FlightFax

REPORT of ARMY AIRCRAFT ACCIDENTS

August 1996 ◆ Vol 24 ◆ No 11

"One of your aircraft is down and burning . . ." is every commander's most dreaded call. But even this nightmare can get worse at the crash site.

Commanders whose units experience aircraft and ground-vehicle accidents are increasingly confronted not only with the accident and the resultant loss of valuable resources but also with exposure of personnel to accident-site hazards such as advanced composite materials, or ACMs. Even though the immediate symptoms of exposure to ACM hazards (headache, burning eyes, and vomiting) may not be evident, the potential still exists for long-term health problems. Therefore, it is crucial that personnel who must work near an accident site be informed of the hazards so that they can take appropriate precautions to lessen their risk of exposure.

Personnel responding to aircraft and ground-vehicle accidents are most at risk because of their immediate exposure to ACMs and other accident-site hazards such as bloodborne pathogens (see sidebar on page 3). However, first responders are not the only ones at risk. Individuals involved in the subsequent investigation, recovery, and cleanup operations also may be exposed to these accident-site hazards.

Potential health hazards

Advanced composite materials—such as graphites, Kevlar, epoxies, and fiberglass—are widely used in modern Army equipment including personal protective equipment, armored vehicles, and aircraft. As more information is obtained about the properties of these materials, concern has heightened about the potential health risk to personnel exposed to ACMs that have been severely fragmented or burned in aircraft or vehicle accidents. When an accident occurs, particularly when a fire has ensued, fragmented composites and gases including nitric oxides, sulfur dioxides, hydrogen cyanide, as well as burned fragmented carbon fibers, are generated.

The Navy Environmental Health Center has collected extensive data concerning composites and, in particular, composites in fires (NEHC-TM 91-6, September 1991). Their main concern is the possibility that the fibers, liberated as the resins burn off, will splinter into a small enough size to be inhaled and retained in the lungs. Fibers also may lacerate or irritate the cornea of the eyes, or they may penetrate the skin in the same manner as a splinter.

In addition, experimental studies done to assess and define composite combustion products revealed that burning graphite or epoxy composites produce carbon monoxide and, to a much lesser extent, hydrogen cyanide. Also found as combustion products were ethane, propane, isopropyl alcohol, benzene, and trace amounts of propylene. Although the gaseous hazards are more prevalent while the fire is active, residual gases may be trapped and subsequently released when the wreckage is moved.

The effects from these hazards may include respiratory function irritation or inflammation (difficulty in breathing may occur) as well as skin irritations (contact dermatitis) and rashes. Cancer could be a delayed effect, especially with prolonged and repeated skin contact or inhalation exposure without protection. At this time, there is not enough information to determine all of the short- and long-term health problems that exposure to ACMs may cause. However, sufficient evidence does exist to suggest the presence and toxicity of many of the materials generated in postcrash composite fires. Without question, a crash site involving composites is a potentially hazardous area. Therefore, commanders must develop pre-accident plans that identify the risks to personnel and specify control measures that will minimize exposure to ACMs.

Pre-accident plans

Installation and unit pre-accident plans must address accident-site hazards as required by DA Pam 385-40: *Army Accident Investigation and Reporting*, paragraph 2-2(2). Commanders, unit safety officers, and personnel at all levels must be actively involved in pre-accident planning. To minimize unnecessary exposure to ACMs and other accident-site hazards, unit and installation emergency response teams must be properly trained, equipped, and disciplined to use the appropriate personal protective measures when responding to any accident but especially when the accident involves composite fires.

The best way to minimize unnecessary exposure to accident-site hazards is through a solid pre-accident plan that outlines work practices required to ensure proper handling of the hazards and specifies the protective equipment necessary to minimize the risks.

■ **Work practices.** In mishaps where fire or an explosion occurs, the following controls must be observed:

- Limit crash-site access to essential personnel. While the wreckage is burning or smoking, allow only firefighters and rescue personnel equipped with a self-contained breathing apparatus (SCBA) into the immediate area.
- Work upwind from the fire whenever possible. Restrict all unprotected personnel from assembling downwind of the wreckage (fires), and restrict entry into the immediate area where burned fibers may be stirred.
- Restrict all personnel except those administering immediate life-saving efforts from entry until munitions have been cleared by the proper disposal teams if live ordnance or munitions are involved.
- Prohibit eating, drinking, or smoking in or around the crash site.
- Spray the debris with a fixative such as polyacrylic acid (for example, Carboset XL-11 manufactured by B.F. Goodrich) as soon as the fire is extinguished and the wreckage has cooled to contain the burned fiber materials. A light oil, acrylic floor wax, or an equivalent tack substance are acceptable substitutes and easily applied. Treat components and wrap them with heavy gauge plastic wrap if they are required for further analysis. This keeps the fibers from becoming airborne during the recovery and transport phases and prevents personnel who handle the components from being injured.
- Cordon off the area and restrict entry to a single entrance and exit point.
- Keep guards and other personnel on the periphery of the accident, upwind at a safe distance when fire or smoke is present. Entry into any downwind area must be restricted. If personnel must be downwind, ensure that they wear protective clothing and equipment.
- Exercise caution while handling debris. Skin punctures from reinforcing fiber splinters are possible.
- Shower as soon as possible after leaving the crash site.
- Handle residue from burned composite materials as nonhazardous waste according to local environmental policies.

■ **Protective clothing and equipment.**

- ***For accidents not involving fire.*** Leather gloves with inserts offer adequate protection from splinter injuries. A respirator and safety eye protection with side shields will provide adequate protection from airborne fibers. All three should be worn when moving or handling composite fiber components.

● *For accidents involving fire.* Units should consider procuring the following appropriate protection devices to be used in crash rescue operations:

◆ A self-contained breathing apparatus as determined by firefighting protocol is essential while the vehicle or aircraft is burning or smoldering. All personnel without an SCBA should be restricted from the immediate area with the exception of those providing immediate life-saving efforts.

◆ A full-face respirator with a high-efficiency particulate air (HEPA) organic vapor filter should be worn by personnel present during the early stages of the investigation before a fixant has been applied or when composite fiber components are being cut, broken, or ripped apart. In the absence of full-face respirators, a respirator with filters and eye goggles are required as a minimum.

◆ Tyvek® or comparable coveralls that have been taped at the openings should be worn by investigation and cleanup crews or anyone working within 25 feet of any burned composite vehicle (M113, Bradley, M1, UH-60, CH-47D, AH-64, OH-58D) unless or until a fixant has been applied. These coveralls are single-use and should be disposed of as normal waste after use.

NSNs for Tyvek® disposable coveralls

Small	8415-01-092-7529
Medium	8415-01-092-7530
Large	8415-01-092-7531
Extra large	8415-01-092-7532
Extra, extra large	8415-01-092-7533

◆ Puncture-resistant leather gloves with inserts are necessary when handling debris. Standard issue black leather gloves are acceptable.

◆ Safety glasses or goggles with side shields will provide eye protection if a full-face respirator is not used.

◆ A respirator is still warranted even after a fixant has been applied to the debris and vapor or mist generation is no longer a concern.

Points of contact

When developing your unit's pre-accident plan, you can obtain specific guidance from the—

■ Local flight surgeon or occupational medicine officer (ground accidents).

■ Installation industrial hygienist.

■ Local hazardous materials emergency response team.

■ Installation safety and occupational health manager.

■ U.S. Army Safety Center, Operations Office, DSN 558-2660 (334-255-2660).

■ U.S. Army Center for Health Promotion and Preventive Medicine, DSN 584-3118 (410-671-3118).

Commanders and safety officers must manage the risks associated with accident-site hazards. A pre-accident plan that identifies and assesses ACM hazards and specifies controls measures will provide commanders with an effective risk-management tool to protect the health of those who must work in and around crash sites.

—MAJ Paul Nagy, USASC, DSN 558-3262 (334-255-3262), developed this article from a recent USASC safety alert message (201506Z May 96) and an April 1992 *FlightFax* article written by LTC Kenneth Tannen.

Another accident-site hazard

Biological hazards involving bloodborne pathogens may be present during rescue operations. While initial responders and emergency rescue personnel are most at risk for these hazards, subsequent investigation, recovery, and cleanup personnel must consider the possibility of exposure to body fluids and bloodborne pathogens. For example, an accident investigation team member could sustain a cut from a piece of contaminated debris while handling biological materials.

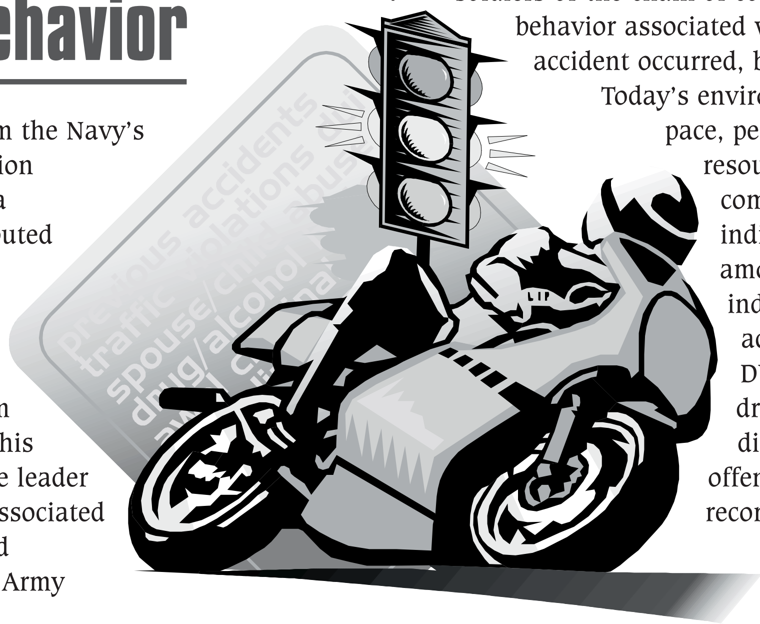
■ Units should identify work practices and controls in their pre-accident plans to protect personnel from exposure to bloodborne pathogens at accident sites. This should include requirements for mandatory briefings of personnel who will be operating in and around an accident site.

■ Personal protective equipment should include—

- ***Latex gloves or double latex gloves.***
- ***Utility work gloves.***
- ***Disinfectant wipes.***
- ***Red biohazard bag.***
- ***10-percent household chlorine bleach solution.***
- ***Boot covers.***
- ***Protective coveralls.***
- ***Goggles.***
- ***Surgical masks.***

SAFETY ALERT MESSAGE

High-risk behavior



Emerging insights from the Navy's recent series of aviation incidents show that a number of these were attributed to human error on the part of individuals who had a record of previous mishaps. The Army family can gain some insights from these unfortunate events. This message is intended to raise leader awareness of the hazards associated with soldier indiscipline and improper crew selection for Army ground and air systems.

Human factors account for 80 percent of Army accidents. Those accidents involving "individual failure," an element of human factors, means that a soldier chose to disregard an established standard to which he or she was trained. Examples include the OH-58 crew that crashed while attempting a loop; the HMMWV driver who rolled his vehicle when he elected to drive in excess of established speed limits under limited visibility; the M1 commander who refused to listen to his driver, which resulted in the tank rolling over in a ditch; or the CH-47 crew that struck wires while flying low level down a river. These very serious accidents are examples of the worst-case effects of indiscipline. Fortunately, they do not happen often.

Studies show that in many of these accidents other soldiers or the chain of command knew of the high-risk behavior associated with indiscipline before the accident occurred, but no action was taken.

Today's environment of high operational pace, personnel turnover, and fewer resources requires that commanders be more vigilant of indicators of high-risk behavior among their soldiers. These indicators include previous accidents, traffic violations, DUI, spouse or child abuse, drug or alcohol history, disciplinary offenses, criminal offenses, AWOL, and poor work record. Other less obvious indicators can include marital strife, frequent family separations, accident proneness, financial problems, and high overall stress levels.

Commanders are encouraged to establish both formal and informal processes to capture the indicators of individual and crew high-risk behavior. For example, most aviation units have a formal "pilot-in-command board." The board consists of the unit commander, an instructor pilot, a safety officer, another pilot-in-command, and perhaps a flight surgeon who evaluate a candidate for pilot-in-command status. In some ground units, a board consists of the unit commander, a senior noncommissioned officer, a master driver, and a safety officer. This group evaluates drivers and crews for evidence of requisite training, maturity, judgment, and the ability to perform the unit's mission. At each of these reviews, the board should watch for the indicators of indiscipline that may develop after a soldier is placed in a crew status.

The bottom line is for leaders to know their soldiers. This can best be accomplished by applying the risk-management process. Start by identifying these behavioral indicators (the hazards) that occur both on and off duty. Then implement controls—for example, additional training, performance review boards, counseling—to mitigate the risks.

POC: CW5 Robert A. Brooks, USASC Aviation Branch, DSN 558-3756 (334-255-3756)

FY 96 SAFETY ALERT MESSAGES

Message	Date	Subject
161532Z	Oct 95	M1A1/M1A2 Abrams Tank
161543Z	Oct 95	G/VLLD, AN/TVQ-2
171558Z	Oct 95	M939 Accident Awareness
062143Z	Dec 95	OH-58D(I) Autorotations
151951Z	Dec 95	MOUT Training
211324Z	Dec 95	POV Fatalities
301711Z	Jan 96	M1A1 Tank Turret Fatalities
291423Z	Feb 96	AH-64 Ground Fire
181832Z	Mar 96	UH-60 Blade Strike Fatality
191910Z	Mar 96	Parachute Fatality
091312Z	May 96	High-Risk Behavior
201506Z	May 96	Accident-Site Hazardous Materials
041835Z	Jun 96	Task Overload and Loss of Situational Awareness

SAFETY ALERT MESSAGE

Task overload and loss of situational awareness

This message is intended to raise leader and individual awareness of situations that could lead to task overload and loss of situational awareness, as well as to stress the importance of applying risk management and using crew coordination to reduce hazards. Talking on the radio; operating navigation and weapon systems; and finding, tracking, and engaging targets can cause the cockpit to be an extremely busy place. Given the workload in today's sophisticated aircraft systems and demanding mission profiles, anyone can become task-saturated and, as a result, lose situational awareness.

Operating complex aircraft systems under adverse environmental conditions can be very demanding and requires a great deal of time and concentration from each crewmember—so much so that, in some cases, each crewmember fixates on the task at hand and fails to fly the aircraft. No matter how busy it gets inside the cockpit, someone has to be looking outside the aircraft. The "aviate, navigate, and communicate" axiom is often quoted as the first rule of flight.

Instructor pilots, instrument examiners, and unit trainers are among those crewmembers who are placed in the most demanding and hazardous scenarios and therefore are most at risk. While instructors are active aircrewmembers and must perform appropriate duties, they also must provide instruction, verify procedures, and ensure safe parameters are maintained. But instructor pilots are not alone in the cockpit. Communication in the cockpit is essential. Communicating and appropriately dividing attention between cockpit duties and flying the aircraft are the best ways to avoid task overload and loss of situational awareness.

The bottom line is that the success and safety of all missions depend on effective risk management and solid crew-coordination techniques.

POC: CW5 William H. Ramsey, USASC Aviation Branch, DSN 558-9857 (334-255-9857)

A message from the new USASC Sergeant Major

We all know that aviation can be an unforgiving business. The old saying that aviation regulations are written in blood has its basis in fact. Unfortunately, most of us who have been around Army aviation for a while have lost friends and unit members to accidents. There's no getting around it; aviation training and operations can involve a high level of risk. And, without effective risk management, we will continue to lose friends and unit members to accidents that should have been prevented.

Risk assessments have been SOP for most aircrews for some time now. But what we really have to ask ourselves is, "Are we filling in blocks on a form or a matrix, or are we getting inside the risk-management process to find ways to conduct the high and extremely high risk missions by designing and implementing controls to manage the risk?"

In aviation, risk management is not just for the pilots. NCOs in aviation units make critical decisions constantly—decisions that can result in a mission accomplished or a mission failed because soldiers were injured or killed. On the maintenance floor and in the shops, soldiers and NCOs routinely use hazardous tools, chemicals, and procedures. In the field, all NCO leaders identify and assess hazards as they establish, occupy, and move around the training area or the area of operations.

We have generators, vehicles, FARPs, TOCs, and a variety of weapon systems in our area of operations for which NCOs are responsible. And along with that responsibility comes the need for NCOs to be just as proficient at applying the 5-step risk-management process as the aviators are.

As the new SGM for the U.S. Army Safety Center (USASC), I want all the soldiers and NCO leaders in Army aviation to know that the Safety Center stands ready to assist units in ensuring that the risk-management process becomes embedded in our units at the level where it comes closest to soldiers—with the noncommissioned officers.

Accidents generally are reported through our accident-reporting system (AAARs, AGARs, 285s); situations that could have been accidents, but weren't, don't get reported. We need the soldiers in the field to tell us how NCOs are using the risk-management process to perform high-risk operations safely. We want to publish vignettes that show real-world practical applications of risk management. Our NCOs and soldiers are out there every day making wise decisions and developing controls to mitigate hazards...let us hear about them.

The focus of the Army Safety Program is to *"Protect the Force Through Risk Management to Enhance Warfighting."* Aviation NCOs play a big part in making that happen.

—SGM Greg McCann, DSN 558-3575 (334-255-3575), fax 558-9136 (334-255-9136),e-mail mccanng@rucker-safety.army.mil

INVESTIGATORS' FORUM

Lessons Learned

Written by accident investigators to provide an accident synopsis and major lessons learned from recent centralized accident investigations.

OH-58D(I). During an NVG Hellfire live fire, Chalks 1 and 2 made in-flight contact. Chalk 1 crashed and was consumed by a fire. Chalk 2 also sustained a high-G, near-inverted impact and was destroyed. Both pilots in Chalk 2 suffered fatal injuries, and the PC in Chalk 1 suffered fatal injuries. The Chalk 1 PI sustained only minor injuries and was able to egress on his own power before the fire consumed the aircraft.

● ***What happened.*** It appeared to be a simple mission. Each of the three aircraft would have one missile, fly a simple route to the range, occupy a 3-kilometer-wide battle position (BP), engage one target each, then egress and return to base via the same route. So what went wrong?

Both the commander and the platoon leader were RL 2 aviators, and this was their first Hellfire opportunity. They were in Chalks 1 and 2 of the accident aircraft respectively and were appropriately paired up with the unit instructor pilots for mission training to be conducted on this flight. The mission was briefed, rehearsed, and rock drilled before execution. The flight of three would enter the BP from the west and would stack from the east to west.

The aircraft entered the BP, but the crews selected firing positions that used only 300 to 500 meters of the 3-kilometer box. Chalks 1 and 3 fired their missiles. As Chalk 2 was preparing to fire, Chalks 1 and 2 made contact. The main rotor blades of Chalk 2 impacted the right door of Chalk 1, wresting the universal weapons platform, landing gear, right doors, and fuel cap from Chalk 1, opening the fuel cell with the blade strike, and causing significant injury to the IP on the controls.

● ***Lessons learned.*** How did two hovering aircraft get so close to each other without any one of the four pilots noticing? The answer is not simple or definitive.

First, design of the aircraft, field-of-view limitations of the ANVIS, and the cockpit workload contribute to difficulties in clearing the aircraft to the rear quarters, particularly on a zero-illumination night. It is extremely difficult, if not impossible, for a pilot in this aircraft to clear the opposite side of the aircraft.

Second, both accident aircraft had RL 2 aviators. The PIs were focused "on the vids" because of self-designating laser engagement requirements and enhanced visibility. Most likely, the IPs were devoting more attention inside the aircraft to verify switch positions, prelaunch parameters, postmissile impact damage, and other training duties.

Third, specific firing positions were not identified in this large BP. The command emphasized numerous times to "use the whole 3 kilometers." Chalks 1 and 2 were evidently too close. Had firing positions been predesignated, which understandably is not always possible, the aircraft would have had more separation. Left tailwinds were prevalent in the BP and may have also contributed to aircraft drift.

It could not be determined who drifted into whom, but regardless of which aircraft drifted, none of the four pilots in the two aircraft maintained a vigilance outside the aircraft to clear obstacles and maintain separation. A lack of crew coordination, improper night scanning techniques, training responsibilities, and equipment shortfalls caused this accident.

As with any of the advanced aircraft, the OH-58D(I) is cockpit intensive and unforgiving. Once the Army installs hover-hold capability and improves the optical display assembly to give pilots "heads-up" capability, workload will decrease, making it easier for the PC to maintain situational awareness and obstacle clearance. However with or without these improvements, both pilots must divide their attention appropriately between responsibilities inside and outside of the cockpit.

Broken Wing Award

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: Army Accident Prevention Awards Program.

■ **CW4 Jerome T. Davis and CW2 Walter R. Lejeune, C Company, 1/160th Special Operations Aviation Regiment (Airborne), Fort Campbell.** With six crewmembers on board, the MH-60L departed Campbell Army Airfield to conduct an annual instrument evaluation for two pilots. The destination airport was Owensboro (KY) Regional. CW4 Davis, the instrument flight examiner, was in the left seat, and CW2 Lejeune, one of the pilots, was in the right seat. The flight to Owensboro was uneventful and lasted 1½ hours. CW2 Lejeune satisfactorily completed all required flight maneuvers, terminated his last instrument approach, and transferred the aircraft controls to CW4 Davis. CW4 Davis transitioned to the parallel taxiway and then to an adjacent taxiway. CW4 Davis then directed CW2 Lejeune to change radio frequencies to ground control. While hovering at approximately 10 feet AGL over the taxiway, the aircraft began an uncommanded, rapidly accelerating yaw to the right. CW4 Davis initially tried to counter the right yaw with left pedal but, based on the lack of response to pedal input and the accelerating yaw rate, he recognized the total loss of tail rotor thrust. CW2 Lejeune, who was temporarily focused inside the aircraft while completing the radio frequency change, detected the rapidly accelerating yaw, immediately refocused his attention, and also recognized the loss of tail rotor thrust. Over the ICS, CW4 Davis announced "tail rotor, PCLs off." Having correctly diagnosed the nature of the emergency virtually simultaneously with CW4 Davis, CW2 Lejeune had quickly positioned his hands on the power control levers (PCLs) in anticipation of instructions from CW4 Davis. At the command of "PCLs off," CW2 Lejeune retarded both PCLs to off. Approximately 3 seconds elapsed from the time the aircraft yawed until CW2 Lejeune retarded the PCLs. CW4 Davis continuously adjusted cyclic to maintain a level attitude and adjusted collective to successfully accomplish an autorotation from a hover. Approximately another 3 seconds elapsed from the time CW2 Lejeune retarded the PCLs until the aircraft landed. In the 6 seconds that passed between the time the aircraft started to yaw rapidly to the right until the crew was safely on the ground, the aircraft completed more than two full rotations, spinning approximately 810 degrees. When the emergency occurred, the gross weight of the aircraft was more than 18,000 pounds. The loss of tail rotor thrust was due to failure of the input bevel gear, which completely sheared, inside the tail rotor gearbox. There were no associated cockpit instrument indications before, during, or after the emergency.

■ **CW2 Gary L. Carrola, 7th Squadron, 6th Cavalry Regiment (ATK HB), Route 22, Box 960, Conroe, TX 77303-2298.** During a night OH-58A training flight with an enlisted aerial observer, CW2 Carrola experienced a complete engine failure that was confirmed by illumination of the engine-out light, N1 and N2 decay, and a rapid left yaw. CW2 Carrola immediately entered autorotation and turned the aircraft approximately 120 degrees to the right toward the only suitable landing area available. The landing area was a small shopping center parking lot on the edge of town. CW2 Carrola simultaneously made a Mayday call on the FM radio and attempted to restart the engine. The engine start sequence was progressing as the aircraft passed through 100 feet AGL but failed after a few seconds. Committed to making the autorotation to the ground, CW2 Carrola noticed wires on the approach end of the parking lot. A cross-check revealed the Nr in the high green, which allowed him to increase the collective pitch enough to clear the wires. At approximately 75 feet AGL, CW2 Carrola had to maneuver the aircraft to pass between several parking lot light poles and effect a safe touchdown. Even though the aircraft touched down on a seal-coated pavement with a slight downslope, the aircraft slid only its own length before coming to a stop without incident.

Broken Wing Award *eligibility and nomination requirements*

AR 672-74: *Army Accident Prevention Awards Program* outlines the requirements for the Broken Wing Award. To be eligible for the award, an aircrewmember must, through outstanding airmanship, minimize or prevent aircraft damage or injury to personnel during an emergency situation. The aircrewmember must have shown extraordinary skill while recovering an aircraft from an in-flight emergency situation.

An emergency will **not** be considered for award if—

- It is self-induced.
- It actually occurs during a simulated emergency requiring no added skill to land the aircraft successfully.
- It occurs because of noncompliance with published regulations or procedures.
- It is determined that no emergency actually existed.
- A lack of discipline or aviator judgment may have induced the emergency.
- The aircraft was in a phase of flight with no unfavorable circumstances to prevent a safe landing.

Nomination requirements

Nominations must include the following information:

- Full name, SSN, and crew duty of the person actually on the controls during the emergency.
- Date, time, and location of the emergency.
- Mission type, design, and series of the aircraft involved.
- Type of mission.
- Phase of flight when the emergency occurred.
- Kind of terrain over which the emergency occurred.
- Obstructions, dimensions, type, and condition of the landing area.
- Altitude above ground level.
- Density altitude.
- Wind condition (direction and velocity).
- Gross weight of the aircraft when landing.
- Concise description of the emergency from inception to termination.
- Action taken by the nominee to cope with the emergency and what was done to recover from the emergency or minimize damage or injury. The circumstances surrounding the occurrence must be documented to show the skill, knowledge, judgment, and technique required and used in recovering from the emergency.
- Lapsed time from onset of the emergency to termination.
- Drawings, other supporting documentation, and photographs, if available.
- Copy of the abbreviated aviation accident report (AAAR) if required and submitted.

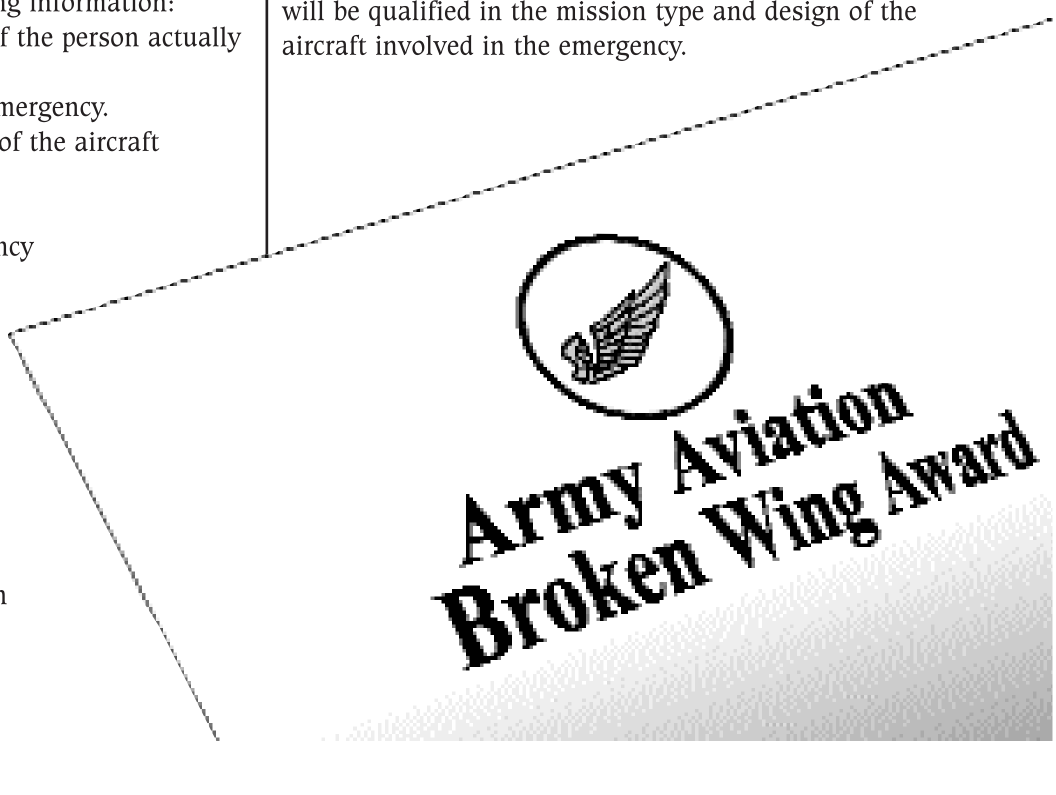
Submitting nominations

The unit commander or installation or unit safety manager should initiate nominations for the Broken Wing Award. Normally, only one person will be nominated to receive the award for a single in-flight emergency. However, if more than one crewmember materially contributed to successful recovery from the emergency, all those involved should be considered for nomination.

Nominations for the Army Aviation Broken Wing Award should be forwarded **through command channels** to the U.S. Army Safety Center, ATTN: CSSC-PT (Broken Wing Award), Building 4905, 5th Avenue, Fort Rucker, AL 36362-5363.

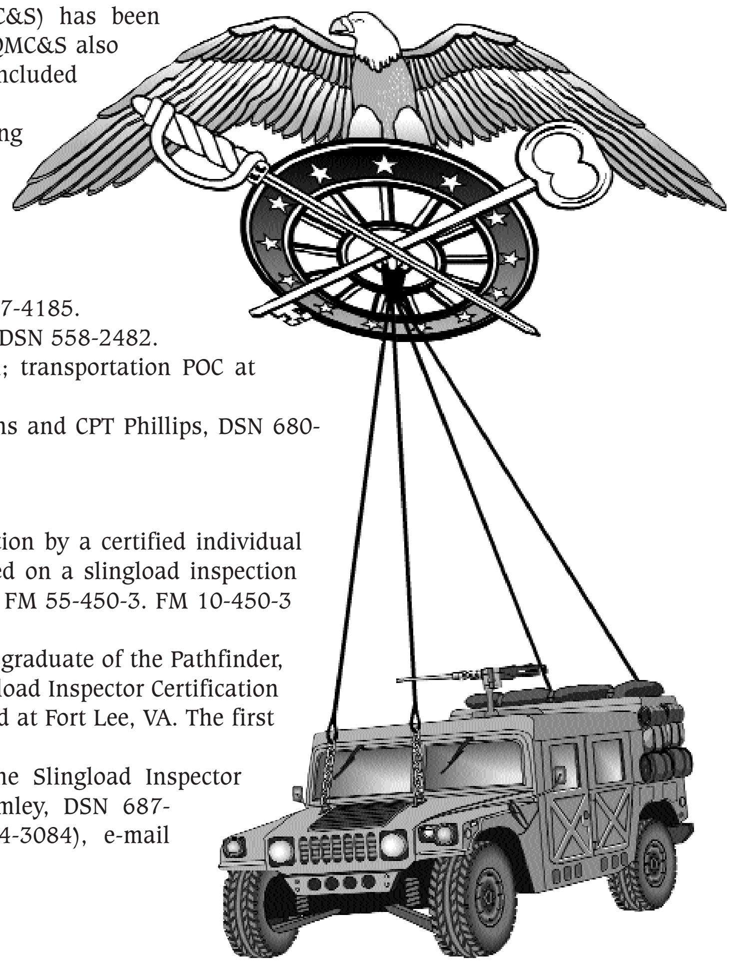
Evaluating nominations

A panel consisting of the Director of Army Safety or his or her representative and at least five aviators will review the nominations. The panel may include senior enlisted crewmembers when appropriate. At least one panel member will be qualified in the mission type and design of the aircraft involved in the emergency.



ShortFAX
Keeping you up to date

Slingload proponency and inspector certification course



The U.S. Army Quartermaster Center and School (USAQMC&S) has been designated the proponent for slingload operations. The USAQMC&S also is the current proponent for aerial delivery (airdrop) and has included slingload in the aerial delivery definition.

Primary duties for the slingload proponency include developing and reviewing doctrine, training, and materiel actions relating to both airdrop and slingload operations, to include field manual development.

Points of contact

- **Slingload operations**—USAQMC&S, Mr. Don Lynn, DSN 687-4185.
- **Aircraft recovery**—U.S. Army Aviation Center, SGT Theim, DSN 558-2482.
- **Internal air transport**—U.S. Army Transportation School; transportation POC at CASCOM is Mr. Lamb, DSN 687-2871.
- **Airborne Airlift Action Office, HQ, TRADOC**—MAJ Higgins and CPT Phillips, DSN 680-2469/3921, fax DSN 680-2520.

Slingload Inspector Certification Course

Effective 1 October 1997, all Army loads will require an inspection by a certified individual before supporting aircraft arrive. Inspection data will be recorded on a slingload inspection form that will be included in FM 10-450-3, which will supersede FM 55-450-3. FM 10-450-3 is scheduled for publication during the first quarter of FY 97.

An inspector must be a specialist fourth class or above and a graduate of the Pathfinder, Air Assault, or Slingload Inspector Certification Course. The Slingload Inspector Certification Course is a new 5-day course that the USAQMC&S has established at Fort Lee, VA. The first class will begin in September 1996.

For additional information or to schedule personnel for the Slingload Inspector Certification Course, please contact Mr. Don Lynn or SFC Rumley, DSN 687-4185/5889 (804-734-4185/5889), fax DSN 687-3084 (804-734-3084), e-mail lynnd@lee-emh2.army.mil.

More on GG rotors

Headquarters, Department of the Army (HQDA), recently issued a message (291400Z May 96) informing commanders of the Army's strategy to correct problems associated with the gas generator turbine rotor blade, commonly referred to as the "GG rotor." A U.S. Army Aviation Center message dated 091530Z Mar 96 provides the best information on the background of the problem and also provides the branch chief's guidance to the field on training and standardization. (See "GG rotors update" in the April 1996 issue of *FlightFax*.)

In the last few months, commanders and senior representatives of appropriate commands and activities have explored various courses of action to remedy problems associated with undampened GG rotors present in -700 and -701 GE turbine engines found in Apache and Black Hawk helicopters. As a result of this effort, the following actions will be pursued:

- A General Officer Steering Committee (GOSC) of 15 February 1996 directed PM, Utility Helicopters, to force retrofit the remaining 350 undampened -700 UH-60 engines with dampened GG rotors. This effort will be centrally funded by the wholesale Supply Management, Army (SMA) business area from the safety-of-flight earnings generated in the SMA surcharge. This program is expected to be completed by March 1997.
- The remaining 800 undampened -701 engines in the Apache fleet will undergo a similar force retrofit. DAMO-FDV and DALO-SMV will provide a fielding plan and funding strategy for PM, Apache Helicopter, to execute in the near-term. This schedule will be released to the field via subsequent message. PEO, Aviation/ATCOM will manage the retrofit by contract team that will exchange GG rotors and required mating parts on affected undampened engines, according to priority established by HQDA. This effort is expected to start in January 1997 and be completed by May 1998.

HQDA is confident that leaders and crews in the field are taking appropriate measures to mitigate the risks presented by this hazard until the retrofit is completed. Accordingly, we do not anticipate issuance of an aviation safety-of-flight message at this time nor do we expect to reduce the time-before-overhaul (TBO) hours of the engine to apply this fix.

POC: LTC R. Kowalczyk, HQDA, DSN 224-2065 (703-614-2065)

Accident briefs

Information based on *preliminary* reports of aircraft accidents

Aviation flight accidents

Utility

UH-60 Class A

L series - As a flight of three UH-60L aircraft were approaching the drop zone to conduct Fast Rope Insertion/Extraction System (FRIES) training, the main rotor blades of Chalk 2 meshed with the main rotor blades of Chalk 1. The crash resulted in both aircraft being totally destroyed and 39 injuries, to include 6 fatalities.

UH-60 Class C

K series - During air assault infiltration exercise, aircraft was Chalk 3 when it landed hard and FLIR turret contacted ground. Aircraft also sustained damage to tail and landing gear.

Attack

AH-1 Class E

F series - Crew detected smell of burning wires. Alternator/rectifier light illuminated. Crew could not reset alternator and landed aircraft without further incident. Maintenance replaced alternator.

AH-64 Class C

A series - Upon return to airfield for fuel, oil low utility hydraulic warning light illuminated. IP realized there must be a leak because system had been serviced before flight. IP hover taxied aircraft to parking ramp and performed normal shutdown. During postflight inspection, IP discovered damage to tail wheel lock hydraulic line, stabilator, and tail rotor blades. Near the end of the first of two periods of RL progression training planned for the night, IP had demonstrated approach and landing to a pinnacle. During approach, tail section of aircraft had passed into and through small tree and some small scrub brush without either pilot realizing incident had occurred.

A series - No. 2 engine cowling came open in flight. Crew landed aircraft, safetied cowling closed, and returned to airfield. Investigation ongoing.

AH-64 Class E

A series - During engine start with APU on, PI was advancing No. 1 power lever to fly. With power lever about halfway to fly position, No. 1 engine torque fluctuated wildly. No. 1 Np dropped to zero, and APU fail lights illuminated. Crew secured engine. Maintenance replaced yellow wire harness.

A series - During cruise flight, utility hydraulic accumulator pressure gauge dropped slowly from 3,000 to approximately 1,800 PSI. No caution warning lights illuminated. Crew returned to airfield, landed, and shut down aircraft without further incident. Maintenance replaced utility hydraulic pressure transducer.

A series - During taxi to parking, crew observed smoke in crew station. PI parked aircraft and executed emergency procedures. Maintenance inspection revealed that shaft-driven compressor had failed.

A series - Aircraft was on APU power at tactical FARP refuel pad when oil PSI accessory pump caution warning light illuminated. PC shut down APU immediately. Inspection revealed accessory gearbox oil pressure switch had failed.

A series - During roll-on landing, No. 2 engine oil PSI light illuminated. Maintenance replaced No. 2 engine oil pressure transmitter.

A series - During night traffic pattern flight, primary hydraulic PSI light illuminated. Crew landed safely and shut down aircraft. Maintenance replaced hydraulic manifold pressure switch.

A series - No. 1 nose gearbox chip and caution warning lights illuminated. Crew retarded power lever to flight idle position and completed roll-on landing. Inspection revealed bearing in gearbox had failed.

A series - During takeoff, PC noticed No. 2 engine TGT rise rapidly to 1,000°C for about 30 to 40 seconds. No. 2 engine-out warning light illuminated and engine-out warning audio sounded. PC obtained single-engine airspeed and recovered aircraft back to home base. Inspection revealed No. 2 engine GG rotor failure.

Cargo

CH-47 Class C

D series - Aircraft departed from Naval air station en route to Army airfield in support of slingload training mission. While transitioning from 500 feet AGL to 1,500 feet MSL, PI noticed that rotor RPM was climbing through 105 percent and announced that they were having a high side on No. 2 engine. As PI began to increase thrust, PC confirmed emergency and began to move engine condition lever (ECL) from flight position to control rotor RPM. When there was no immediate response, PC aborted defined emergency procedure and tried to control rotor RPM with emergency engine beep trim system. When there was no response using emergency beep trim system, PC came on the controls and entered an autorotation to disengage engines from drive train. Rotor RPM had reached 120 percent and stayed there throughout descent and landing. PI performed emergency engine shutdown. During shutdown, ECLs responded normally and engine shutdown was completed. Inspection revealed that rotor heads had experienced overspeed and would have to be replaced. No. 2 engine was suspected of an N2 overspeed. Maintenance performed rig check on actuators that are controlled by ECLs and found them to be normal and functioning. Suspect that fuel control for No. 2 engine malfunctioned. Secondary cause may have been N2 control box. Maintenance replaced both rotor heads, No. 2 engine, and N2 control box. Mishap is still under investigation.

CH-47 Class D

D series - As Chalk 4 in flight of four, crew air taxied along predetermined route to pick up VIP as briefed. Although route was briefed as "cleared of all nonparticipating aircraft," Chalk 4 came within 150 feet of OH-58 that was parked for maintenance. Rotorwash from CH-47 blew door off OH-58.

CH-47 Class E

D series - Crewmember was closing up aircraft for taxi and saw hole where window should have been. Passenger had been seated by right side bubble window. Suspect that passenger used window as a brace when he stood up to exit aircraft.

D series - On VFR NVG training flight, No. 1 generator caution light illuminated during normal cruise flight. PI performed emergency procedures. Generator off caution light went out, and SP elected to continue to airfield. Within a few minutes, both No. 1 and No. 2 generator off caution lights illuminated, resulting in a dual generator failure. PI and SP performed emergency procedures for No. 1 and No. 2 generator off caution and landed aircraft at airfield without further incident. Inspection revealed faulty generator control box.

D series - At 700 feet MSL and 100 knots, PI transferred flight controls to IP to conduct local area orientation of airfield. After IP took controls, aircraft began to yaw 5 degrees, progressively increasing to 20 degrees left to right. IP turned aircraft to final for landing, and flight controls locked up in yaw axis to the left. Left pitch axis was dissipating all available airspeed. IP increased counterpressure to flight controls but no movement of controls occurred. Flight controls felt as if there were no hydraulic pressure in system, but flight engineer indicated pressures and temperatures were normal. No caution lights illuminated on the caution panel. After approximately 30 seconds, flight controls broke free and it felt as if partial hydraulic control were restored. IP centered cyclic and put aircraft in trim, but only limited control of the aircraft was restored. IP selected suitable landing area and was initiating approach for landing when flight controls locked up again in yaw and roll axis, making aircraft control nearly impossible. Flight controls felt as if they were free again just before ground contact. IP completed successful landing, neutralized flight controls, and transferred controls back to PI to conduct normal shutdown. At that time, crew felt slight vibration in flight controls that increased rapidly to violent vibration and blade flapping. Crew locked shoulder harnesses and completed emergency engine shutdown. Postflight inspection revealed an extended jam indicator on the aft swiveling upper dual boost actuator.

D series - After landing, crew smelled hydraulic fluid and noticed No. 1 flight control system was losing fluid. Maintenance replaced pitch integrated lower control actuator.

D series - During engine runup for second leg of mission, No. 2 flight control hydraulic return filter button popped and would not reset. Maintenance replaced hydraulic filter.

D series - On landing from VFR training mission, No. 1 flight control hydraulic pressure gauge indicated excessively high pressure. Temperatures and levels were normal. Maintenance replaced faulty No. 1 flight boost hydraulic pressure transducer.

Observation

OH-58 Class C

D series - During live-fire operations, flash suppresser on 50-cal machinegun failed. Part of suppresser damaged trailing edge of red main rotor blade. Crew found damage during postflight inspection.

D series - Mast-mounted sight cover (upper shroud) separated during aircraft runup and hit rotor system. Cover was destroyed, and one blade and one blade grip were damaged.

OH-58 Class E

A series - Aircraft was at 500 feet and 80 knots in level flight when crew smelled hot oil. Crew landed aircraft immediately in field and shut down engine. Aircraft had been flying 20 minutes on full load of fuel. Inspection revealed oil leaking from transmission input seal. Crew chief replaced transmission input seal. Crew completed 10-minute ground run and MOC with no further problems.

C series - Aircraft was in shallow turn when N2 dropped to 97 percent. PC landed aircraft and rolled throttle to idle. N1 stabilized at 62 percent and then dropped to 55 percent. Maintenance found loose bleed air line.

D series - Crew was conducting 50-cal machinegun gunnery in support of avionics test. After completing second load of 500 rounds, crew was repositioning aircraft to rearm site. At 600 feet AGL and 95 knots, copilot's chin bubble broke. Crew landed aircraft at rearm site and shut it down. Chin bubble also was a test item.

D series - At 700 feet MSL and 65 knots during climbout from combat position, DC generator fail caution light came on. PI performed emergency procedures but DC generator would not reset. Crew heard loud noise from generator compartment and executed 180-degree turn back to combat position. At approximately 10 feet, low rotor audio sounded and light illuminated. Low transmission oil PSI light illuminated along with low engine oil PSI light. After shutdown, DC generator caught fire. PI put out fire with extinguisher. Maintenance replaced starter generator.

Training

TH-67 Class C

A series - While hovering, directional control was lost and aircraft impacted ground. Aircraft sustained twisted tail boom pylon whirl, isolation mount damage, and damage to transmission cowling. Investigation is ongoing.

TH-67 Class E

A series - During VFR flight, aircraft experienced fluctuation in all gauges, fuel pump light illuminated, UHF/VHF radio failed, and audio could not be reset. Emergency procedures for total electrical failure produced no results. Maintenance replaced reverse current relay and aircraft battery.

A series - Main transmission chip light illuminated and would not go out. Maintenance replaced faulty chip detector sensor.

A series - During flight No. 3, crew performed precautionary landing for engine chip light. Maintenance replaced engine quick change assembly harness.

Fixed wing

C-12 Class E

C series - Following descent and landing during rainshowers, No. 2 fire pull handle light illuminated while aircrew taxied to parking. Crew could not visually identify a No. 2 engine fire and completed taxi without incident. Postflight inspection revealed no indication of No. 2 engine fire. On following day during aircraft runup for one-time evacuation flight, engine fire protection system checks were normal. Crew flew aircraft to base without incident. Suspect moisture in one or more fire warning system detectors caused illumination of No. 2 fire pull handle.

C series - At 22,000 feet during climb, pilot's outer windshield cracked. OAT was -20°C, sky condition was clear, and windshield anti-ice switch had been in normal position since 5,000 feet. Crew returned aircraft to airfield without incident. Contract maintenance determined that windshield had delaminated.

C-21 Class E

A series - During climb to 14,000 feet, crew heard a tone over headset and speakers during all power changes. Crew also noted erratic needle movement on right and left generator voltage meters that seemed to correspond to tone. PC initiated return to base while PI conducted troubleshooting via UHF phone patch. Problem was isolated to No. 1 generator. Crew placed generator switch in off position in VMC and completed uneventful landing. Maintenance replaced generator.

OV-1 Class D

E series - During engine runup, maintenance technician in right seat attempted to reset his shoulder harness lock with the lock reset lever. He mistakenly pulled ejection seat manual override lever, which activated manual disarmament of ejection seat and severed the drogue chute line. Crew shut down aircraft without further incident.

U-21 Class E

A series - During takeoff, aircraft would produce only 2100 RPM on left engine. Crew reentered traffic pattern and landed aircraft without further incident. Postflight inspection revealed frayed control cable assembly in power quadrant, which prevented full travel of left propeller control.

Safety messages

Safety-of-flight messages

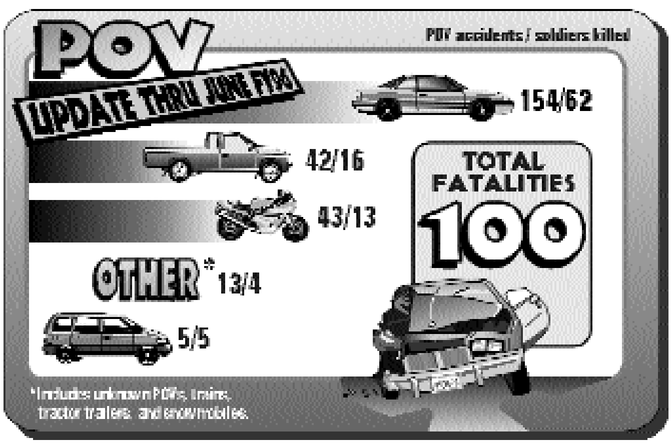
■ Safety-of-flight technical message concerning retirement life change for main rotor drive shaft, P/N 7-211350021, on all AH-64 aircraft (AH-64-96-02, 101917Z Jun 96). Summary: The current interim statement of airworthiness qualification (ISAQ) and TM 1-1520-238-23 list a retirement life of 5,400 hours for the Fenn main rotor drive shaft. This part now has a reduced interim retirement life of 1,750 hours based on engineering review of test data. The purpose of this message is to require units to inspect all AH-64 aircraft for drive shafts manufactured by Fenn and to change the aircraft time change DA Form 2408-16 to reflect the interim fatigue life. Contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Aviation safety action messages

■ Aviation safety action maintenance mandatory message concerning removal and replacement of main rotor blade tip weight retention nuts on all AH-64 helicopters (AH-64-96-ASAM-07, 291900Z May 96). Summary: After removing the main rotor blade tip cap, inspections have revealed that one of the nuts securing the aft weight support fitting was cracked. The purpose of this message is to require units to replace the nuts that secure both the forward and aft main rotor blade tip weight fittings and to reduce the torque on these nuts. Contact: Mr. Lyell Myers, DSN 693-2438 (314-263-2438).

■ Aviation safety action maintenance mandatory message concerning revision to replacement of the inboard balance weight attachment bolts required by AH-64-96-ASAM-05 on all AH-64 helicopters (AH-64-96-ASAM-08, 121919Z Jun 96). Summary: AH-64-96-ASAM-05 required replacement of the main rotor blade shouldered studs, P/N 7-211412071-3, due to cracking from hydrogen embrittlement. This message revises the list of main rotor blade serial numbers. Contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

■ Aviation safety action maintenance mandatory message concerning one-time inspection of the forward and aft rotary wing heads to ensure flow of lubricating oil to the horizontal hinge pin bearings on all CH-47D, MH-47D, and MH-47E aircraft (CH-47-96-ASAM-04, 061523Z Jun 96). Summary: During the scheduled maintenance of a rotor head assembly, tape was discovered covering one of six oil lube ports on the upper surface of the rotor hub. These ports are used to provide lubrication of the horizontal hinge pin bearings. The tape is used to protect the oil passages during painting and may have been accidentally left in place during overhaul production. A complete or partial restriction of lubricating oil to the horizontal hinge pin bearings causes premature wear and results in damage to the bearings and related components. The purpose of this message is to require a one-time inspection of all CH-47D, MH-47D, and MH-47E forward and aft rotor hubs to ensure flow of lubricating oil to the horizontal hinge pin bearings. Rotor hubs received from the supply system shall have this ASAM complied with before installation on the aircraft. Contact: Mr. Lyell Myers, DSN 693-2258/2085 (314-263-2258/2085).



Ground precautionary message

■ Ground precautionary message (GPM-96-007, 061330Z Jun 96), BB-558/A (NSN 6140-01-186-8802) nickel cadmium battery manufactured by Saft America, Inc., all contracts, used in the OH-58D aircraft. Summary: Recently, it has been reported that the subject battery has exhibited a number of violent ventings or explosive incidents and fire during nonflight or flight line tests. The BB-558/A battery is used only in the OH-58D aircraft. Analysis of failure reports indicates the likely cause to be from damaged heating elements internal to the battery. It is believed that heater element damage is caused during battery maintenance or reassembly and the absence of shims between the heater blankets and battery case. This message outlines user actions required. Contact: Mr. Lyell Myers, DSN 693-2438 (314-263-2438).

For more information on selected accident briefs, call DSN 558-2119 (334-255-2119).

In this issue:

- Caution—advanced composite materials
- Another accident-site hazard
- High-risk behavior
- Task overload and loss of situational awareness
- A message from the new USASC Sergeant Major
- Investigators' Forum
- Broken Wing Awards
- Broken Wing Award eligibility and nomination requirements
- Slingload proponency and inspector certification course
- More on GG rotors

Class A Accidents through June

		Class A Flight Accidents		Army Military Fatalities	
		95	96	95	96
1ST QTR	October	0	1	0	0
	November	0	0	0	0
	December	1	0	0	0
2D QTR	January	1	1	1	0
	February	0	0	0	0
	March	1	2	0	7
3D QTR	April	1	1	5	3
	May	2	0	2	0
	June	1	1	0	6
4TH QTR	July	0		0	
	August	2		5	
	September	1		0	
	TOTAL	10	6	13	16

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