prevention is everybody's job

Individuals and supervisors can alleviate or control foreign object debris by—

- Ensuring the unit has an SOP dictating proper procedures and that the SOP is followed and enforced.
- Ensuring that a tool inventory is completed *before* and *after* every maintenance procedure performed on the aircraft. Tool accountability is both an individual and a supervisory task.
- Ensuring individuals check the bottoms of their boots before climbing on the aircraft, especially when in the field.
- Ensuring that an FOD sweep of the flight line is conducted on a regular basis (at least three times weekly, preferably daily).

To win the war against FOD, both debris and damage, requires enthusiasm and action. But the payoffs are worth it: the life you save may be your own! Remember foreign object debris doesn't have to become foreign object damage. **You** can prevent it. ❑

—Written by CW2 Christopher Lake Gardner while attending the Aviation Safety Officer Course 93-3

Broken Wing awards

The Broken Wing award is given in recognition of aircrewmembers who demonstrate a high degree of professional skill while actually recovering an aircraft from an in-flight failure or malfunction necessitating an emergency landing. Requirements for the award are spelled out in AR 672-74.

■ **CW4 Kent A. Knapp, Flight Standardization Division, Directorate of Evaluation and Standardization, Army Aviation Center, Fort Rucker.** During an AH-1 NVD qualification evaluation, the master caution and engine chip detector lights came on. CW4 Knapp took the controls and completed a safe landing. A maintenance crew dispatched to the area completed corrective actions and an MOC, and released the aircraft for flight. CW4 Knapp decided to discontinue the evaluation and make an unaided flight back to the heliport. At 110 knots and 250 feet AGL about 3 minutes after takeoff, the master caution and chip detector lights again came on. CW4 Knapp told the student to reset the master caution and confirm which chip light had come on. The student verified that it was another engine chip light. CW4 Knapp was attempting to make contact with the maintenance crew again when the aircraft shuddered, followed by the master caution and engine oil pressure lights. He made an immediate left turn toward a landing site to avoid wires to the right and trees to the front. During the turn, he entered autorotation and confirmed that the N2 had split, N1 was zero, and the engine had failed. After executing a 180-degree left turn, CW4 Knapp achieved a maximum deceleration attitude to minimize aircraft ground run because of uncertain field conditions. CW4 Knapp applied initial pitch at about 15 feet AGL. Aircraft touched down and slid about one helicopter length before coming to a stop. Early inspection revealed N2 gearbox had failed.

■ **CW2 Evan Edward McManus, A Company, 5th Battalion (Attack), 501st Aviation Regiment, APO Area Pacific 96297-0626.** At about 450 feet AGL while crossing a series of ridges that were perpendicular to the OH-58A's flightpath, both

pilots heard the low RPM audio sound. CW2 McManus, who was on the controls, lowered the collective to conserve rotor RPM while he checked the instruments to see if he had an actual engine failure. He noted that the N2 and rotor RPM needles were dropping through 90 percent and the N1 was spooling down rapidly. While the pilot made a mayday call and monitored the instruments, CW2 McManus searched for a landing site. After spotting a suitable landing area, he initiated a left turn to build rotor RPM and began an approach to a series of stair-stepped rice paddies in a small valley. After beginning the deceleration, he realized that he would not have room to stop the aircraft in the rice paddy before it slid into a 5-foot-high berm. He checked rotor RPM and saw that it had returned to the high green. Since he had rotor RPM to use, he increased collective slightly to extend his glide over the berm to reach the next rice paddy. He bled off all remaining airspeed and pulled remaining collective to cushion the landing. CW2 McManus completed the landing with an aircraft ground run of about 5 feet.

■ **LTC (Ret) Daniel C. Dugan (LTC Dugan was attending the Command and General Staff College at Fort Leavenworth when this in-flight emergency occurred on 8 January 1970).** At about 5,000 feet AGL in clear but extremely cold weather, a connecting rod failed in the T-41's engine. The aircraft started smoking and losing power. As LTC Dugan began descending and looking for a suitable place to land, he established contact with the tower by relay through another Army aircraft in the area. LTC Dugan selected a small dirt road that was reasonably aligned with the prevailing wind. Telephone wires paralleled the right side of the dirt road and crossed it at intervals. LTC Dugan landed over one set of wires, under another, and kept the right wing away from the telephone poles. The cause of the emergency was attributed to a ball of ice that had formed on the crankcase breather pipe. Once the breather was completely closed off, the crankcase pressurized and the engine oil was rapidly pumped overboard through the filler cap. This led to the loss of the rod bearing from the immediate oil starvation. Because of a maintenance oversight, the breather had not been winterized as required. ❑

Accident briefs

Information based on preliminary reports of aircraft accidents

Utility

UH-1 Class C

H series - Aircraft had departed from static display area on climbout to cruise when crew heard loud bangs and aircraft began to yaw. Pilot decreased collective, checked instruments, and looked for forced-landing area. Pilot began descending toward wires and congested highway that was unsuitable for landing. As PC applied collective, crew heard bangs and aircraft began yawing again. PC then determined he could land in clearing near cemetery and was able to maneuver aircraft to that area. Crew completed shutdown without further incident.

H series - While on approach to tactical landing zone, rotor blades struck top of tree, causing damage to underside of each blade. Right skid tube was also damaged while repositioning for takeoff.

H series - Aircraft failed repeated HIT checks and topping check. Mechanic found air leak in bleed air elbow and blocked P3 air so that it would not leak. As a result, P3 air was blocked from oil cooler fan. At 1,000 feet and 90 knots during test flight, engine oil pressure decreased to 55 PSI and engine oil temperature rose to 138 to 140° C.

V series - Engine oil temperature exceeded limits during cruise flight. Crew landed aircraft without further incident. Maintenance personnel replaced thermostat flow control, and aircraft was cleared for one-time flight to home station for engine replacement.

UH-60 Class B

A series - While flying at about 100 feet AGL and 100 knots, crew sighted bridge that was not marked on map. Pilot increased altitude slightly. After passing bridge, pilot sighted wires and attempted cyclic climb. Aircraft struck high-power lines at about 140 feet AGL and lost instrumentation. Pilot was momentarily blinded when his NVGs shut down. PC came on controls, and crew executed controlled emergency landing to open field. Aircraft sustained extensive damage. 9337

A series - During IFR flight at 6,000 feet AGL, aircraft was struck by lightning. Flight computer went off line, and crew executed emergency landing. 9338

L series - Following recon/service mission, crew found damage to all four main rotor blades during postflight inspection. 9339

Cargo

CH-47 Class C

D series - While at 15-foot AGL hover, No. 2 engine ingested FOD material and failed. Crew completed landing without further incident.

Observation

OH-6 Class C

A series - At 20 feet AGL while on final approach over sod, aircraft experienced engine flameout and landed hard.

C series - During running landing to sod area, left skid broke off. IP took controls and hovered aircraft until ground personnel could place jacks and matting under aircraft. Crew completed landing without further damage.

Fixed wing

C-12 Class B

C series - While preflighting aircraft, crew discovered lightning damage. Engine will require replacement. 9340

Messages

■ Safety-of-flight technical message concerning modified procedures for boresighting when using TOW 2 and TOW 2A missiles on all AH-1F aircraft (AH-1-93-01, 251934Z Jun 93).

■ Safety-of-flight technical message concerning inspection of vertical stabilizer barrel nuts and bolts (AH-64-93-05, 091441Z Jun 93).

■ Safety-of-flight technical message concerning one-time records check of engine transmissions to identify unserviceable transmissions on all CH-47D, MH-47D, and MH-47E (CH-47-93-03, 161400Z Jul 93).

■ Aviation safety action informational message concerning maintenance checklist procedures to be included in DA Pamphlet 738-751: Functional Users Manual for the Army Maintenance Management System—Aviation (TAMMS-A) dated 15 June 1992 (GEN-93-ASAM-09, 241606Z May 93).

■ Aviation safety action informational message concerning inappropriate use of nonfire-resistant jackets with the aviation battle dress uniform (ABDU) (GEN-93-ASAM-10, 091950 Jun 93).

■ Aviation safety action maintenance mandatory message concerning oil debris detection system modification to caution panel on all UH-1H/V series aircraft (UH-1-93-ASAM-03, 241700Z May 93).

■ Aviation safety action maintenance mandatory message concerning one-time inspection of tail rotor drive shaft heat shield for debonded liner on all UH-1 series aircraft (UH-1-93-ASAM-04, 071234Z Jul 93).

■ Aviation safety action maintenance mandatory message concerning special oil sampling and repair of T53 engines with high iron content in all UH-1, AH-1, and OV-1 series aircraft (UH-1-93-ASAM-05, AH-1-93-ASAM-03, OV-1-93-ASAM-03, 191200Z Jul 93).

■ Aviation safety action operational message concerning all H-60 aircraft with external stores support system (ESSS) and extended-range fuel system (ERFS) mission kits installed (UH-60-93-ASAM-13, 011432Z Jun 93).

■ Aviation safety action maintenance mandatory message concerning inspection of extended-range fuel system (ERFS) ejector racks on all H-60 aircraft with external stores support and ERFS mission kits installed (UH-60-93-ASAM-14, 161534Z Jun 93).

■ Aviation safety action informational message concerning correction to phased maintenance checklist on all OH-58A/C aircraft (OH-58-93-ASAM-08, 071137Z Jul 93).

■ Aviation safety action maintenance mandatory message concerning one-time and recurring inspection of all T703-AD-700 engine fuel controls for broken bypass cover screws on all OH-58D series aircraft (OH-58-93-ASAM-09, 071741Z Jul 93).

■ Aviation safety action maintenance mandatory message concerning rescission of OV-1-93-ASAM-01 concerning emergency manual canopy jettison system on all OV-1D/RV-1D aircraft (OV-1-93-ASAM-02, 252200Z May 93).

For more information on selected accident briefs, call DSN 558-3262, commercial 205-255-3262.

Class A Accidents through July

	Month	Class A Flight Accidents		Army Military Fatalities	
		FY92	FY93	FY92	FY93
1st Qtr	October	1	6	0	2
	November	3	2	4	6
	December	1	1	0	0
2d Qtr	January	3	1	0	0
	February	1	5	0	8
	March	4	1	2	5
3d Qtr	April	1	4*	0	0
	May	1	2	1	1
	June	2	0	2	0
4th Qtr	July	2	0	1	0
	August	1		0	
	September	2		0	
	Total	22	22	10	22

*An accident previously reported as Class A has been downgraded

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