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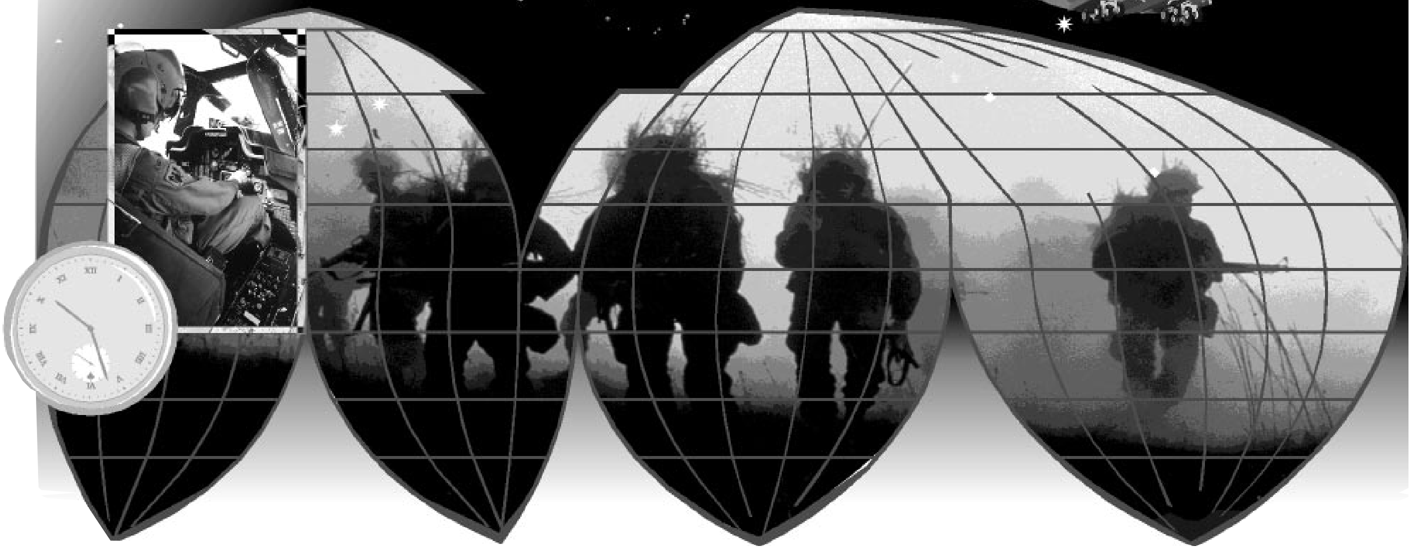
ARMY AVIATION RISK-MANAGEMENT INFORMATION

JANUARY 1997 ◆ VOL 25 ◆ NO 4

A lesson in risk management and crew endurance



Stress, fatigue, lack of sleep, and changing schedules have always been critical issues in Army aviation. But they have become even more critical in this new Army of ours where working environments and schedules can change with little notice or time to adjust as we deploy back and forth across time zones. We may be working in the desert one week and in an urban area the next, flying days this week and nights the next, doing not only traditional military missions but also new and different ones. In addition, the sophistication of today's aviation equipment requires more alertness and concentration by all of us, aviators and maintainers alike. These factors combine to make crew-endurance issues more important than ever before.

Last summer at Fort Rucker, the U.S. Army Aeromedical Research Laboratory and the Army Safety Center jointly produced the *Leader's Guide to Crew Endurance* to give leaders the latest information on recognizing when human performance can be expected to decline and how to control crew-endurance-related hazards.

Here's an overview of the section on work schedules and the body clock.

The biological clock

Our biological clock regulates the availability of our mental and physical resources, which fluctuate during the 24-hour day. The best and worst times of day are determined mostly by light cues received by the body clock. Exposure to daylight after a normal night's sleep sets the body clock in a day-oriented pattern, which means that physical and mental energy peaks between 0800 and 1200, decays slightly between 1300 and 1500, increases between 1500 and 2100, and finally declines from 2200 through 0600.

Inconsistency in daylight exposure times will result in unpredictable availability of alertness and energy. If wake-up times and daylight exposure vary continuously from day to day, the body clock receives inputs similar to frequent travel across time zones. Unstable sleep wake schedules, whether caused by changes in work schedules or travel across time zones, may disrupt body-clock timing and ultimately induce **circadian desynchronosis**.

Circadian desynchronosis causes classic symptoms of jet lag and shift lag, including fatigue, malaise, sleepiness, digestive disorders, confusion, and lack of motivation. These body-clock disruptions increase mission risk levels and can compromise safety if risks are not managed. Working the five-step risk-management process offers a simple way to control the risks.

> **"Circadian"**
>
> **(Latin: circa = about; dies = day) describes biological and behavioral rhythms regulated by the body clock.**

The risk-management process

Step 1: Identify the hazard

It's usually easy to predict shift lag or jet lag. Anytime the work schedule and sleep/wake cycle are shifted suddenly, soldiers will be at risk for circadian desynchronosis. Given sufficient notice, leaders and individuals can take measures to minimize the effects of this body-clock disruption.

Circadian desynchronosis can be detected by a variety of signs. However, most of these signs are also characteristic of simple fatigue, so it is important to consider the context of the situation and recent body-clock history of individuals involved. For example, the following may be present in soldiers suffering from circadian desynchronosis, with or without simple fatigue:

- Vacant stare.
- Glazed eyes.
- Pale skin.
- Body swaying upon standing.
- Walking into objects.
- Degraded personal hygiene.
- Loss of concentration during briefings.
- Slurred speech.

Step 2: Assess the hazard

Gauging the severity of circadian desynchronosis depends largely on the operational scenario. For example, a sudden change of eight time zones is obviously of more concern than a long-planned trip across three. Factors such as the severity of and soldier susceptibility to desynchronosis can assist in assessing the magnitude of the hazard.

Leaders should consider the following factors when planning changes in work schedules:

- Rotations from daytime to nighttime or early morning duty hours will result in some degree of sleep loss and fatigue the first day. Controls should be implemented from the beginning of the work-schedule change.
- Night shifts ending around sunrise will pose the greatest challenge to the body clock and are associated with more severe desynchronosis.
- Rotations from daytime duty hours to afternoon or evening work schedules do not require rapid adjustment of the body clock. These rotations can be considered benign compared to rotations into night or early-morning duty hours.
- Return to daytime duty hours after several days or weeks of nighttime or early morning duty hours produces significant desynchronosis and should not be underestimated. At least 3 days are required to rotate from nighttime to daytime duty hours.
- Eastward or westward travel across more than one time zone will result in some degree of jet lag. This may manifest as fatigue in the early night for westward travelers and reductions in total sleep duration for eastward travelers. Increasing the number of time zones crossed increases the severity of symptoms.

Individual differences make some people more susceptible to jet lag or shift lag than others. It may be useful to consider the following tendencies in shift assignments and specific missions:

- People who prefer early-morning rise times (0400-0600) and early bedtimes (2000-2100) tend to adjust easily to early-morning duty hours. In contrast, those who prefer to retire at 2200 or later and rise after 0700 tend to adjust more easily to nighttime duty hours. Preferences are often masked by work schedules, so they are not easy to detect. It may be useful to determine preferred off-day bedtimes and rise times.
- Soldiers over 40 may experience sleep disturbances and gastrointestinal disorders more frequently than younger soldiers. Controls are required for all soldiers, although younger soldiers tend to benefit more quickly than the over-40 group.

Once circadian desynchronosis has developed, it is difficult to treat. To estimate the magnitude of a body-clock problem, consider the soldier's body-clock history, the severity of the signs and symptoms previously listed, and the following factors that may affect safety:

- **Impaired self-observation.** Desynchronosis is usually accompanied by severe sleep loss, with an attendant fatigue-related inability to adequately judge one's own behavior. Crewmembers may not be able to reliably determine if they are safe to fly and may not respond to subtle warning remarks made by peers.
- **Impaired communication.** Soldiers suffering from desynchronosis may have difficulty communicating critical mission, flight, or safety information. Conversation may become fragmented and contain repetitive phrases and ideas. In addition, weariness tends to result in misinterpretation of verbal communications.
- **Increased irritability.** Irritability and impatience are commonly experienced in association with desynchronosis. One positive aspect of increased arguing is that it shows soldiers are still talking to each other, exchanging orders and messages. Cessation of bickering may indicate mental exhaustion. This is particularly dangerous if a crew is flying between 0400 and 0700. During this period, crewmembers may experience sleepiness and degraded alertness, and cognitive function will be at its lowest. The combination of acute fatigue and desynchronosis can be lethal. When possible, avoid flying between 0400 and 0700 after working all night. Fatigue can be overcome more easily between 2400 and 0300.
- **Physical exertion.** The perception of exertion changes as a function of time of day. Desynchronosis can interfere with soldiers' ability to judge the physical difficulty of a task.

Step 3: Develop controls

The timing of sleep is critical to managing and preventing desynchronosis. Maintaining consistent schedules that ensure well-timed sleep is essential but can be difficult in the operational setting. Once shift lag or jet lag actually develops, returning to normal can take several weeks of a consistent sleep/wake schedule. Desynchronosis symptoms are unlikely to disappear in just a few days of normal sleep. The following controls can be helpful in preventing circadian desynchronosis:

Jet lag, shift lag: What's the difference?

Although the symptoms of jet lag and shift lag are similar, their mechanisms differ. In jet lag, desynchronosis is induced by the change in sunrise and sunset times that results from crossing several time zones. In shift lag, desynchronosis is caused by changes in work and sleep schedules and the corresponding change in daylight exposure time.

■ **Napping.** In the context of body-clock adjustment, naps are recommended if soldiers rotate from day to night shift, if they cannot sleep more than 4 to 5 hours during the sleep period, and if the next night is going to be another work period.

■ **Pre-adaptation.** Before deployment, a unit can attempt to pre-adapt to the new work shift or destination time zone. While potentially useful, pre-adaptation requires much coordination and cooperation from all levels of the involved unit. In a pre-adaptation scenario, deploying elements typically begin shifting their sleep/wake cycle toward the new cycle several days before transition.

■ **Timed light exposure.** The timing of daylight exposure is critical for resynchronizing the body's biological clock. By carefully scheduling exposure to sunlight or proper artificial light, it is possible to speed adaptation to a new work schedule or time zone. However, incorrect timing of light exposure can actually worsen jet lag.

The following example illustrates the control-development step of the risk-management process:

A mission is received that will require UH-60 crews to fly nightly troop lifts to forward combat positions for approximately 2 weeks beginning that night. Mission durations vary, with some missions ending between 0100 and 0300 and others ending between 0500 and 0600. Crews will be assigned to missions randomly, so it is difficult to assure the same schedule from night to night. The tasking will require soldiers to work a full daytime duty day on the first day.

Here's what planners came up with to reduce the effects of shifting to the night schedule:

■ Soldiers working the night shift will be required to nap between 1800 and 1930 during the first 3 days of the transition. Naps will improve alertness during the night, but crews should, if possible, avoid flying the early morning hours (0300-0700) on the first day of the rotation. Leaders will need to be sure that meals are available at times that will not interfere with the napping schedule.

■ To orient the body clock to a nighttime work cycle, sleep should begin as close to 0400 as possible, even if flying is completed before that. Every effort should be made to begin sleep well before sunrise to avoid exposure to daylight. Daylight exposure should be delayed until 1200. Soldiers will wear dark sunglasses to reduce sunlight exposure when it cannot be avoided.

■ Exposure to bright light between 2000 and 0300 could improve adaptation to this schedule. Therefore, bright lights will be used in the tactical operations center, maintenance shops, and other areas where soldiers are required to work nighttime hours. (Note: This would not be recommended for flight crews or drivers because of night-vision impairment.)

■ Soldiers working the night shift will eat breakfast upon awakening. This means breakfast must be served in the early afternoon.

■ Soldiers working the night shift will be required to wear sleep masks during their sleep period to avoid inadvertent exposure to daylight.

■ All briefings, maintenance, and training will be scheduled to take place outside the designated sleep period.

■ The sleep period will be protected from noise by using power generators to mask sound. Commercially available sound-masking devices may also be used. Earplugs provide an alternative, and combining their use with sound-masking may be most effective.

Steps 4-5: Implement controls & supervise

The commander and planners have now identified controls to mitigate the risk. The implementation measure best used in this example would be to insert the control measures into the operations order. Supervision in the form of spot checks would ensure that the controls are followed.

Summary

Soldiers—even aviators—are only human. Therefore, Army leaders must clearly understand how human-endurance limitations can degrade human performance, which, in turn, can jeopardize both the safety of their soldiers and unit readiness. It's also critical that leaders understand how they can use the five-step risk-management process to control the risks.

For more information on the subject of crew endurance, request a copy of *Leader's Guide to Crew Endurance* from Sharrel Forehand at the Army Safety Center, DSN 558-2062 (334-255-2062).

Problems unique to nighttime aviators

Because of the necessity to protect their night vision, aviation crewmembers are not usually able to get the amount of light exposure that would help adjust their body clocks to a night-duty schedule. In addition, the quality and duration of their sleep are frequently degraded by lack of properly darkened sleeping quarters and lack of control over environmental noise.

There are, however, several effective countermeasures that nighttime aviation crewmembers can employ. A general night operations crew-rest plan might include the following:

■ Avoid working after 0400 to prevent the harmful effects of fatigue on performance and the pronounced tendency to fall asleep from 0400 to 0700.

■ Avoid exposure to daylight in the morning after flying a night mission. Exposure to sunlight before bedtime can severely retard adaptation to night shift and result in reduced sleep time and quality.

■ Schedule sleep to begin between 0400 and sunrise, and delay exposure to sunlight until noon. Engage in outdoor activities as much as possible in the afternoon. Reduce unavoidable early-morning exposure to sunlight by wearing dark sunglasses.

■ When possible, sleep in complete darkness and avoid even momentary exposure to sunlight during the sleep period. Sleep quarters should isolate night-shift personnel from the activity of day-shifters, reduce environmental noise, and reduce sunlight in all living areas, including restrooms, during sleep periods.

ShortFAX
Keeping you up to date

Aircrew-coordination training update

Field input indicates that aircrew-coordination training (ACT) has been progressing very well. All your suggestions for improvement were considered, and many of them have been implemented. Following are highlights of the most significant changes:

- All active Army aircrewmembers will be qualified in aircrew coordination by 31 May 1997. ARNG/USAR aircrewmembers have until 31 May 1998.
- Effective 1 June 1997 (1 Jun 98 for ARNG/USAR), rated and nonrated aircrewmembers may not progress to RL1 status until they have completed Aircrew Coordination Qualification Training. Those who are already RL1 on 1 June 1997 but have not completed the training will be immediately redesignated RL2 until the training has been completed.
- Simulator devices cannot be used to train nonrated aircrewmembers. They will attend and complete the same academic training as rated crewmembers but must receive their training and evaluation in the actual aircraft.
- The Aircrew Coordination Exportable Training Package has been revised as follows: Because the Student Guide closely parallels the Instructor Guide, it is recommended that the Instructor Guide be used by all students undergoing qualification training. However, if the Instructor Guide is used for qualification, chapter 11 and appendix E need to be extracted from the Student Guide.
- Do not reprint the Trainer Guide.
- The pretraining evaluation can be deleted from the course.
- The introduction to ACT in chapter III of the Instructor Guide may be reduced from 4 hours to not less than 1 hour.
- Instrument flight examiners in all units can be certified as ACT trainers. Once certified, the IE may conduct ACT in the category that IE duties are performed. The IE is restricted to the use of instrument scenarios or instrument flight when conducting the flight portion of ACT.
- Effective with IERW Class 95-07, ACT has been included in initial entry training. All subsequent IERW classes should have the entry "ACT qualified" annotated on their DA 759.
- There is no resident ACT course at Fort Rucker. All ACT is taught from the Exportable Training Package. The Train-the-Trainer team assembled at Fort Rucker has completed its task and no longer conducts training.

These changes have improved the ACT course without compromising the content. Direct responsibility for managing the program now rests with Directorate of Training, Doctrine, and Simulation at Fort Rucker. If you do not have a copy of the latest changes or have questions about ACT, please contact CW4 Smith or CW4 Johnson by phone, DSN 558-9660/9661/9658 (334-255-9660/9661/9658); fax, 334-255-9662; or e-mail, atzqatm@rucker-emh4.army.mil.

Keep the hazards out of staying warm

With the onset of winter, it's time to review what aviation crewmembers should be wearing to keep warm. By now, we all know about the hazards of wearing nylon-based fabric in outer garments, undergarments, or boots. However, the new issue cold-weather long undergarment for all soldiers is made of a nylon-based (polypropylene) material. Although great for general use, comfortable, and quite warm, this undergarment should not be worn while performing flight duties or in any high-fire-potential environment such as is common within the armor community. The old cotton/wool long undergarments that were issued for years are now out of the inventory. So what do we do?

The Air Force has a quilted undergarment that has fire-protection qualities. This two-piece garment can be obtained only through federal stock as a unit-issue item and is governed under CTA 50-900 by climatic region:

- **CWU-43P Drawers, Flyer's, Anti-Exposure, Aramid**
  NSN 8415-00-467-4075, Small
  NSN 8415-00-467-4076, Medium
  NSN 8415-00-467-4078, Large
  NSN 8415-00-467-4100, Extra Large
- **CWU-43P Undershirt, Flyer's, Anti-Exposure, Aramid**
  NSN 8415-00-485-6547, Small
  NSN 8415-00-485-6548, Medium
  NSN 8415-00-485-6680, Large
  NSN 8415-00-485-6881, Extra Large

Your unit may or may not be able to obtain these based on a myriad of requirements within the logistics system. Fort Rucker, for example, falls into a zone that is not authorized these items, but the need for cold-weather undergarments clearly exists during the winter months. Mrs. Edna Whitely of the Army Aviation Branch Military Clothing Sales Store has provided us two excellent options for aircrewmembers.

There is a two-layer set of long underwear with an inner layer of cotton and an outer layer of wool; it contains a minimal amount of nylon to allow for stretch while maintaining the form of the underwear. It is known as the Duofold 410LS for the long-sleeved top and 410LD for the long drawers. Both top and bottom come in small, medium, large, extra large, and extra-extra large. They can be ordered from any Army or Air Force Exchange and are in major retail stores across the U.S.

For those who would like a lighter-weight protective layer, a 100-percent cotton single-layer cold-weather top and bottom is available through the supply system:

- **Drawers, Extreme Cold Weather, Cotton, Men, Women**
  NSN 8415-01-051-1175, Extra Small
  NSN 8415-00-782-3226, Small
  NSN 8415-00-782-3227, Medium
  NSN 8415-00-782-3228, Large
  NSN 8415-00-782-3229, Extra Large
- **Undershirt, Extreme Cold Weather, Cotton, Men, Women**
  NSN 8415-00-270-2012, Small
  NSN 8415-00-270-2013, Medium
  NSN 8415-00-270-2014, Large
  NSN 8415-00-270-2015, Extra Large

We are not singularly endorsing these items as the only cotton- and wool-based undergarments available. If you can find undergarments that provide the desired protection, do buy and use them. Your helmet, Nomex flight coveralls, flight gloves, leather boots, and Nomex jacket are all part of your issued winter ensemble; be sure to finish off your ensemble safely.

For more information, contact Mr. Joseph Licina or CW5 Joel Voisine, U.S. Army Aeromedical Research Laboratory, P.O. Box 620577, Fort Rucker, AL 36362-0577, DSN 558-6893/6895 (334-255-6893/6895). You may also phone the Fort Rucker Military Clothing Sales Store at DSN 558-2186/3313 (334-255-2186/3313).

Pull-out posters on pages 5-8

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class C

F series

■ While hovering to parking pad at night, aircraft No. 1 backed into aircraft No. 2, which was parked on pad directly behind it. Tail rotor, 90-degree gearbox assembly, and tail boom of aircraft No. 1 were damaged as was main rotor blade of aircraft No. 2.

Class E

F series

■ Aft fuel boost pump segment light came on during cruise flight. Boost pump was replaced.

■ Transmission chip-detector and master caution lights came on in cruise flight. Transmission was replaced.

■ During start sequence, fire guard noticed fuel leaking from start fuel purge solenoid to fuel line. Fuel line was replaced.

■ During approach at night, master caution and rectifier/alternator lights came on. Alternator was replaced.

AH64

Class B

A series

■ While applying full forward cyclic in cruise flight at 800 feet agl, crew heard loud pop and noted damage to PNVS and WSPS. After landing and shutdown, additional damage to three main rotor blades was discovered.

Class C

A series

■ Crew heard loud noise and fire light came on during taxi to parking. Crew activated fire extinguishers and performed emergency shutdown. Clutch bearing seized and caused fire.

Class D

A series

■ During maintenance test flight, pilot noticed that forward end of right side pylon P-3 panel had broken off. Maintenance determined that several worn dzus fasteners came loose in flight, causing pylon P-3 panel to break. Panel was replaced and aircraft released for flight.

Class E

A series

■ Upon starting, APU gave loud reports indicative of compressor stall. APU was shut down immediately and replaced.

■ Avionics bay cooling fan bearing failed in cruise flight, causing high-pitched whine.

■ Aircraft HARS/DASE system malfunctioned during cruise flight, causing uncommanded control inputs. Pilot released DASE system and landed at home station. Maintenance replaced the DASE, and MOC was completed okay.

■ During NOE flight, braided utility hydraulic line chaffed against fuel line clamp until it failed. Utility hydraulic system fluid was drained, line was replaced, and aircraft returned to service.

■ No. 1 engine spun up to 27-percent NG during start. After power lever was advanced, engine did not ignite. Exciter was replaced.

■ PNVS picture lost all contrast and became solid green during NVS flight. Contrast control was inoperative during attempt to adjust FLIR picture. Pilot's fire control panel and display adjust panel were replaced.

■ During attempt to start No. 2 engine during runup, engine failed to develop tgt. No. 2 engine alternator was replaced.

CH47

Class C

D series

■ During NVG mission, as IP was positioning aircraft on ground after releasing external load, right-side fuel pods contacted load block. Pods were not punctured, and no fuel leakage occurred.

■ **Flight related.** Slingloaded HMMWV was inadvertently released during cruise flight at night. HMMWV was destroyed, but aircraft was not damaged. Cause under investigation.

Class E

D series

■ During normal start sequence, No. 2 engine failed to start and N1 temperature failed to increase. Compressor section had failed internally with no other indications.

■ During static internal-load training, cable snapped while winching M119A1 howitzer into aircraft. Aircraft returned to home station, where cable was replaced and aircraft released for flight.

■ No. 1 fire light illuminated dimly during instrument training flight. Flight engineer could not see a fire in the engine. As aircraft was on final for active runway in IMC, crew decided to continue approach. SIP shut down No. 1 engine and completed a roll-on landing. Inspection revealed a chaffed detector line.

■ During takeoff, No. 1 flight hydraulic caution light came on. PC made precautionary landing and performed normal shutdown. No. 1 flight hydraulic line was found loose. Line was tightened and hydraulic fluid replaced.

■ Low side beep trim failed after repositioning from refuel. Maintenance inspection revealed broken wire on No. 2 minimum beep resistor.

■ No. 2 engine oversped during engine start. Rotor reacted 110 percent, and PTIT reached 900°C. When placing No. 2 ECL to stop failed to control engine, No. 2 fire pull handle was pulled and PC was able to control N1 with emergency engine trim. After normal shutdown, No. 2 engine was replaced, and aircraft returned to service.

■ No. 1 engine produced intermittent vibrations through the airframe during hover check. Aircraft returned to parking with no further incident. Maintenance inspection revealed bleed band actuator out of adjustment.

OH6

Class B

J series

■ One hour after takeoff, engine failed at 500 feet. Crew autorotated to wet cotton field, touching down at near-zero airspeed. Aircraft rolled forward, stopping inverted. Tail boom separated. Crew suffered minor injuries.

OH58

Class C

A series

■ Crew was unaware that, during NVG

aerial recon, rotor blades hit tree. Damage was found during daylight preflight by next aircrew. Investigation continues.

Class E

A series

■ Engine shut down during runup. Caused by fuel starvation to engine caused by release of trapped air in deck-mounted fuel filter. Fuel system was bled of air and ground run for 20 minutes. Test flight was completed with no incident.

■ DC generator segment light came on during landing, and amps went to zero. Reset attempt failed. Suspect starter-generator failure.

C series

■ Vibration was felt during approach and again at approximately 5 feet agl. Caused by failure of swashplate seal.

D series

■ During OGE hover, crew smelled smoke, and mast-mounted-sight (MMS) and transformer-rectifier messages displayed on multi-function display. On landing, avionics and aft electrical compartments were inspected for fire, but none was detected. Maintenance inspection revealed damage to MMS power supply, right torquer sensor, and elevation gimbal drive system. Suspect damage was caused by failure of elevation gimbal drive system.

■ Forward crosstube broke at skid cuff and separated during landing. Fatigue failure.

■ Crew heard loud humming sound from rear of aircraft while on the ground, and tail rotor pedals developed severe vibration. Cause unknown.

■ Right front crosstube was found broken on postflight. Crosstube was replaced.

■ After 5 minutes in parking with force trim on, tail rotor pedals drove themselves to full left stop. Could not be duplicated with hydraulic mule connected to aircraft.

UH1

Class E

H series

■ While in cruise flight at 2,000 feet agl over large urban area at night, PC noticed engine oil temperature above red line at 120°C. Engine oil pressure was fluctuating 5 to 8 pounds within green arc. During descent, smoke began filling cabin and cockpit. PC continued approach to large, well-lit parking lot. At 200 to 500 feet agl, copilot called out engine chip light. Noting good rotor and engine rpm, PC continued powered approach but prepared for possible engine failure. Aircraft landed with power and without damage, and crew performed emergency shutdown with large amounts of smoke now filling the cockpit. Both crewmembers and their passenger exited aircraft safely. Inspection revealed breakaway fitting on oil tank connecting tank to N1 accessory gearbox vent hose failed and pressurized N1 gearbox. Engine was replaced and Category I QDR submitted.

V series

■ On climbout passing through 2100 feet msl, aircraft yawed hard right. PC initiated procedures for engine overspeed and selected a forced-landing site. Passing through 500 feet agl, engine failed. PC entered autorotation, completed a 180-degree turn to avoid high-voltage wires in flight path, and landed with no damage.

UH60

Class A

K series

■ During night training with ANVIS-6 in use, aircraft had hovered about 50 meters from parking site on range when it became enveloped in dust. As crew applied power to avoid dust, low rpm audio sounded. Aircraft settled to the ground and rolled onto its right side. Tail rotor, stabilator, and all four main rotor blades were damaged. No one was injured.

Class B

L series

■ While at a hover over foot-deep loose snow at night, aircraft began uncommanded roll to the left, and main rotor system struck ground. Aircraft sustained extensive damage to main rotor system, ESSS support structure, and stabilator.

Class C

A series

■ Chalk 1 of flight of three Black Hawks lost right cargo door window panels due to inadvertent tripping of emergency release lever by a passenger. First window did no damage; second window flew through tail rotor blades. Aircraft returned to PZ and landed without incident.

■ During roll-on landing to unimproved area, tail wheel struck 12-inch ditch and collapsed. Tail boom was cracked at mounting point struts.

■ During roll-on landing, aircraft touched down tail wheel first in a 15° nose-high attitude. Rated student pilot reduced collective and, as main wheels touched down, IP noted vibration and took the controls. As he increased collective to reposition aircraft for parking, it entered an uncommanded right spin. IP then lowered collective and landed after aircraft completed a 520° spin. Aircraft sustained damage to main rotor blades and tail rotor drive shaft.

K series

■ Aircraft failed to maintain positive climb after rolling takeoff, and low rotor audio sounded. PC verified rotor rpm at 93 percent and took No. 2 engine power-control lever to lockout. Upon beginning a climb, PC noticed that No. 2 engine tgt was 1024°. He retarded PCL and again experienced low rotor rpm. When he advanced PCL to regain rotor rpm, No. 2 engine tgt was 1024° and torque was 116 percent. He circled and completed roll-on landing without incident.

Class E

A series

■ During right turn in NDB holding at 2,000 feet, electrical sparks were seen below pilot's side HSI instrument. Indicator panel was replaced.

■ During RL1 checkride, aircraft was on ground with PCLs at "fly." When aviator placed No. 2 PCL to ECU lockout at IP's direction, sparks flew from PCL housing area. Aircraft was shut down in place without further incident. Sparks were due to frayed wires. Maintenance replaced No. 2 engine control assembly quadrant.

■ During engine start, No. 1 engine made sounds like a compressor stall. NG was fluctuating between zero and single numbers. PC shut down engine, waited a few minutes, and attempted a second start. When NG and tgt failed to increase, he shut down engine again. Maintenance replaced No. 1 starter.

C12

Class E

C series

■ When power levers were moved to

adjust cruise power after leveling off at 14,000 feet msl, No. 2 engine would not respond and was stuck at 99-percent torque. Power lever would go from forward to aft setting without response from No. 2 engine. After consulting with maintenance personnel over the radio, crew secured No. 2 engine and made a single-engine approach and landing without incident at an Army airfield. Maintenance inspection revealed that No. 2 engine breather hose had slipped out of position, causing fuel control rod to hang up at 99-percent torque.

■ During landing roll, tower advised of smoke from left main gear. Aircraft was shut down in place. Maintenance personnel found that left outer tire was worn through and flat. When they removed the wheel, hydraulic fluid started pouring onto the ground due to defective O ring. Suspect that O ring caused left outer brake to stick during landing.

■ During descent for landing, flaps would not extend when flap switch was lowered. Flap switch and circuit breakers were recycled, but all attempts to lower the flaps failed. A no-flap landing was made without incident. Maintenance found corrosion in split-flap mechanism fuse. Corrosion created an open circuit, preventing flaps from functioning. Fuse was replaced.

D series

■ Crew noted vibration on takeoff roll and aborted takeoff. Inspection revealed flat spot on tires.

F series

■ During before-landing check, landing gear failed to extend. Gear lever was placed in down position, but no gear-in-transit light or green landing-gear lights illuminated. Pilot recycled gear with same results and initiated a go-around. After emergency gear-extension procedure was initiated and gear was manually pumped down, safe indication was verified by three green landing-gear lights. Aircraft completed approach and landed without further incident. Maintenance determined a faulty landing-gear power relay switch caused the problem.

■ During cruise flight at FL 200, a loud pop was heard and cracks in copilot's right windshield were noticed. Only outside layer of glass was cracked. PC reduced airspeed and descended to 10,000 feet. Cabin pressure was stabilized at 4 psi differential, and airplane returned to home base without further incident.

■ While being vectored for visual approach final course, master warning and No. 1 engine chip detector lights came on. Engine was shut down, cleanup was completed, and single-engine landing was made without incident. Engine was replaced.

G series

■ No. 1 fuel transfer segment light would not extinguish after engine start and up to 10 minutes after start. Maintenance replaced pressure switch.

R series

■ During cruise flight with autopilot engaged, aircraft would not maintain altitude (climbing). When CWS was depressed, aircraft pitched up. Electric trim was inop, and manual trim took excessive force to move. Emergency electric trim failure procedures were followed, and aircraft landed. Maintenance determined that trim system had frozen; inspection showed no damage.

N series

■ Aircraft was descending through 10,000 feet msl at 180 KIAS when crew heard loud thump followed by strong airframe shudder then loud bang. UT in right seat looked out CP's window and saw outboard and top No. 2 engine cowling had blown off. Inboard cowling was attached but flapping in the wind. PI slowed to 130 KIAS, continued the descent, and landed without further incident.

■ Crew smelled fuel odor in flight but could not determine source. Crew elected to return to base and land. During taxi to parking, pilots noted fuel leaking from the right nacelle. Fuel continued to leak after shutdown. Maintenance found a hole in nacelle tank bladder. Suspect hole was caused by fuel-bladder hanger.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

STACOM

STACOM 168 ◆ January 1997

Recent DES evaluations have made it clear that some units are unsure how to document auxiliary-power-unit (APU) operation orders for nonaviators. Some units are not making APU authorization/evaluation entries, relying instead on Part II (Authorized Flight Duties/Stations) of DA Form 7120-R and the applicable ATM tasks to suffice as orders from the commander.

AR 95-1, paragraph 3-17d, says that commanders may authorize nonaviator personnel to start, operate, and stop aircraft APUs. These personnel, however, must be trained on all functions they are authorized to perform and have written authorization from the commander.

NGR (AR) 95-1, paragraph 3-17d, states that commanders may authorize nonaviator personnel to operate the APU for the purpose of conducting MOCs. These personnel must be trained in accordance with NGR (AR) 95-210, chapter 5, and have written authorization from the commander. Such authorization must specify the operations and checks permitted and must be posted in the facility and unit operations and maintenance offices.

APU-operation authorizations will be annotated in the remarks block of Part II on DA Form 7120-R or DA Form 7120-3R. Only marking the CE block in Part II does not accurately reflect the crewmember's RL status. The crewmember must be an RL3 and is not required to do all base tasks (CH-47).

Commanders may include an evaluation requirement for their nonaviators on APU-operation orders. This evaluation requirement may be annotated on DA Form 7120-R, Part IV.

—POC: SFC Dean Christopher, DES, DSN 558-3475 (334-255-3475)

Standardization Communication ■ Prepared by the Division of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5208, DSN 558-2603/2442. Information published in STACOM may precede formal staffing and distribution of Department of the Army official policy. Information is provided to enhance aviation operations and training support.

Aviation messages

Recap of selected aviation safety messages

Safety-action messages

AH-64-97-ASAM-02, 181546Z Nov 96, maintenance mandatory.
A discrepant lot of filler necks has been issued to the depot and installed on aircraft. These filler necks may allow static electricity to generate sparks during gravity refueling, which could cause a fire. The purpose of this message is to direct a one-time inspection for discrepant forward fuel cell filler necks. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

AH-64-97-ASAM-03, 181600Z Nov 96, maintenance mandatory.
A Category I QDR from the Utah National Guard reported chaffing and subsequent arcing and burning of the ALQ-144 radar jammer power lines on the aft mixer support bell crank upon power-up of the radar jammer. Without proper clamping and routing, chafing may occur when the collective is full up and the cyclic forward, similar to when the aircraft is in a 30-degree dive. The purpose of this message is to require a one-time inspection of suspect area to repair and reroute lines as necessary. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Safety-of-flight messages

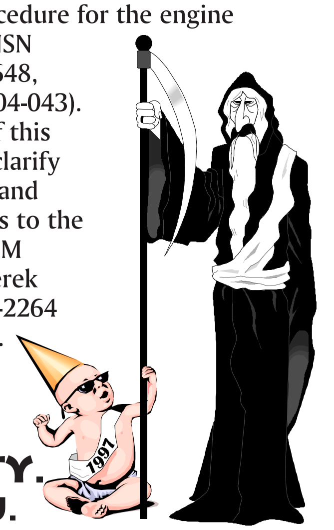
UH-1-97-01, 021643Z Dec 96, technical.
This is a follow-on message to SOF UH-1-96-03, which required certain operational restrictions due to numerous failures of the engine N2 accessory drive carrier assembly. The purpose of this message is to provide necessary instructions to clear the circle red X imposed by the earlier message and to ensure that engine and aircraft records are properly annotated. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-60-97-01, 021657Z Dec 96, technical.
A swashplate assembly removed from a UH-60A for rough operation and binding when rotated by hand was found to have improperly machined liners. Swashplate assemblies that had new liners installed during overhaul will be removed to ensure liners are properly machined. The purpose of this message is to perform a records check to identify suspect swashplate assemblies and to remove them before next flight. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Maintenance-information messages

CH-47-97-MIM-01, 201414Z Nov 96.
It has been reported that some CH-47 engine transmission main housings have corrosion damage to the flanged area that contains the holes used to mount the engine transmission to the engine. The purpose of this message is to modify maintenance procedures to correct the problem. ATCOM contact: Mr. Matthew Wesselschmidt, DSN 490-2267 (314-260-2267).

UH-60-97-MIM-001, 251712Z Nov 96.
TMs 1-1520-237-23 and 1-1520-250-23 contain a discrepancy in the 30-hour inspection procedure for the engine output shaft (NSN 2835-01-123-7648, P/N 70361-08004-043). The purpose of this message is to clarify the procedure and outline changes to the manuals. ATCOM contact: Mr. Derek Dinh, DSN 490-2264 (314-260-2264).



YOU'RE NEVER TOO JUNIOR OR TOO SENIOR FOR SAFETY.
NEW YEAR'S RESOLUTION TIME! BEST WISHES FROM US TO YOU.

IN THIS ISSUE

Class A Accidents

thru November

		Class A Flight Accidents 96	Class A Flight Accidents 97	Army Military Fatalities 96	Army Military Fatalities 97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0		0	
2D QTR	January	1		0	
	February	0		0	
	March	2		7	
3D QTR	April	1		3	
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	7	0	16	0

U.S. ARMY SAFETY CENTER

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Thomas J. Konitzer
Brigadier General, USA
Commanding General
U.S. Army Safety Center

Flightfax

ARMY AVIATION RISK-MANAGEMENT PUBLICATION

FEBRUARY 1997 ◆ VOL 25 ◆ NO 5

There appears to be a killer stalking Army aviation. When it strikes, pilots are unable to see, believe, interpret, or process the information on their flight instruments. Instead, they rely on false information their senses provide, becoming victims of

SPATIAL Disorientation

Tracking down a killer

While flying 30 to 60 feet agl during an NVG training mission, an OH-58 PC perceived that he had more than 10 feet of clearance from the sand dune to his front. He was in fact below the crest of the sand dune and flew into it.

Luckily, neither he nor his copilot was seriously injured, but the aircraft was destroyed and a combat asset was lost during training in a combat theater of operations—Desert Shield/Desert Storm (DS/DS). Investigators attributed this accident to human error due to lack of training in the desert environment, which provides little or no visual cues to assist flight crews with obstacle clearance.

This accident would, in time, contribute to a growing concern that spatial disorientation (SD) was playing a far greater destructive role in helicopter operations than had been previously suspected. As Army aerospace-medicine specialists reviewed report after report of accidents in DS/DS, they became more and more concerned. Was SD a problem unique to the Southwest Asia theater of operations, or was it a problem inherent in modern-day operations requiring aircrews to fly faster and more complex missions under higher-risk conditions?

A review by the Army Safety Center surgeon in 1993 compared Class A accidents (noncombat) in the DS/DS theater of operations to a baseline timeframe 1 year before. This review showed the following:

Item of comparison	DS/DS timeframe (1 Aug 90 - 11 Apr 91)	Baseline timeframe (1 Aug 89 - 11 Apr 90)
Class A acdt rate*	14.87	2.24
Fatality rate*	11.28	2.54
SD a major factor	66% (19/29)	43% (10/23)

*Per 100,000 flying hours

This review was the first true indication of the magnitude of the SD hazard in Army helicopter operations. It also suggested (but did not confirm) the possibility that accidents involving SD tend to cost more both in injuries and damage than those not involving SD. More important, these results directly contradicted those of previous studies that

Some of today's flight profiles keep aircrews on a razor's edge from losing situational awareness. This edge is lost when fractured by spatial disorientation....

indicated downward trends in SD-related accidents during the 30 years from 1957 through 1987.

The exact magnitude of the SD hazard and its direct link to increased fatalities would come as the result of a study[1] conducted jointly by the U.S. Army Aeromedical Research Laboratory (USAARL) and the U.S. Army Safety Center (USASC). Published in June 1995, this study of Class A-C Army helicopter accidents during the 5-year period 1 May 1987 through 30 April 1992 found that—

- Spatial disorientation was a major factor in 32 percent of the accidents.
- The 32 percent that involved spatial disorientation accounted for a disproportionate 60 percent of the fatalities and 52 percent of the cost of the accidents. This finding supported the notion that loss of orientation tends to lead to a more-catastrophic outcome in modern-day operational flight profiles.
- Mechanisms most commonly associated with SD accidents included misjudgment of clearance to the ground or terrain obstacle (65%); aircrew distraction (44%); and brownout, whiteout, or inadvertent entry into IMC (25%). (Some accidents involved more than one mechanism.)

A key human-performance observation made in the report was that: "The typical picture is . . . one of a hard-pressed aircrew, flying a systems-intensive aircraft under NVD, failing to detect a dangerous flight path." A direct implication of this observation is that some of the flight profiles being flown in current operations keep aircrewmembers on a razor's edge from losing situational awareness. This edge is lost when fractured by spatial disorientation or other human, environmental, or materiel factors.

This study clearly delineated the role that SD had played in Class A-C helicopter accidents over a 5-year period. However, focusing on accident results looks only at worst-case scenarios. The next logical issue was to address the frequency of SD in aviation operations overall, not just in those resulting in an accident. To determine the possible role of SD in current aviation operations, USAARL surveyed 299 pilots, all of whom were currently flying at five Army airfields. Results of this survey were published in May 1996[2] and included the following:

- 78% of the pilots surveyed had experienced SD during their flying career.
- 22% had experienced SD in the previous 4 months.
- 33% reported that the mission was adversely affected.
- 2% reported that the mission had ended in mishap.
- 44% had experienced the "leans."
- 13% had experienced brownout, whiteout, or inadvertent entry into IMC.

Some survey observations provided compelling arguments for the need to develop and implement controls for spatial-disorientation-related hazards. The observations included the following:

- Flying experience, whether measured by flight hours or by pilot designation (aviator, senior aviator, master aviator), did not appear to offer protection from SD.
- Having two pilots is not sufficient protection against SD; in 40 percent of NVG episodes, both pilots experienced SD simultaneously.
- In 43 percent of reported worst-ever episodes, pilots were not immediately aware of having SD.
- In 60 percent of worst-ever episodes, pilots were focused on the flight instruments. (This observation is not a negative critique of instrument flying, but emphasizes the adverse effect of channeling attention.)

These observations raised the argument that, because SD is physiologically based, it may require a technological fix, not simply a training fix. In other words, some of our flying profiles are exceeding the limits of human sensory systems; therefore, some aspects of flight must be controlled by technology, not by the aviator (i.e., automatic pilot, hover lock, etc.).

A followup study[3] extending the timeframe of the original study another 3 years (through 1995) showed only minimal improvements in the SD impact on rotary-wing operations:

Category	1987-1992 (5 years)	1987-1995 (8 years)
SD a major factor (of all Class A-C)	32%	30%
Avg annual SD fatalities	15.6	13.8
Avg annual SD cost	$61.8 M	$58.5 M

These studies had made it clear that spatial disorientation poses hazards and high risks to Army helicopter operations, and the cost is high. The challenge then became to start identifying and implementing controls for the hazard.

The first step was to clarify the operational definition of spatial disorientation. FM 1-301: *Aeromedical Training for Flight Personnel* (1987) defined SD as "an individual's inaccurate perception of position, attitude, or motion.... When it occurs, pilots are unable to see, believe, interpret, or process the information on the flight instruments. Instead, they rely on the false information their senses provide." In view of current mission profiles that include multi-ship operations, this definition was expanded for the purposes of this study to include an aircrewmember's inaccurate perception of position, attitude, or motion ***relative to another aircraft.*** The definition does not include instances in which an aircrewmember is geographically disoriented (or, just simply, lost); however, it does not exclude circumstances when being lost contributes to an SD situation developing as a subsequent event.

Given this operational definition of SD, the next logical question was: Why has SD become such a problem in helicopter operations at this point in time? Several theories have been proposed. The two that seem to be most valid based on the results of recent studies are these:

- Technology continues to compress the time in which the aircrew can be given input while increasing the amount of input they're given. Consequently, aircrewmembers must sort and process more information in less time, which can result in sensory overload that leads to spatial disorientation. If this happens in *training*—and we know that it does, the increased sensory input during *combat* will make SD even more likely.
- Closely related to sensory overload is the theory that the profiles currently being flown already exceed the human physiologic design for processing sensory input. Today's routine mission profiles demand more than human beings are designed to do. Army aviators are asked to fly faster, lower, longer, in the dark, in weather, in formation, and under goggles. More often than not, they're asked to do all this at the same time. And, oh, by the way, somebody may also be shooting at them. This level of complexity is further increased by the frequency and amount of real-time information technology is giving them during flight. It comes, then, as no surprise that they're experiencing SD, yet not sensing or realizing it before reaching the point at which it's too late to react.

If we are to accept these theories, one of the implied solutions may be difficult for Army aviators—who for so long have been in control of every aspect of flight—to accept. That is, to accept technology that will enable the aircraft of the future to fly itself (i.e., hover lock, position-holding devices, automatic pilot), freeing pilots to be concerned solely with tactical considerations.

Having defined and identified the hazard posed by SD, the foundation had been laid to discuss what controls need to be applied to this hazard to eliminate—or at least reduce—SD-related risks. To this end, a tri-service Spatial Disorientation in Rotary Wing Aviation Conference was held at Fort Rucker in September 1996. What resulted were proposed SD controls in four major categories:

- **Education.** These controls involve initiatives to increase awareness of spatial disorientation and to improve SD documentation and data collection.
- **Training.** These controls involve the review and updating of current training to incorporate what is now known about the SD hazard.
- **Research.** These controls were divided into near-, mid-, and long-term initiatives to continue the research momentum to further define the SD hazard and test effective technologic controls.
- **Equipment.** These controls emphasize the need to look at current off-the-shelf technologies developed to address spatial disorientation and to develop future technologies to control it.

A future *Flightfax* article will outline details of the specific controls in each of the four categories.

Summary

The FY 96 rate of 0.65 Class A aviation accidents per 100,000 flying hours is evidence of the dedication and effectiveness with which aircrewmembers are applying risk management in flight operations. However, among the seven Class A accidents in FY 96 were two midair collisions, one tail-rotor strike, and a high-G ground impact during IMC. That four of the seven accidents might have involved some degree of "...an individual's inaccurate perception of position, attitude, or motion..." begs the question of whether the problem is being sufficiently addressed in rotary-wing aviation.

Spatial disorientation plays an undeniable role in the loss of situational awareness in Army rotary-wing operations. It is clearly a hazard that requires more focus if application of our risk-management process is to continue to drive our accident rate down.

—COL Edwin A. Murdock, MD, MPH, U.S. Army Safety Center Surgeon, DSN 558-2763 (334-255-2763)

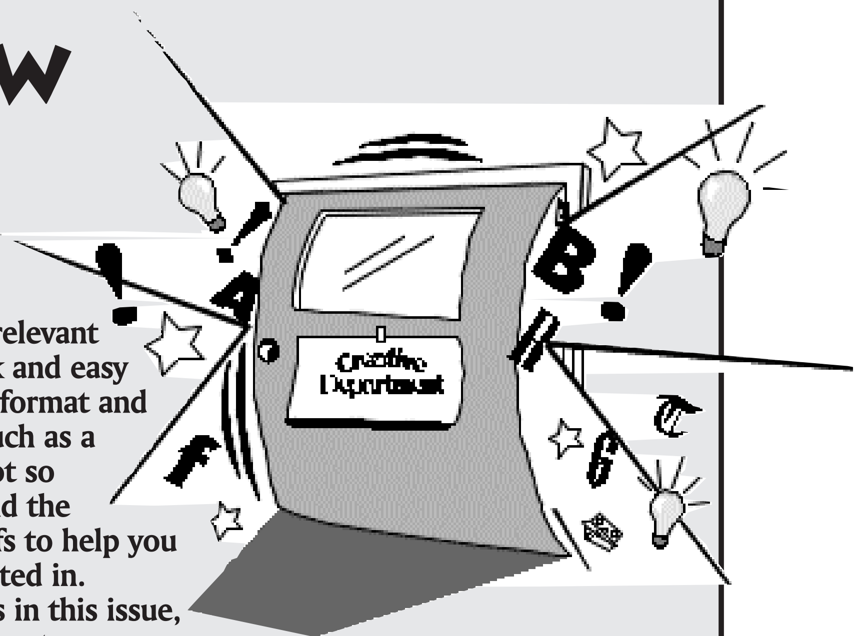
References

[1]Durnford, S.J., J.S. Crowley, N.R. Rosado, J.P. Harper, and S.L. DeRoche. *Spatial Disorientation: A Survey of U.S. Army Helicopter Accidents, 1987-1992*. USAARL Report No. 95-25, June 1995.

[2]Durnford, S.J., S.L. DeRoche, J.P. Harper, and L.A. Trudeau. *Spatial Disorientation: A Survey of U.S. Army Rotary Wing Aircrew*. USAARL Report No. 96-16, May 1996.

[3]Braithwaite, M.G. *A Review of U.S. Army Helicopter Accidents, 1987-1995*. Personal Communication, USAARL (to be published).

WHAT'S NEW WITH *FLIGHTFAX*



In our continuing efforts to keep Flightfax relevant to your needs and interests as well as quick and easy to read, we've made a few changes in both format and content. Some of the changes are subtle, such as a new, more readable typeface. Others are not so subtle, such as the redesigned masthead and the use of graphic symbols in the accident briefs to help you quickly find the aircraft you're most interested in.

We're also introducing two new columns in this issue, the success of which will depend on your input.

"Crew Commo" (page 6) is intended to give aircrews—and other aviation personnel, for that matter—an informal forum in which to communicate with us and each other. We hope to hear from all of you—including maintenance personnel—on issues regarding safety and risk management in Army aviation.

Because the cost of accidents is paid in lives, dollars, and readiness, we cannot afford to learn every lesson first-hand; we must learn from others' experience whenever we can and share what we know with each other. That's the idea behind "War Stories" (page 7). The purpose of this new feature is to provide a way for the entire Army aviation community to learn from each others' mistakes and to share how risk management is being integrated into real-world Army aviation operations.

But all is not new in *Flightfax*. You'll also continue to see—and, we hope, contribute to—the old familiar columns: *ASO Talk, STACOM, ShortFax, Broken Wing Awards,* and *Food for Thought*.

The Army Safety Center is dedicated to the concept of protecting the force through risk management, and our goal is to make it easy for our readers to contribute to that effort. Just a couple of notes so everybody understands the deal:

- Space in *Flightfax* is limited, so we ask that you be as brief and to the point as possible.
- We won't be publishing items that are submitted anonymously, but we will keep your identity confidential if you say so.
- If we edit your input for length or clarity, we'll get your approval before publishing the revised version.

You can contact us in a number of ways:

- Phone: DSN 558-2676 (334-255-2676)
- Fax: DSN 558-9478/3743 (334-255-9478/3743)
- E-mail: flightfax@safety-emh1.army.mil
- Mail: Commander, U.S. Army Safety Center, ATTN: CSSC-RSA (*Flightfax*), Bldg. 4905, 5th Ave., Fort Rucker, AL 36362-5363.

Please let us know how we can help you. We truly want to know how we can serve you better. And we look forward to working with you as you contribute to Army aviation safety through *Flightfax*.

On recklessness and skill

Your cover story [“Recipe For Disaster”] in the November 1996 *Flightfax* reminded me of an article I read 2 years into my Army aviation experience in 1984. It was about a stunt pilot who repeatedly exceeded Ve 5 to 10 knots while performing inside loops in a twin-engine commuter plane. He exceeded Ve for the last time when both wings broke during an inside loop at a show that, ironically, his fiancée was announcing. The aircraft was destroyed, and he was killed. I think this excerpt from the article says it all:

“Each new plateau of risk, when first attained, seems to be the last; but, as we grow accustomed to it, a new horizon beckons. What insulates us from fear as we approach the danger is simply habit, the familiarity of a point we have reached and all the points we’ve left behind. Until one steps too far, it’s often hard to tell the difference between recklessness and skill.”

—MAJ Chris Miller, Aviation Systems, Air Delivery Branch, Yuma Proving Ground, AZ 85365-9110, DSN 899-6530 (520-328-6530)

More about the weather

We enjoyed “About the Weather. . .” in the November 1996 *Flightfax*. I would like to contribute these comments on weather calls and mission accomplishment.

Our mission is to provide 24-hour, all-weather helicopter transport for a senior unified commander. When tasked to provide transport to our customer, we not only perform the detailed mission planning required by regulatory guidance, we consider the customer’s mission and the impact his presence has on world affairs. When we accept a mission, we are assuring that we can transport him to his destination safely and on time. Because of his robust and demanding schedule, our customer can ill afford to miss or be late for important military or political gatherings in which many policies/decisions depend upon his presence. When weather conditions require IFR flight, our procedures require us to ensure destination weather minimums do not require the use of an alternate airport, which would delay or cancel the customer’s schedule.

If an alternate is required and time is critical, we recommend that ground transportation be used to ensure the customer arrives at his destination on time. When we accept a mission and execute to standard, we take a great amount of pride in mission accomplishment. However, if we have to cancel or recommend ground transportation, we take an equal amount of pride in knowing our customer arrived at his destination safely and on time.

Prior to every flight, all units, regardless of type, must use the risk-management process to ensure the weather is more than just legal. This process is designed to facilitate the decision-making process. If the benefits of performing the mission do not significantly outweigh the inherent risks of marginal/borderline weather, the customer is best served by being advised to implement alternate transportation to ensure safe mission accomplishment. An age-old sense of urgency associated with many aviation support profiles—to launch in marginal weather—has been the recipe for far too many aircraft mishaps.

Following these or similar guidelines will result in a higher mission-accomplishment rate, a lower weather-related mishap rate, and a better customer image of aviation professionalism.

—CW4 Dale A. Miller, Safety/Operations Officer, SHAPE Flight Detachment, Chievres AB, Belgium, DSN 361-5544

Three strikes, you're out!

Better pilots than I have often told me about a preflight procedure in which mission cancellation is considered when three or more significant deficiencies are found. I once had a chance to apply that advice. However, in the spirit of "mission accomplishment," I did not—with almost disastrous results.

I was a warrant officer at the time and new to the Black Hawk, having just transitioned from Cobras. After progressing to RL1 day and night, I had already tucked a few missions under my belt and was feeling pretty good about my new aircraft. After receiving a mission with a new PC, I was excited; my IP and the commander were showing confidence in me.

The strike sequence began when we received our mission. The mission was at night, and I had not yet begun my NVG progression. Low light levels made matters worse. Strike one.

We had completed a risk assessment for this mission, but, because we didn't take it far enough, it did not tell the whole story.

During preflight, we discovered that the VHF radio was inop, leaving us with only the UHF radio for air traffic control. Strike two.

Perhaps an inoperative radio was enough to cancel the mission when combined with unaided flight at night in low light. But we didn't cancel.

Then we checked the weather. Although legal, conditions were marginal at best. Strike three.

I know what you're thinking; we would be crazy to depart. Two relatively inexperienced pilots on a night unaided mission under low light conditions, marginal VMC, and only one radio.

Our mission was simple: Travel clockwise around the reservation and insert a squad into an LZ. With 10 soldiers on board, we departed to the west. After turning to the north, the weather started getting worse, so I began flying lower. At this point, I finally started feeling uncomfortable and said so. The PC said it was not bad enough to cancel and to continue on, so we did.

The farther north we went, the worse the weather became. I turned to the east to follow our route, and out of nowhere came a solid wall of fog. I banked hard to the right to avoid the fog, momentarily entering it. We came out in a dive that I pulled out of just prior to entering the trees.

That was when the PC and I decided to take our passengers back to the PZ and return to base.

I couldn't see the PZ because it was out our left door and I was in the right seat, so I transferred the controls to the PC. As he initiated the turn, he inadvertently ascended into the clouds. We finally got smart and committed to IFR. Feeling the sharp increase in our rate of ascent, the soldiers in the back made it known that they were having a great time, oblivious to what was going on in the cockpit.

We contacted our flight-following agency and told them our status. The controller gave us a VHF frequency for radar control. We, however, did not have a VHF radio, so after a short delay he gave us a UHF frequency.

The stress in the controller's voice was evident when he realized our situation. We were at 3,500 feet as we started receiving vectors for downwind. We were in inadvertent IMC. It couldn't get any worse, right?

Wrong.

As our crew chief dug for the approach plate, our UHF radio started going intermittent. Then, for what seemed like a very long time, it was totally silent—and, oh, by the way, our fuel was getting low. Finally, our radio crackled back to life, and we made a safe landing.

Mission accomplishment was so important that it clouded our judgment. We put not only the crew but also our passengers in a dangerous situation.

As professional aviators, we have a responsibility to our passengers and to ourselves to apply sound risk management. We had completed a risk assessment for this mission, but, because we didn't take it far enough, it did not tell the whole story. We had looked at each "strike" separately; had we considered their cumulative effects, we probably would have done things a lot differently.

That's the whole idea behind the three-strike rule: Small problems combined with other small problems can turn into big trouble quick!

Looking back on this mission, I wonder: What in the world was I thinking?

—2LT Shannon D. McAteer, A Company, 603d Aviation Support Battalion, Hunter AAF, GA 31409, DSN 971-2782 (912-353-2782)

Rescue hoists: A resurgence of past problems?

Since I've been assigned to the Safety Center, I've reviewed reports of mishaps involving rescue-hoist operations. Several factors became obvious: lack of written standards and operating procedures, lack of or inadequate maintenance procedures, and lack of standards for conducting hoist operations. One recent case involved improper installation of the wrong cable assembly. Five different standards were identified for performing pre-operational checks on the hoist. Another involved cable shearing. And the Army is not the only organization with hoist problems. The Air Force just issued a restriction on live training missions because of cable failures on the Breeze Eastern external hoist. These examples reinforce the need to establish, train, and maintain to standard.

We've done well in keeping the hoist accident rate low over the years, but it appears we are taking a step backwards—a step back to a time when we killed and injured soldiers and civilian emergency personnel during hoist operations.

Units with rescue hoists on their property books must stop and review their hoist-operation procedures. Unit leaders should ensure they have a written qualification and training (ATM) standard, review the individual training and experience of those operating the hoists, and designate a unit trainer to oversee individual and crew operational training.

Once these reviews are completed and all factors have been brought to standard, units should look at who's doing the maintenance. If your maintenance is being done by a contractor, are the contractor personnel trained and qualified to maintain your hoists to Army standard? Are your military maintenance personnel trained and qualified to maintain your hoists to Army standard? This is where the unit trainer comes in. Unit trainers must also be involved in maintenance to ensure Army standards are maintained.

When it comes to hanging from a hoist, no matter how close to the ground, you must have the confidence that comes from knowing that all aspects of hoist maintenance, inspection, operation, and in-flight procedures are done to Army standards. If they're not, chances are someone will get hurt at some point.

Let's take a positive, proactive approach to the business of rescue-hoist maintenance, operations, and training. Bring your hoists out of the CONEX. Get them out of the shipping boxes. Get them inspected and brought up to serviceable condition. Get your people involved, and above all, get them trained to standard. You'll see your rescue-hoist operations take on a new air of confidence. Your people will take pride in knowing that their equipment can be called on any time, any where to get the job done. Remember the bottom line: Get in. Get 'em out. Do it safely. Do it to standard. Do it with confidence in your equipment.

—MSG Will Bauer, USASC Force Development/Force Projection Branch, DSN 558-2959 (334-255-2959)

ShortFAX

Keeping you up to date

New slingload requirements

FM 10-450-3 currently requires that all slingloads be inspected by a certified inspector. After 1 October 1997, all personnel whose jobs involve slingload requirements must have attended a certification course and qualified as an inspector.

The Army Slingload Inspection Certification (SLIC) Course is available to all services at Fort Lee, VA. For information, contact the Slingload Office, Inspector Certification Course, Airborne and Field Services Department, U.S. Army Quartermaster Center and School, Fort Lee, VA 23801-1501, DSN 687-4185 (804-734-4185).

E-mail for ALSE info

The U.S. Army Aeromedical Research Laboratory has established a new e-mail address for the following:

- Aviation Life Support Equipment Retrieval Program (ALSERP) issues from accident investigators.
- ALSE equipment compatibility and injury concerns.
- Helmet-fitting questions and coordination of Lab visits to resolve helmet-fitting issues.

The e-mail address is ALSERP@RUCKER-EMH2.ARMY.MIL. You may also call DSN 558-6895/6893 (334-255-6895/6893).

GG-rotor-replacement update

The UH-60 T700-GE-700 engine change-out began on 4 November and is scheduled to be completed by 31 March 1997. As of early January, General Electric had replaced about 200 of the estimated 380 undampened GG rotors.

The AH-64A GG-rotor contract was awarded on 20 December to replace T700-GE-701 engines with undampened GG rotors. The contractor is required to supply 50 GG rotors per month, and on-site change-out will begin this quarter. The program is expected to last for about 16 months and will follow the DCSOPS-approved fielding schedule. Replacement schedules will be coordinated between the replacement team and affected units. USAREUR and the Netherlands units are first priority.

UH-60 POC is Mr. Dave Lizotte, DSN 693-0485 (314-263-0485); AH-64 POC is Mr. Bill Reese, DSN 693-6794 (314-263-6794).

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class E

F series

■ While hovering for takeoff at night, master caution and alternator rectifier segment lights came on. Aircraft was shut down and mission was canceled. Maintenance replaced alternator control unit.

■ During engine runup, crew increased throttle to 100-percent N2. Upon reducing throttle to ground idle, crew chief noticed fuel manifold was leaking. Aircraft was shut down, and maintenance replaced fuel manifold assembly.

■ Master caution and engine chip detector lights came on in cruise flight at night at 1800 feet agl. About 15 seconds later, the engine failed. Aircraft was autorotated and landed without incident in passing lane of interstate highway. Cause of engine failure not reported.

AH64

Class C

A series

■ While applying full forward cyclic in cruise flight at 800 feet agl, crew heard loud pop and noted damage to PNVS and WSPS. Upon shutdown, additional damage to three main rotor blades was noted.

Class D

A series

■ While in formation flight at 500 feet agl and 120 KIAS at night, aircraft hit bird. Impact caused main transmission access fairing to bend backward and cover No. 1 engine nose gearbox. Crew was unaware of the bird strike until an hour later when the gearbox caution/warning light came on.

Class E

A series

■ TADS/FLIR failed after 15 minutes of cruise flight. Aircraft returned to home base, where maintenance repaired TADS turret. MOC was okay, and aircraft was released for flight.

■ During takeoff to a hover, PC noticed engine oil pressure fluctuating between 22 and 40 psi. Aircraft was shut down without incident. Maintenance replaced HMU seal.

■ During approach to airfield at 300 feet and 20 KIAS, chips main transmission caution warning segment light came on. Crew continued approach and landed without damage. Metallic fragments were found on chip detector; transmission was replaced.

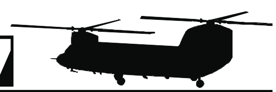
■ Pilot's ICS was intermittent during runup. Maintenance replaced pilot's ICS cable.

■ No. 2 generator light came on during NOE flight. Generator was reset with no response. Aircraft returned to home station, where maintenance replaced generator.

■ APU failed after 25 minutes of operation during runup. APU was restarted but failed again after 5 minutes. APU was replaced and aircraft released for flight.

■ No. 2 engine would not start (air turbine starter failed). Maintenance replaced No. 2 engine air starter due to broken shaft. MOC okay.

CH47



Class B

D series

■ **Aircraft-ground accident.** About 45 minutes into flight following deck landing qualification, aircraft was at 10 feet agl and 120 knots when aft blade pitched 20 degrees. Crew disengaged heading hold and regained blade control with aft cyclic input and continued flight for 2.5 hours. On engine shutdown, yellow aft blade contacted forward yellow blade and No. 2 tunnel cover. Inspection revealed that bracket holding blade damper had separated and kevlar windings had broken. Further inspection revealed that kevlar windings in damper brackets in remaining two aft blades had loosened.

Class C

D series

■ **Flight related.** External load was inadvertently jettisoned from 75 feet on short final to landing zone during multi-ship NVG external-load operations. CE calling the load pressed the cargo-release button instead of the microphone switch on the hoist operator control grip, jettisoning the load. Aircraft executed a go-around and landed about 100 meters behind the load, an M998 HMMWV. Damage was limited to the M998.

Class E

D series

■ At 10-foot hover during multi-ship NVG external-load operations, crew-member calling the load allowed aircraft to descend too low. M119 howitzer's gun tube struck bottom of aircraft just forward of right forward landing gear. Inspection revealed sheet metal damage to bottom of aircraft.

■ At 2000 feet and 140 knots, left escape hatch fell off. Crew felt no impact to aircraft or rotor system, and no vibration increase was noted. Postflight inspection revealed no damage.

■ While aircraft was on the ground with engines running, No. 1 vertical gyro indicator malfunctioned and showed a 30-degree left bank. No caution lights came on. No. 1 VGI worked in the emergency position. Aircraft was shut down and turned over to maintenance, but problem could not be duplicated.

■ Aircraft was straight and level at 2500 feet msl on instrument approach when loud groaning noise was heard in forward transmission area. Less than 15 seconds later, a severe lateral airframe vibration began. Precautionary landing was made immediately and vibration was still present after landing. Emergency shutdown was performed. Vibration was caused by faulty No. 1 flight hydraulic pump.

■ No. 1 engine went high side during hover. Crew controlled rotor rpm with thrust and ECL during return to airfield and landed without incident. MOC could not duplicate, and aircraft was released for flight.

OH58

Class B

A series

■ Engine failed during OGE hover at 500 feet. Aircraft descended into trees.

D series

■ During NVG training mission, aircraft drifted rearward and down, and tail rotor hit tree.

Class C

D series

■ Crew detected burning odor about 40 minutes into third leg of four-leg flight. Shortly thereafter, a.c. generator failed and crew noticed traces of smoke in the cockpit. Associated components sustained collateral damage.

■ Tail rotor and associated gearbox separated at rivet points during maintenance test flight. Aircraft landed hard and tail boom separated. Location of gearbox separation had been identified for repair.

Class E

A series

■ PC noticed binding in collective during HIT check. Aircraft was returned to parking without incident. Electrical clamp was found chaffing on collective dust boot housing. Housing was cut away to allow free movement of collective.

D series

■ Throttle was opened at 12 percent during engine start. Engine did not light off until 16 percent, accompanied by rapid rise in tgt. Start was aborted and tgt gauge readings indicated max temperature of 896°C was reached. Check of engine monitor page indicated max temperature of 940°C was reached.

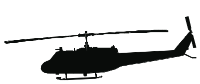
■ After battery switch was on for 1 minute, caution light came on. Maintenance replaced battery.

■ Small hole was found on leading edge of tail rotor blade during postflight. Blade was replaced. Suspect damage was caused by rocks during operations in unimproved areas.

■ During OGE hover, IP and PI noticed vertical vibration. Main rotor hub assembly was replaced.

■ Single red segment light on engine oil temperature vertical scale came on during low-level flight. Maintenance replaced thermo-bulb valve.

UH1



Class C

H series

■ During cruise flight at 5500 feet msl and 100 KIAS, aircraft yawed left, N2 decayed, and rpm light and audio came on. IP took controls and lowered collective. N1 was fluctuating at about 80 percent. IP increased collective and rotor rpm decayed to 260 rpm. IP again lowered collective and instructed PI to place governor switch to emergency position. IP adjusted throttle and again increased collective, resulting in rotor rpm decay. As IP performed autorotative landing to narrow asphalt road, main rotor blades struck small tree branches, causing dents in bottom of blades. Cause of engine failure not reported.

Class D

V series

■ Aircraft landed hard during NVG blowing-snow landing to unimproved area. Touchdown was normal and smooth, but, while skiing forward, aircraft pitched up and then down sharply before coming to complete stop in a 5-degree nose-low attitude. Aircraft was inspected in deep snow and no damage was observed. After landing at home station for refueling, aircraft was sitting unusually low and was shut down and reinspected. This inspection revealed damage to front cross tube, right cross tube tunnel, and lower WSPS tip.

UH60

Class C

A series

■ PI applied excessive aft cyclic during final phase of blowing-snow approach. As flight continued for pinnacle approach, IP noted lateral vibrations. Aircraft returned to base and was shut down without incident. Postflight inspection revealed that main rotor blades had contacted intermediate drive-shaft cover. One main rotor blade, two tip caps, and intermediate drive-shaft cover were damaged.

Class E

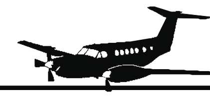
A series

■ During cruise flight, PC noticed burning odor. Crew chief then noticed electrical sparks coming from behind copilot's head. PC turned off auxiliary cabin heater, which had not been used in several months, and sparks subsided. Postflight inspection revealed that 20-gauge wire attached to ESSS support bar was chaffing, causing the sparks. Wiring was replaced.

■ After departure with slingload, fire lights on master caution panel and No. 2 emergency "T" handle came on. No fire was seen. Postflight inspection revealed lower fire detector sensor had water in it. Sensor was replaced.

■ During shutdown, SP inadvertently moved fire extinguisher switch to main while moving air source switch to APU. None of the fire "T" handles were armed. CE saw puff of black smoke from APU exhaust. After shutdown, inspection of fire bottles showed one had 0 psi while the other indicated 550 psi. No evidence of extinguishing agent was found in any compartment. Suspect that bottle charging agent leaked out prior to flight. Bottle was replaced.

C12



Class C

C series

■ During short final for landing, IP announced "power," and RSP reduced power. Aircraft touched down hard. Visual inspection revealed no damage, but subsequent crew noted wrinkling in fuselage. ECOD pending.

Class E

C series

■ While aircraft was passing through 8500 feet on climbout, loud whistling sound emanated from cabin area. Crew determined that air was leaking around emergency exit window. Maintenance found that seal was not seated properly.

D series

■ At 5500 feet during climb to cruise altitude, pilot saw flock of geese and made evasive maneuver to avoid bird strike. Although crew saw or heard nothing to indicate bird strike had occurred, postflight inspection revealed 6-inch-long, ½-inch deep dent in leading edge of right wing immediately outboard of nacelle tank.

■ During runup, left engine torque gauge dropped to zero as power lever was increased. Maintenance determined that torque gauge cannon plug wire had become disconnected.

F series

■ Aircraft was refueled after landing from routine service mission. Upon startup for departure, right auxiliary fuel gauge registered zero with a load of 250 pounds. Maintenance replaced fuel probe.

■ Crew heard loud thump during approach to home station at night. Bird-strike damage was discovered during postflight inspection.

G series

■ During IFR flight at 21,000 feet and 175 knots, lightning struck aircraft.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-1-97-ASAM-01, 171600Z Dec 96, maintenance mandatory.
UH-1-96-ASAM-01 required replacement of all UH-1 main drive shaft clamp bolts and established a mandatory phase inspection replacement for those bolts. At the time of the original ASAM, the bolt was thought have failed due to fatigue because of its age. Subsequent analysis indicates that the fatigue was caused not by age but from a machining mark on the bolt head-to-shank radius that exceeds allowable surface-finish requirements for this part. The purpose of this message is to require replacement of drive shaft clamp bolts (P/N 204-040-624-1, NSN 5306-00-724-3593) exhibiting the marking "SV" on all UH-1H/V and AH-1 aircraft, purge these bolts from supply, and eliminate the previously implemented phase inspection replacement of these bolts on the UH-1H/V. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

CH-47-97-ASAM-01, 101555Z Oct 96, maintenance mandatory.
CCAD announced a recall of certain forward synchronizing drive shaft assemblies. The purpose of this ASAM is to require a one-time records check and visual verification of all 145D3400-23/25/32 forward synchronizing drive shaft assembly data plates for suspect serial numbers. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

CH-47-97-ASAM-02, 301923Z Dec 96, maintenance mandatory.
Several reports have been received of inadvertent release of an external load due to inadvertent actuation of the cargo hook release switch. The purpose of the message is to fabricate and install a plastic cargo hook release switch guard on the winch/hoist operators control grip assembly. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-1-97-ASAM-01, 171600Z Dec 96, maintenance mandatory.
See AH-1-97-ASAM-01 above.

UH-60-97-ASAM-04, 191631Z Dec 96, maintenance mandatory.
The retirement life of the main rotor blade cuff manufactured by Fenn Manufacturing had been adjusted several times as a result of preliminary test results. The purpose of this message is to permit the Fenn cuff to be operated to its full life of 2400 hours (500 hours for the MH-60K) due to engineering testing results. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-60-97-ASAM-05, 301341Z Dec 96, maintenance mandatory.
Certain viscous damper bearing support assemblies (P/N 70361-05060-042) have been found to be defective. The purpose of this message is to require inspection for subject assemblies manufactured by Laumann Manufacturing and to remove them at the next 100-hour inspection. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

GEN-97-ASAM-02, 060655Z Nov 96, operational.
In June 1995, restrictions were placed on firing certain 2.75-inch hydra-70 rockets from AH/MH-6, MH-60, AH-1, AH-64A/D, and OH-58D aircraft. The purpose of this message is to rescind GEN-95-ASAM-04, 021818Z Jun 95, and also to require reporting of MK-66 incidents to ATCOM directly. ATCOM contact: Mr. Howard Chilton, DSN 693-1587 (314-263-1587).

GEN-97-ASAM-03, 302019Z Dec 96, operational.
Problems involving corrupted data have been reported with some global positioning system (GPS) receivers. The purpose of this message is to require inspection of all CH-47D, UH-60, Special Operations Aircraft (SOA), and Special Electronics Mission Aircraft (SEMA) for type of GPS receiver installed and to change operational procedures for loading crypto keys in AN/ASN-149 GPS receivers. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Safety-of-flight message

CH-47-97-SOF-01, 141510Z Nov 96, technical.
Two safety-of-flight messages issued in April 1990 required inspection for and replacement of certain barrel nuts manufactured by Hartford Aircraft Products, Inc. A report was just received that another barrel nut manufactured by this vendor has been found, suggesting that additional discrepant nuts may be installed on H-47 Chinooks. The purpose of this message is to require another one-time visual inspection of forward transmission NAS577B20A mounting (barrel) nuts on all CH-47D, MH-47D, and MH-47E aircraft prior to next flight and removal of nuts manufactured by Hartford Aircraft Products, Inc. They can be identified by an impression stamp marking of HAP or cage code 66861 on the exposed barrel nut carrier. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Maintenance-information messages

AH-64-MIM-97-03, 121340Z Dec 96.
There have been a number of failures of the pilot and CPG cyclic housings in the lateral portion where the MS20066-77 keys are installed. The keyway may become loose, causing the DASE roll channel to disengage intermittently during control inputs with force trim on. It is also possible that a loose keyway may cause a slight lateral drift in a hover. The purpose of this message is to outline procedures to correct the problem. ATCOM contact: Mr. Ken Muzzo, DSN 490-2257 (314-260-2257).

OH-58-MIM-97-01, 311606Z Oct 96.
Change 24 to TM 55-1520-228-23-1, 31 Aug 96, erroneously placed a 600-hour retirement interval on certain engine parts on all OH-58A/C aircraft. The purpose of this message is to remove the 600-hour retirement interval and substitute "on condition" in the overhaul interval column. ATCOM contact: Mr. Stephen P. Dorey or Mr. Rusty Reed, DSN 490-2258/2697 (314-260-2258/2697).

GEM-MIM-97-02, 171451Z Dec 96.
Adjustment procedures in TM 11-5895-1037-12&P for the AN/APX-100(V) IFF transponder have been found to be incomplete and misleading and may significantly degrade operation of the system. The purpose of this message is to outline procedures to correct the problem. ATCOM contact: Mr. Stephen Sekach, DSN 693-5580 (314-263-5580).

Messages: What's the difference?

Messages. We get all kinds. We get safety-of-flight messages; we get safety-action messages; we get safety-of-use messages; we get safety alert messages. While they're all important, some are more important than others. So it's good to review their purposes every once in a while.

Here goes.

Safety-of-flight messages

SOF messages pertain to any actual or potential defect or hazardous condition that could cause injury to personnel or damage to aircraft, components, or repair parts. They may also authorize immediate use of technical changes to publications pending receipt of the DA-authenticated change. There are four types of SOF message:

- **Emergency:** Used for grounding purposes only. Immediately grounds a fleet or a designated portion of a fleet when a hazardous condition exists that has the potential to cause a catastrophic accident.
- **Operational:** May ground aircraft for other than emergency reasons to correct hazardous conditions relating to aircraft operations. These may include flight procedures, operating limitations, or operational policy.
- **Technical:** May be issued to effect noncatastrophic grounding for materiel or maintenance conditions. Messages include corrective action not involving configuration changes; aircraft, component, or repair-parts modification; one-time inspection requirements; or long-term replacement of safety-related items that require continuous monitoring.
- **Maintenance mandatory:** Will not ground aircraft but may require accomplishment of a task and require a report of completion or findings.

The proponent for SOF messages is the ATCOM Material Safety Office, DSN 693-2933.

Aviation safety-action messages

ASAMs pertain to any defect or hazardous condition, actual or potential, that can cause injury to personnel or damage to aircraft, components, or repair parts. They may also authorize immediate use of technical changes to publications announced in the message pending receipt of the DA-authenticated change. ASAMs are of lower priority than SOF messages. There are three types of ASAM:

- **Maintenance mandatory:** Directs maintenance actions and/or updates technical manuals; may call for compliance reporting.
- **Informational:** Provides status and information of a maintenance, technical, or general nature.
- **Operational:** Pertains to aircraft operations and flight procedures, limitations, or operational policy.

The proponent for ASAMs is ATCOM Material Safety Office, DSN 693-2933.

Safety-of-use messages

SOU messages for aviation-associated equipment pertain to any defect or hazardous condition, actual or potential, that can cause injury to personnel or damage to nonaircraft equipment such as aircraft ground-support and ancillary equipment. There are four types of SOU messages for aviation-associated equipment:

- **Operational:** Changes operating procedures or places limits on equipment use.
- **Technical:** Deadlines equipment used in support of aircraft or other aviation-associated equipment because of materiel or maintenance deficiencies and for modification of the equipment or its components.
- **One-time inspection:** Immediately deadlines equipment and directs inspection prior to next use and maintenance/modification to correct identified hazard or deficiency.
- **Advisory/technical maintenance or operational:** Contains new operational or technical maintenance information.

The proponent for SOU messages for aviation-associated equipment is ATCOM Material Safety Office, DSN 693-2933.

Safety-alert messages

SAMs are issued to notify users of existing and ***potential*** hazardous conditions identified during the course of an accident investigation. The proponent is the Army Safety Center's Operations Office, DSN 558-3410/2660.

IN THIS ISSUE

Class A Accidents

through December

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1		0	
	February	0		0	
	March	2		7	
3D QTR	April	1		3	
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	7	1	16	0

U.S. ARMY SAFETY CENTER

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Thomas J. Konitzer
Brigadier General, USA
Commanding General

Flightfax

ARMY AVIATION RISK-MANAGEMENT INFORMATION

MARCH 1997 ◆ VOL 25 ◆ NO 6

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In Army aviation, we devote a lot of paper and a lot of ink to crashes and the errors that caused them. We do this so that other Army aviators can learn hard-bought lessons without experiencing them first hand.

But there are also lessons to be learned from inflight emergencies that have a happy ending—those that could have ended in disaster but didn't because of the way the crews responded.

These are lessons in crew coordination and maintaining aircraft control.

They're lessons in good judgment, good execution, and performing to standard.

They're lessons about crews staying calm and thinking clearly and working together and using exceptional skill to recover from the unexpected.

They're the best kind of lessons—those we learn from

catastrophic accidents that didn't happen...

Broken wing awards

The Army Aviation Broken Wing Award recognizes aircrewmembers who demonstrate a high degree of professional skill while recovering an aircraft from an inflight failure or malfunction requiring an emergency landing. Requirements for the award are in AR 672-74: Army Accident Prevention Awards.

- ***CW4 William D. Scoles, pilot in command***
- ***CW3 Robert D. Petty, copilot***
- ***SGT James R. Seiders, crewchief***

Aviation Company, 1st U.S. Army Support Battalion, Multinational Force and Observers, Sinai, Egypt

The UH-1H was one of three medevac aircraft en route to the scene of a vehicle accident with multiple casualties. The crew was under NVGs as they flew over water 1.5 miles off the coast. They were 1070 feet AHO at 110 KIAS when CW4 Scoles heard what he thought was the hydraulic pump cavitating. He decelerated and began a shallow left turn toward shore in preparation for imminent hydraulics failure.

SGT Seiders, on a monkey harness, checked the transmission area and confirmed that the noise was coming from the vicinity of the hydraulic pump. CW4 Scoles then felt feedback in the controls and, within 2 to 3 seconds, an unexpected and violent cyclic hardover to the right occurred. He advised CW3 Petty of the hardover and requested his assistance. CW3 Petty immediately got on the controls and placed the hydraulic-control switch into the off position.

The aircraft, now in a severe nose-low and right-hand attitude, began a rapid descent (>500 feet per minute) and a steep, uncontrolled turn farther out to sea. Application of collective aggravated the nearly uncontrollable bank.

Both pilots fought the cyclic hardover for the next minute or so. CW3 Petty had to use both legs, hands, and arms to apply adequate counterpressure on the cyclic to help maintain aircraft control. He was able to notify flight following of the hardover and subsequent loss of control, but little else was said due to the situation at hand. SGT Seiders had the passengers immediately assume the crash position.

To this point, execution of published emergency procedures had not corrected the cyclic hardover. With a crash into the water in an unusual attitude at high airspeed imminent, the crew decided that cycling the hydraulic switch (immediate-action steps for control stiffness) was necessary. CW3 Petty attempted numerous times to recycle the hydraulic switch, but each time he took his left hand off the cyclic to do so, the aircraft quickly turned further right and came rapidly closer to an unrecoverable attitude/roll rate.

Seeing this situation, SGT Seiders, disregarding his own safety, unbuckled from his seat and climbed over the two rear-facing jumpseats (medevac configuration) to cycle the hydraulic switch himself. Just as he reached to do so, CW3 Petty managed to very rapidly cycle the switch on then off. The hardover ceased and normal hydraulics-off flight was restored at 500 feet.

CW4 Scoles initiated an immediate shallow left turn towards shore, and the crew began discussing where to land. They all agreed that they needed to get the aircraft on the ground as soon as possible to avoid another hardover condition, but the nearest airfield suitable for a running landing was 35 miles away. A low recon over the open desert did not reveal a suitable area. CW3 Petty then mentioned a helipad with a short run-on capability that was 3 miles away.

CW4 Scoles opted for this scenario and set up for an approach using shallow left turns because of the potential for another right-cyclic hardover. CW3 Petty kept lightly on the controls to assist in case another hardover occurred and notified the other medevac aircraft of their intentions. CW4 Scoles instructed the passengers to remain in the crash position. He briefed CW3 Petty to call out airspeeds continuously, to assist in reduction of collective when braking was required, and to under no circumstances let airspeed go below 30 KIAS. SGT Seiders, acting as a critical part of the crew, called altitudes and rate of closure.

CW4 Scoles made a teardrop approach—using a series of left turns to avoid several large towers, a resort area, and palm trees on final—and set up for a perfect shallow approach. On short final, the crew realized that large rocks, gravel, and barricades on the landing area further limited the 110 feet of available run-on capability. The pilots continued the approach into the wind and just above effective translational lift airspeed, touching down only 2½ feet past the threshold of usable landing area. On touchdown, the two pilots reduced collective simultaneously for more rapid braking action and maneuvered the aircraft to the right during the skid to avoid striking large rocks. The aircraft slid to a controlled stop after only 90 feet of ground run.

CW3 Petty performed a normal shutdown and notified the sister aircraft that a safe landing was terminated with no further damage or injury to passengers. The sister aircraft landed, picked up the medical personnel and equipment, and continued the medevac mission.

Postflight inspection found that the line from the check valve to the hydraulic filter was completely sheared, which had resulted in immediate and total loss of all hydraulic fluid. The cyclic hardover resulted from failure of the irreversible valve in the right cyclic servo. The suspected cause of this failure was that air was introduced into the system during the rapid loss of hydraulic fluid.

■ *Mr. John D. Edmunds, Jr.*

UNC Aviation Services, Fort Rucker, AL

During contact flight training in a UH-1H, Mr. Edmunds initiated a simulated engine failure (SEF) task. His student identified the task correctly and executed the proper emergency procedure, including selection of a suitable forced-landing area. At 400 feet agl, Mr. Edmunds called for a power recovery to end the task. This recovery altitude would prevent the aircraft from descending below the minimum task altitude of 200 feet agl.

The student began to apply engine power and collective pitch to establish a climb back to altitude. At about 250 feet agl, a sudden left yaw occurred, and engine speed began dropping below 6600 rpm.

Mr. Edmunds took the controls and made a quick check of the throttle position to ensure it was full open; it was. A rumbling noise began to fill the cockpit, and the sound coming from the engine compartment became unmistakable: The Huey was experiencing multiple compressor stalls, and they were becoming progressively worse.

The aircraft would not climb or maintain altitude, and the forced-landing site selected for the SEF task was well behind them. Mr. Edmunds initiated a 150-degree downwind turn toward the only other forced-landing site available, a wheat field. The helicopter was now about 100 to 125 feet agl.

A line of 70- to 80-foot-tall trees formed a barrier across the near side of the field. Mr. Edmunds executed a slight flare and, with minimal remaining engine power, cleared the trees by 10 to 20 feet. Clear of the tree line and at about 50 feet agl, the engine made a pinging sound and went silent. It had seized.

Mr. Edmunds put the aircraft into full autorotation and began a gentle deceleration to fly over a wire fence and a large sloping agricultural terrace before touching down. Several days of heavy rain had made the soil extremely soft and adhesive. Mr. Edmunds brought the aircraft to zero forward velocity before touchdown and cushioned the aircraft as it settled onto the face of a left-to-right downsloping (10°) terrace. The Huey sank into the soft soil but was undamaged by the landing forces. No one was injured.

■ *CW3 Timothy W. Harper*

A Company, 2nd Battalion, 227th Aviation Regiment, 1st Armored Division, Fliegerhorst, Germany

At 120 feet agl while conducting a simulated rocket engagement, the AH-64 crew heard a loud explosion from the left side of the aircraft. This was followed by immediate and complete failure of the No. 1 engine. CW3 Harper, the PC, realizing that he could not obtain single-engine airspeed, quickly lowered collective and entered an autorotation with only 120 feet to regain Nr to cushion impact. At about 5 to 10 feet, he applied collective to cushion the landing. Descending at the rate of more than 1000 feet per minute, the aircraft landed hard on an 8- to 10-degree slope. CW3 Harper maintained positive control of the aircraft, avoiding the possibility of dynamic rollover. Damage was limited to the left main landing gear and tail wheel strut; no one was injured. The emergency was caused by catastrophic failure of the No. 1 engine's GG rotor.

■ *CW2 Paul M. Dean*

U.S. Embassy, Cairo, OMC/AV Apache TAFT, Cairo, Egypt

CW2 Dean was conducting day RL progression training for a rated Egyptian Air Force aviator, who was in the front seat of the AH-64. During gunnery switchology training at a stabilized 370-foot OGE hover over rugged desert terrain, the EAF pilot announced that he had a master-caution light. Simultaneously, CW2 Dean noticed that he, too, had a master-caution light and an engine-out light as well. Cross-check of his instruments verified that the No. 2 engine Ng and Np and rotor rpm were decreasing. He immediately lowered collective and applied forward cyclic to gain single-engine airspeed. About 7 seconds after the No. 2 engine failed, while at 200 feet agl and slightly above single-engine airspeed, the No. 1 engine also failed. CW2 Dean immediately entered autorotation and began to evaluate the available landing area, which was covered with 2- to 3-foot-high hard sand mounds and berms. He noted a small, flat area ahead of the aircraft and attempted to reach it. With little time to plan or react, he began his deceleration at about 100 feet agl. As the aircraft descended, he realized that the aircraft tail wheel would not clear the last berm. He used the collective to minimize the impact of the tail wheel and cushion the touchdown of the main landing gear. After touchdown, he brought the aircraft to a stop using the wheel brakes, and the crew exited the aircraft. Elapsed time from onset of the first engine failure until termination was less than 30 seconds. The only damage to the aircraft was a collapsed tail landing gear shock strut.

■ *CW3 Randall M. Rushing*

Operations Group, Combat Maneuver Training Center Aviation Detachment, Hohenfels, Germany

CW3 Rushing was the instrument examiner on an instrument training mission in a UH-1H. The aircraft was at 6000 feet and 90 KIAS, and the outside air temperature was -8° when forecast light-rime icing began accumulating on the WSPS and wiper blades. After about 20 minutes, CW3 Rushing noticed that airspeed had deteriorated to 70 KIAS and told the pilot, who adjusted controls to correct it. Within a few seconds, CW3 Rushing saw airspeed at 60 knots and told the pilot, who again indicated he was correcting it.

Within seconds, airspeed dropped to zero and the aircraft was completely iced over and began to vibrate severely. Torque was 60 psi and the aircraft was entering an excessive right bank; N2 was 6000 rpm. CW3 Rushing took the controls, leveled the aircraft, and attempted to climb above the cloud deck. He adjusted torque to 45 to 50 psi but was unable to climb or initially regain N2, and the aircraft continued to descend. He then established a controlled descent and requested and received immediate radar vectors to the nearest forecast VMC and clearance to a lower altitude. He then requested assistance from the two pilots in the back to help monitor instruments and call out any significant indications. He asked the controller to compute aircraft ground speed and notify him if airspeed varied below 70 or above 110 knots.

CW3 Rushing continued flying the aircraft toward the destination airport, primarily using heading, attitude, and torque information to maintain level flight. While descending through 3500 feet msl, the vibrations began to subside as the ice began to melt. Visual flight was established at approximately 500 feet agl. The airspeed indicator remained inoperative as the ice began to clear from the windows. CW3 Rushing landed the aircraft without damage at the airport 20 minutes after onset of the emergency. No one was injured.

. . . to train in the mountains of north Georgia. What's in it for them? An opportunity to conduct actual day and night air-assault operations, aerial resupply missions, and cadre airborne operations in mountainous terrain.

Camp Frank D. Merrill, located near Dahlonega, GA, is home to the 5th Ranger Training Battalion and the location of the mountain phase of the U.S. Army Ranger School. In the past, the battalion has received outstanding aviation support from Fort Benning. However, due to crew shortages and crew-rest requirements, Fort Benning can no longer single-handedly support the monthly 10-day field exercises.

The 5th Ranger Training Battalion can provide a tactical scenario, missions, billets, mess, and most logistical needs. Mission requirements and fuel capacity at Camp Merrill make four to five UH-60s the ideal aviation support for a Ranger class.

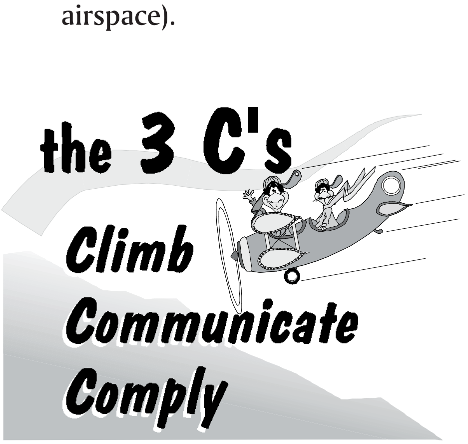
For more information, please call SFC Sanchez or SSG Finney at DSN 797-5770 (706-864-3367), ext. 199 or 114.

The three C's still work

The Army has some of the best low-level pilots in the world, but there is one thing we need to occasionally be reminded of: Almost all fatalities occur when the aircraft impacts the earth's surface. Remember this: When you are flying low with no place to safely land and you lose forward visibility because of fog, dust, snow, rain—whatever the reason, CLIMB! Do not hesitate. Get on the gauges and climb. Immediately.

If you stay below 1200 feet agl, which in most areas is uncontrolled—Class G—airspace, you can settle down, relax, and enjoy still being alive. When you have regained your composure, you can proceed to an area of known VFR conditions or you can contact air traffic control and let them know you are in Class G airspace operating IFR and request an IFR clearance into Class E airspace and to the nearest facility you can use.

14 CFR Part 91, section 173, states: "No person may operate an aircraft in controlled airspace under IFR unless that person has (a) filed an IFR flight plan, and (b) received an appropriate ATC clearance." You, however, are flying by instruments in uncontrolled airspace with no flight plan or ATC clearance, alive and perfectly legal (unless you or the aircraft are not qualified for IFR flight or you fly out of Class G airspace).



However, remaining a safe distance from rising terrain and obstacles becomes more difficult when operating in inclement weather. For many years we have taught that, when encountering inclement conditions that do not allow continued VFR operation, you should follow the three C's: ***Climb***—as high as necessary; ***Communicate***—contact ATC immediately; and ***Comply***—follow the instructions issued by ATC.

If you can return safely to VFR conditions while operating IFR in Class G airspace, fine. But if you can't, then get a clearance from ATC. Remember, FAR 91.3 allows a pilot involved in an inflight emergency to deviate from any rule to the extent necessary to meet that emergency. Explaining the event to the FAA or your superiors is far better, in my mind, than dying.

I have had to do this several times in my many years of flying, which includes 20 years as a rated Army aviator in the Tennessee National Guard and 30-plus years as an FAA Operations Inspector in the Nashville Flight Standards District Office. There are those who might disagree with this stay alive procedure, but it has worked for me and I feel comfortable in passing it along to others.

—CW4 William S. Whitmore, U.S. Army, Retired

More on "Recipe for Disaster"

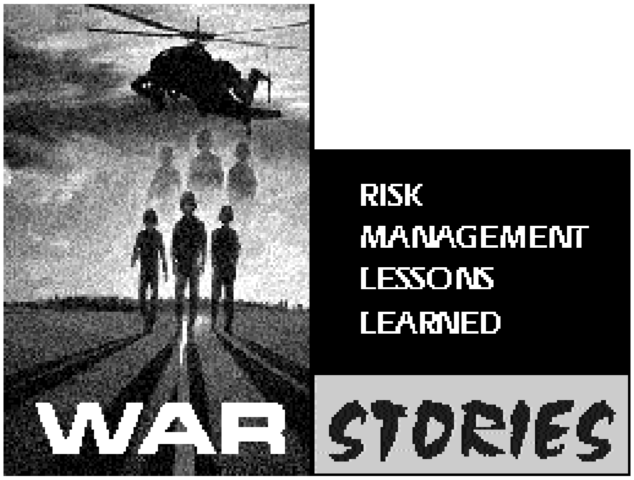
This letter is in response to the November 1996 *Flightfax* article entitled "Recipe for Disaster."

The author, being a CW4, needs to do some serious soul searching regarding his lack of action concerning the pilot referred to in the article. The author must know that this string of incidents was not the first and will not be the last. This pilot is either one who is "above" the rules or too proud to admit error. In either case, the pilot does not need to be around aircraft.

All of us make errors in judgment from time to time. No rational pilot would expect a pilot to be grounded for making a single mistake and correcting. But this pilot continued to put himself and his crew in harm's way. He either did not or would not recognize the alarms voiced by the crew. Too, after successfully escaping one problem, he continued and put himself in another critical circumstance. In any one of these cases, the fact is that this guy does not need to be in a cockpit. As a senior pilot, not recognizing the crew being audibly nervous and his total disregard for the crew is totally wrong.

The author needs to know that responsibility for this pilot is now his. He is responsible for this guy when he gets into another problem. And we all know, it's just a matter of time.

—Anonymous ASO



Communication: Live by the word, die by the word

We all know that military aviation is an inherently dangerous business. Having been in the "business" for a little over 18 years, I've witnessed many of those dangers. Sometimes, however, we experience luck and the danger passes with no damage to personnel or equipment (or both). During my career in aviation, I've noticed that mishaps have a single common thread that not only links the results, but could have prevented the mishaps in the first place.

Of course, that link is communication. If you think of all the situations leading up to a mishap, you can pinpoint a breakdown (at some point) in communication. A breakdown in communication is usually the first hazard that creates a chain of events, a chain that ultimately leads to a mishap.

I'm reminded of my experiences as a junior aviator and what I've learned from many close calls while flying attack helicopters. Recently, I was going through some pictures of fellow aviators I once flew with. One of those pictures was of a brand-new pilot assigned to our unit just before we deployed for a 30-day field exercise at Fort Irwin, CA. As one of the unit's new trainers, I was assigned the new guy as a copilot. He was not only young but seemed to be somewhat of an introvert (unusual for the attack-helicopter community). Every day we flew together, I wanted to teach him something new and valuable that would make him not only good, but safe! We spent our battle drills working on crew-coordination techniques, tactics, and other tools to improve our proficiency. That one aspect of his personality, shyness, never seemed to surface during our flights. My assumption was that he left that on the flightline when he climbed in the aircraft. This assumption was the beginning of a breakdown in communication that nearly cost us our lives and the lives of another aircrew.

We were flying a Combined Arms Team battle drill. Our mission was to fly to a battle position (BP) with three other AH-1s. We had two Scout helicopters with us that provided oversight, command and control, and other routine services. As we entered the BP we had maneuver room and set about getting the best observation position for unmasking and locating the armor targets we knew would be entering the "kill zone." As we maneuvered, I was unaware that one of our Scout helicopters had landed (to our 5 o'clock) and was waiting for commo from another battle captain. My new guy (in the front seat) saw the Scout land, and he assumed that I had seen it as well. Unfortunately, my eyes were trained in the direction the enemy was expected to come from, and my scan was limited to that side of the aircraft (opposite the Scout). As we slowly hovered at 10 feet agl, something didn't feel right, and I increased power to gain about 10 additional feet. As I did, something caught my peripheral vision. The two pilots from the Scout were looking up at us as they ran away from their aircraft, ***which I now saw below our own landing skids***. Our skids cleared their main rotors by no more than 5 feet as we flew directly over them! The Scout pilots knew it was too late to get our attention with a radio call, so they bailed. As I cleared their main rotor with our aircraft, my terror was replaced by sheer anger at my copilot, who seemed to be enjoying the whole ordeal. My first words to him were, "Did you see that aircraft?" He said he had and didn't say anything to me because he thought I saw it too. I was livid.

We landed and shut down our aircraft. I quickly approached the Scout pilots and apologized, explaining the problem. They were just happy I had my "psychic friends" along that day when I decided a 20-foot hover felt safer (just prior to impacting their aircraft). My new guy and I had a long talk about never assuming anything while in the cockpit. I told him that our breakdown in communication for just that single 30- to 40-second period nearly killed us and the Scout crew and nearly destroyed two aircraft.

I learned a valuable lesson that day, not only about crew coordination and communication between crewmembers, but also that personality plays a significant role in determining the thoroughness of a crew briefing. Knowing my copilot's introverted nature outside the cockpit should have sent me a signal. I should have stressed to my new guy that shy behavior and precise cockpit communication is an oxymoron. We can never assume anything about the other crewmember while flying. When we aren't as precise as possible in communicating thoughts, ideas, and directions, there is a degradation of safety and a sharp increase in potential risk.

In Army aviation, as well as in every aspect of today's society, there seems to be a decline in understanding between individuals caused by a simple lack of or breakdown in communication. The only way to improve our skills in this area is to practice constantly. Mission pre-briefs and post-briefs are ways to identify and correct deficiencies in communication.

Writers, politicians, and some other professions "live by the word and die by the word." Believe me, aviators can be added to the list of professions that should heed that old axiom. Your life may depend on it!

—CW4 Tom Clarke, PA ARNG, DSN 664-3221, ext. 8903 (703-604-3221, ext. 8903)

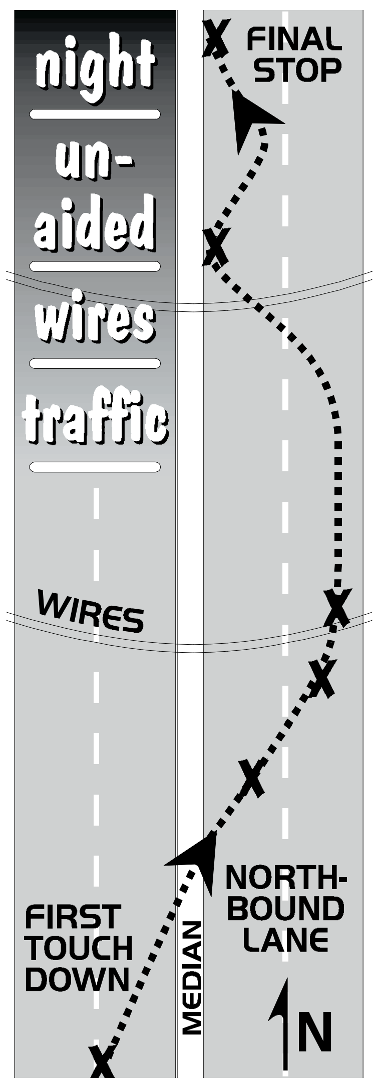
"Go for the road"

On 23 October 1995, I was pilot in command of a UH-60A on a medical evacuation mission to transport a patient from the Air Force Academy to a hospital in Denver, CO. It was a cold, clear night, and, due to the many ground lights in the area, we were unaided. The mission was uneventful, as far as medevac missions go, until we were almost to our destination.

We were in straight and level flight at approximately 90 KIAS when the low rotor audio sounded. The copilot was on the controls at the time, and he immediately reduced the collective. The rotor rpm increased to the normal operating range, and I directed my attention to the engine TGTs. They were equal and in the normal operating range, so I told the pilot on the controls, "The engines are fine." There were no other abnormal indications.

The copilot then increased the collective to arrest our descent rate, and the rotor rpm immediately started to bleed down again. Our original altitude at the onset of this emergency was 900 to 1000 feet agl, so time was now extremely critical. I saw no other option than to execute a forced landing and selected the only unlit and uninhabited area I could see, which was to our front left.

The copilot turned the aircraft toward this area and turned on the landing light, which, fortunately, was already extended. The area I had selected, once illuminated, was not a survivable forced-landing site. At that point, I yelled over ICS, "Go for the road," and came on the controls. We managed—how, I have no idea—to clear oncoming traffic and merge with northbound traffic on an overpass, get over a concrete median and under powerlines, and come to rest in the breakdown lane (how appropriate) without injury to anyone and with minimal damage to the aircraft.



What happened?

Our aircraft had experienced a rather rare malfunction known as a "dual engine rollback." Both engines had failed to the low side. This has happened 13 times, with our accident being number 12. This is not a problem unique to the UH-60A, though. It has also happened in the UH-60L and the AH-64. Not all of these failed as low as ours did that night, and they have happened on the ground, at a hover, and during flight. What causes this malfunction is still being investigated. My intent in writing this article is to share my experience so that if this malfunction presents itself to you, you won't be asking "What's this?" and spend the rest of your life (in my case, it would have been 28 seconds) trying to figure out what's happening.

One good thing I have taken away from this accident is that I have learned an invaluable lesson. I once heard an Air Force General speak on crash survival, and he said, "If you knew that on your next flight you were going to have an emergency or crash, would you do anything different in preparation for that mission?" Now getting grounded or canceling the mission weren't options! He then said, "If you can think of one thing, you're not ready to fly."

I didn't appreciate his words as much before as I do now. Every situation we might encounter isn't necessarily going to be fixed by an answer memorized from a book. Crew coordination and situational awareness are absolutely key. The most important single consideration will always be aircraft control. And the primary consideration will always be survival of the occupants. Had I not been fortunate enough to be flying with the greatest pilot, crewchief, and medic in the world that night, it all could have turned out differently.

—CW2 Mike "Lucky" LaMee, B Co, 2/1 Aviation, Operation Joint Endeavor, APO AE 09789

ShortFAX
Keeping you up to date

A note for life-support gurus!

How long has it been since your unit's Emergency Beacon Corp. (EBC) ELTs have been returned to the manufacturer for inspection, maintenance, or repair? If your answer is "Never" or you don't know, consider sending them back to the manufacturer for an update. Glatzer Industries Corporation, the manufacturer of the EBC ELT, offers a special program that will maintain your ELTs to proper factory specifications.

Glatzer Industries has established a factory maintenance program where they inspect and repair as necessary (IRAN) each ELT on a repetitive 2-year basis. Each ELT that is "IRANed" is essentially restored to as-new condition, including new battery packs, and, therefore, receives a new 2-year unconditional warranty.

Under the IRAN program, each ELT is visually inspected and then electrically tested and measured at room temperature. It is then placed in an environmental test chamber, where the temperature is -50°C and relative humidity is 95 percent. The ELT is again tested and measured to determine low-operating-temperature characteristics. The ELT is then warmed to room temperature and tested and measured again. Finally, the ELT is tested and measured at 70°C and 95-percent humidity. The electrical tests at each temperature include power output on each frequency, frequency stability, modulation characteristics, and receiver sensitivity for those ELTs that have voice transmit and/or receive capability. G force versus pulse duration is measured in a centrifuge in each of six positions: up, down, left, right, front, and back.

As you can see, there are many maintenance checks required to ensure your unit's ELTs are maintained in a high state of readiness. Don't we owe it to our crews to ensure their equipment is in the best possible state of repair?

For further information from Glatzer Industries, call 800-382-0079; ask for Pat.

—CW4 Andy Sickler, ASO, Fort Benning, GA, DSN 835-2425/4753 (706-545-2425/4753)

ALSE update

Two recent Aircrew Integrated System (ACIS) messages contain important information on aviation life-support equipment.

■ ACIS advisory message 052025Z February 1997 repeats an earlier message (021445Z Oct 96) that delayed (until 30 Sep 97) implementation of the AR 95-3, paragraph 7-6b, requirement for one survival radio per crewmember. PCs will continue to ensure that at least one fully operational survival radio is on board and that crewmembers without radios have other means of signaling (i.e., flare kit or signal mirror).

■ ACIS advisory message 052031Z February 1997 reminds users that the aircraft safety restraint assembly commonly referred to as the "monkey harness" is intended for use ***only*** to prevent soldiers from falling out of the aircraft. It is not designed to be used as a harness to suspend soldiers from the aircraft and must not be used for this purpose. This message also outlines inspection procedures for and limitations on the use of safety restraint assemblies.

The ACIS POC is SSG Stan Marmuziewicz, DSN 693-3573 (314-263-3573). If you are greeted by a voice-mail message and require immediate assistance, you may call DSN 693-9142 (314-263-9142).

Notes from Black Hawk PMO

In the January/February 1997 issue of "Black Hawk Newsletter," Mr. Joe Hoover cautions users to carefully review every message:

"I know we have been burdening Black Hawk users with a lot of Aviation Safety Action Messages (ASAMs) lately. But please be careful and take the time to review each message. As most of you know, as of 24 January, there have been nine ASAMs issued for fiscal year 1997. As some may not know, there has been one Safety of Flight (SOF) issued this year. Note the difference. In message UH-60-SOF-97-01, I am trying to locate 18 specific serial-numbered swashplate assemblies. To date, I have received reports for eight. Using the 2410 data base, I located a couple more. The problem is the similarity in the message numbering system. Some people look at the ending part of the message, see "-01," check the records and see "-01," and automatically assume the message is complied with. Don't make this mistake."

Mr. Hoover's phone number is DSN 693-0484 (314-263-0484).

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class E

F series

■ Engine quit while bringing N1 up to 68 to 72 percent during engine start. Maintenance could not duplicate. Suspect interruption of power to fuel valve before start.

■ Aft fuel boost pump caution light came on during cruise flight at 80 knots and 1500 feet agl. Caused by faulty fuel boost pump cartridge.

■ During engine runup, forward fuel boost segment light came on. Maintenance replaced pump.

■ Fuel gauge began fluctuating 300 to 400 pounds during cruise flight. Inspection revealed that forward fuel probe connector was loose.

■ During correlation check, pilot and gunner N1 gauges differed by 4.4 percent at 100-percent rpm and by 3.7 percent at engine idle. Maintenance replaced pilot's N1 tachometer.

■ When IP entered descending left turn at 110 KIAS, PI (back seat) observed torque at 105 percent. Aircraft was landed without incident, and overtorque inspection was completed. Main-rotor trunnion bolts (P/N MS20006-20) were replaced.

■ Aircraft began to settle toward trees during right-hand turn in gusty winds. PC pulled 110 percent torque for 3 seconds to arrest rate of descent and continued turn toward downsloping terrain. Aircraft landed with no further incident.

■ Engine/transmission oil cooler fan bearing seized during runup. Engine oil temperature reached 130°C for 5 minutes. High engine oil temperature inspection is in progress. Oil cooler was replaced.

AH64

Class A

A series

■ While flying between trees, crew noted aircraft vibration and buffeting. Crew landed at first available landing site, where inspection revealed extensive damage to airframe and main-rotor system. Suspect tree strike. Accident is under investigation.

Class C

A series

■ While in level flight at 700 feet agl and 120 to 130 knots in loose trail formation about 10 to 12 rotor disks behind lead aircraft, crew of Chalk 2 heard loud bang. No warning lights illuminated. On landing, inspection revealed damage to PNVS turret assembly, three main-rotor blades, pilot's windshield wiper, and center windscreen WSPS. Cause reported as "suspected object strike."

■ **Aircraft-ground accident.** During runup, power levers were advanced to fly. At 89-percent NP/NR, MP felt shudder and retarded power levers to idle. All indications were normal, and a normal shutdown was completed. Postflight revealed significant damage to No. 4 tail-rotor drive shaft next to utility hydraulic manifold and surrounding components. Cause not reported.

Class E

A series

■ At 400 feet agl during autorotation to runway, backseat pilot noticed decreasing NP on No. 1 engine. IP on the controls confirmed No. 1 engine failure and transitioned to roll-on single-engine landing. Master caution light flickered, and No. 1 engine oil pressure segment light came on. No. 1 engine completely shut down during landing. Cause not reported.

■ Main transmission light came on during runup. Maintenance replaced main transmission chip detector.

■ No. 1 engine fire handle flickered on and off during final approach for landing. Caused by electrical short.

■ Transmission oil hot light came on in flight. Cause not reported.

■ APU failed to start on two attempts. Maintenance determined that APU controller sensed low-oil condition and prevented start. Oil was added, and APU started. Maintenance later replaced APU after several days of monitoring determined that it was losing oil.

■ During cruise flight at 500 feet and 100 knots, PNVS picture quality began deteriorating and became unusable. Maintenance replaced PNVS.

■ During normal runup, crew heard pop and APU shut down, causing a hard shutdown. Cause not reported.

■ During NVS deliberate attack, PNVS would not lock in position for more than 30 to 40 seconds at a time. Cause not reported.

■ On short final for landing at night, shaft-driven compressor light came on with no interruption in pressurized air system airflow. No other information reported.

■ No. 2 general caution/warning light came on during startup procedures. Fault detection and location system indicated that GCU had failed.

■ Shaft-driven compressor light came on during runup. Maintenance replaced hose and clamp.

■ Oil psi accessory pump caution light came on during climbout. Pressure switch was replaced.

■ No. 2 engine NP failed on climbout. Electrical control unit was replaced.

■ Postflight inspection revealed that ADF sensing antenna was missing, aft mount was bent, and lower IFF antenna was loose and bent at mounting point. Crew had felt no unusual movement during flight. Cause unknown.

■ Oil low primary light came on and primary hydraulic pressure fluctuated during cruise flight. About 15 seconds later, primary hydraulic psi light came on and pressure gauge went to zero. BUCS fail light came on, and DASE yaw channel disengaged. DASE pitch and roll channels then disengaged, and ASE light came on. Aircraft landed and hose assembly was replaced.

■ Damage to one outboard tail-rotor blade was discovered during postflight. Suspect damage resulted from rotorwash from other AH-64s and CH-47s during FARP operations at unimproved landing area. Tail rotor blade was replaced.

Class F

A series

■ While on ground at flat pitch, crew heard popping sound from No. 1 engine. PC identified No. 1 engine tgt had reached 917°, reduced power lever to idle, and tgt reduced to 580°. As he began advancing power lever back to fly, tgt began to rise rapidly and engine began to pop. He shut down engine. Inspection revealed internal engine damage, and engine was replaced. Suspect FOD.

CH47

Class D

D series

■ While landing to snow-covered terrain, aircraft started to slide backwards with brakes applied. Aircraft was picked up to hover and repositioned. Postflight inspection revealed VHF antenna had contacted the ground and cracked. Antenna was replaced.

Class E

D series

■ No. 1 torque needle on P and CP gauge fell to zero during takeoff and would not respond to normal engine trim adjustment. It initially responded to emergency engine trim, but stopped after about 30 seconds. Flight was terminated, and aircraft was shut down without incident.

■ Ramp tongue separated from aircraft after external load was delivered. Cause not reported.

OH58

Class B

D series

■ Aircraft drifted rearward during OGE hover at night, and tail rotor struck treetops. Both pilots were under NVGs and had "come inside" the cockpit for 10 to 15 seconds while conducting airborne target handover system training.

Class C

D series

■ Before flight, aircraft doors had been taken off and secured to Hesco basket with heavy-duty bungee strap. At completion of mission, aircraft was at 2-foot hover over landing pad when one of the doors came loose. Rotor wash lifted door into main rotor blades, destroying door and damaging two rotor blades.

Class E

A series

■ On start sequence, PI opened throttle at 13-percent N1 and closed the throttle before reaching 927°. TOT continued to climb during abort and reached 960° for 1 second. Hot-end inspection revealed to damage to engine.

C series

■ PC was starting aircraft after refueling at intermediate stop. When he opened throttle to engine-idle position after reaching 15-percent N1, he noticed rapid rise in TOT and began emergency shutdown procedures. Idle detent did not release initially, but second attempt to roll throttle off was successful. TOT had momentarily reached 998°.

D series

■ A single loud compressor stall occurred while crew was conducting an engineering test flight profile and performing a target acquisition OGE hover at 1800 feet agl. There was no damage.

UH1

Class C

H series

■ Wrench was inadvertently left on vertical fin after tail rotor adjustment. Test flight was accomplished without incident, but damage to tail rotor was found during postflight inspection.

J series

■ Aircraft experienced overtorque in flight. Adverse environmental conditions suspected to have contributed. Local investigation in progress.

V series

■ Aircraft encountered blowing snow during approach and drifted left into tree line. Both main-rotor blades contacted 3- to 5-inch-diameter trees. Aircraft landed without incident. Investigation continues.

Class E

H series

■ During runup, PC detected increase in engine noise. N2 had been set to 6600 rpm but was passing through 7000. Just as PC reduced throttle, transmission chip detector light came on, so torque indication was not observed. Engine and main rotor hub assembly was replaced.

■ During normal climbout after takeoff, pilot heard loud popping noise from rear of aircraft and felt yaw. He observed torque oscillations and egt fluctuations, then reduced power and returned to takeoff point. Cause not reported.

■ During MOC ground run for engine component change, large amount of smoke was emitted from engine exhaust and bleed air system. Aircraft was shut down. Maintenance found that two small O-rings had become dislodged during N2 gearbox installation and were severed during assembly. This caused engine oil to be pumped into bleed air system.

■ During MOC runup after engine replacement, linear actuator would not increase or decrease. Aircraft was shut down. Maintenance could not duplicate problem after warming aircraft in hangar. Suspect that actuator was frozen from -20°C temperatures.

V series

■ The crew had completed five simulated engine failures from altitude with normal indications during external fuel system qualification. However, when the sixth was entered, N2 and rotor needles did not split as normal. Power recovery was initiated and aircraft was landed. Suspect failure of transmission input quill.

UH60

Class D

A series

■ While in cruise flight, crew saw a concentration of large birds and altered course. As pilot took evasive action by entering descending right turn, bird flew into left-side nose cowling of aircraft.

Class E

A series

■ Low rotor rpm master warning light came on, low rotor audio horn sounded, and both PDU indications of rotor rpm went to 0 percent during IFR training flight. No. 1 and No. 2 engine rpm remained at 100 percent. Low rotor rpm audio horn could not be deactivated, and pilot requested and completed instrument approach to minimums with low rotor rpm audio horn on until aircraft landed. Caused by system sensor failure.

■ Pilot felt slight yaw left and right during IFR cruise flight then noticed No. 1 tail rotor servo caution light, backup pump on advisory light, No. 2 tail rotor servo advisory light, and master caution light on. Suspecting failure of No. 1 tail rotor servo with No. 2 tail rotor servo operational, crew elected to return to home base for precautionary landing.

■ During cruise flight at 1000 feet msl and 70 KIAS, load of 2 empty 500-gallon fuel blivets became unstable. Airspeed was reduced smoothly, and as it approached 60 KIAS, load began to oscillate. As load started swinging out, IP entered a turn and added power in attempt to stabilize load. One blivet swung around and hit right side of aircraft tail cone, then both settled under aircraft and became stable again. Aircraft landed safely.

■ During IFR flight at 5000 feet msl and 120 KIAS, APU fire light came on. Crewchief checked for smoke, but found none. IFR flight plan was canceled, and aircraft proceeded direct to landing area without further incident. Photo cell was found to be shorting out. Wire was repaired and aircraft was released for flight.

■ During cruise flight at 120 KIAS, pilot felt boost off control forces in cyclic pitch axis with no accompanying caution/advisory lights. He turned off both SAS and FPS, then executed precautionary landing at nearby airfield. MTP could not duplicate condition and released aircraft for flight. During return flight to home base, pilot again noted boost off control forces in cyclic pitch axis for about 5 minutes before returning to normal. Cause not reported.

■ Tip cap was found damaged on preflight. Last flight had been 2 weeks before and involved multiple approaches to unimproved landing zones. Suspect damage was caused by flying debris. Tip cap was replaced, and aircraft was released for flight.

■ Passenger discharged a training round into floor of aircraft while exiting at landing zone during FTX. Crew was unaware of incident until 2x2-inch tear in floor and bow in floor stringer was found after mission completion. Investigation is in progress.

■ Chip accessory module came on during climb. Aircraft landed and maintenance cleaned module. During landing after return flight to home station, second illumination occurred. Special oil sample was taken and module was replaced.

■ In level flight at 1500 feet agl and 130 KIAS, aircraft suddenly started to vibrate as if something had struck it or a cowling had come off. When aircraft slowed to 80 knots, vibration decreased. As power was applied prior to landing, vibration increased. Cause not reported.

■ No. 2 engine oil filter bypass light came on intermittently during cruise flight. Outside air temperature was -30°C, and No. 2 engine temperature was between 30° and 40°C. Light went out on landing when temperature rose above 40°C. Suspect extreme cold temperatures combined with inflight wind chill caused engine oil temperature to fall below 38°C, causing filter bypass to occur.

L series

■ While climbing to cruise altitude of 10,000 feet, PI noticed 4-inch crack in bottom right-hand corner of windshield. Within 30 seconds, the crack grew to the full length and width of the windshield and the anti-ice connector began sparking. Crew turned off anti-ice and returned to takeoff point without further incident. OAT at 9,000 feet msl during climbout had been noted at 3°C.

C12

Class E

C series

■ During postflight, IP found a nick on one propeller blade of left engine. Suspect FOD.

F series

■ At about 40 knots on takeoff roll on ice-covered runway, aircraft began to fishtail and slid off left side of runway into snow-covered sod. No damage.

■ No. 1 engine torque, fuel flow, and tgt gauges began to fluctuate 45 minutes into flight. As crew evaluated indications, fluctuations increased and engine power changes could be heard. When power was reduced to 60 percent, all indications returned to normal. Crew aborted mission and returned to home station. Cause not reported.

R series

■ During runup, right fuel flow was inoperative and signal generators were crossed. Cannon plugs to signal generators were switched and right fuel flow transmitter was changed out, correcting the problems.

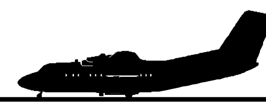
C26

Class E

B series

■ During climbout, pilot attempted to reduce power on both engines. As he moved power levers aft, right power lever momentarily hung up and would not retard then operated normally. When aircraft reached cruise altitude and pilot again attempted to reduce power levers, right power lever moved a short distance and again locked up. It would increase but could not be reduced below 50-percent torque. Flight to AAF was continued at a reduced power setting of 50-percent torque. Crew made decision to shut down right engine on final and land with one engine. Landing was made without incident. Postflight inspection revealed clevis pin was missing from lever position switch arm clevis. The pin (P/N MS203922C11) was found, and inspection showed a slight mark where the washer had gotten cocked on the pin after the cotter pin broke or wore through and fell away. The washer had apparently stopped on the remaining portion of the cotter pin until vibrations caused it to rotate and also fall away. This allowed the arm to drop its position that stopped the power lever from retarding aft. Further inspection suggested that the slight outward pressure being applied by the clevis to the washer and cotter pin could have caused the cotter pin to wear or break. During reinstallation, the clevis was "drawn" slightly to alleviate the pressure on the cotter pin.

O5



Class C

DHC-7

■ During preflight, forward HF DF antenna appeared damaged. Since the flight was nowhere near thunderstorms or lightning and no mission gear system problems were reported, aircraft was flown back to home station. Maintenance inspection later revealed damage to four additional antennas and the elevator.

Class E

DHC-7

■ While starting engines, ground crew indicated problems with No. 4 engine. Simultaneously, copilot noted smoke coming from cowling, and crew aborted start attempt. Maintenance inspection revealed starter generator had failed. It was replaced, and aircraft was released for flight.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

"If you knew that on your next flight you were going to have an emergency or crash, would you do anything different in preparation for that mission?"

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

CH-47-97-ASAM-03, 041913Z Feb 97, maintenance mandatory.
A problem with the 5,000-pound tie-down rings pulling loose from the cabin floor was identified in 1993. The problem was caused by a lack of sealant on the retaining bushing threads, and CH-47-94-ASAM-5 was issued to inspect fielded CH/MH-47s and action was to be taken by Boeing to inspect production-line aircraft prior to delivery. Recently, during flight of an Australian CH-47D, the forward right-hand tie-down fitting on the ramp backed out of the adapter while the flight engineer was using the tie-down fitting to secure his safety harness. Investigation revealed the absence of sealant on the threads of the adapter and bushing, and no conclusive evidence that the aircraft had been inspected/corrected prior to delivery by Boeing. The purpose of this message is to inspect/correct aircraft and to establish a recurring phase maintenance (200-hour) inspection requirement for the fittings. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-60-97-ASAM-06, 071647Z Jan 97, maintenance mandatory.
The lateral bellcrank assembly, P/N 70400-08150-045, manufactured by Purdy Machine Company (cage code 15152) recently completed engineering testing. Results indicate that its endurance strength is significantly below that of the original component; therefore, its retirement life is reduced to 360 hours since new. The purpose of this message is to require removal of all subject assemblies that have 360 hours since new. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-60-97-ASAM-07, 102105Z Jan 97, maintenance mandatory.
Tail rotor servo cylinder assemblies, P/Ns 2227000-9, -13, and -17, recently supplied by Parker Bertea Aerospace may have been assembled with O-rings that are not compatible with the hydraulic fluid used in H-60 aircraft. The purpose of this message is to require removal of the tail rotor servo cylinder assemblies whose serial numbers are listed in the message. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-60-97-ASAM-08, 102057Z Jan 97, maintenance mandatory.
The connecting link, P/N 70400-08155-056, manufactured by Purdy Machine Company (cage code 15152) recently completed engineering testing. Results indicate that its endurance strength is significantly below that of the original component; therefore, it must be removed from the aircraft. The purpose of this message is to require removal of all subject assemblies. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-60-97-ASAM-09, 221453Z Jan 97, maintenance mandatory.
The main rotor shaft extensions, P/N 70351-08186-043, manufactured by The Purdy Corp. (cage code 15152) and by Fenn Manufacturing Company (cage code 82001) are undergoing testing. Until testing is complete, an interim finite life of 2100 hours has been assigned. The purpose of this message is to require removal of all subject assemblies that have reached or exceeded 2100 hours. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Safety-of-flight message

C-23-97-SOF-01, 312022Z Jan 97, emergency.
Shorts Brothers Aircraft has notified ATCOM that a defect in the material thickness of the C-23B(Plus) rudder and elevator skins may not withstand loads experienced during a single-engine failure. Such a failure could have catastrophic results. The purpose of this message is to immediately ground all C-23B(Plus) aircraft with serial numbers 93-1317 through 93-1322. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

IN THIS ISSUE

WS • War Stories, CC • Crew Commo, SF • Shortfax

Class A Accidents

through January

Quarter	Month	Class A Flight Accidents 96	Class A Flight Accidents 97	Army Military Fatalities 96	Army Military Fatalities 97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	1	0	2*
	February	0		0	
	March	2		7	
3D QTR	April	1		3	
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	7	2	16	2

*Excludes 1 USAF pilot trainee fatality

U.S. ARMY SAFETY CENTER

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Thomas J. Konitzer
Brigadier General, USA
Commanding General

Flightfax

ARMY AVIATION RISK-MANAGEMENT INFORMATION

APRIL 1997 ◆ VOL 25 ◆ NO 7

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The February 1997 *Flightfax* identified a killer that's stalking Army helicopter operations. This month we address controls that we need to evaluate and implement to reduce the hazard of . . .

Spatial Disorientation

Type I SD: Aircrewmembers are *unaware* that they have an inaccurate perception of their position, attitude, or motion.

During an NVG orientation flight over desert terrain in a UH-60A, the pilot began a descent from 140 feet to his planned altitude of 100 feet. He initiated the descent without informing other crewmembers nor requesting their assistance in warning him if he passed through 100 feet agl. Due to inadequate visual cues, the pilot failed to arrest his descent and struck a sand dune in a near-level attitude at 69 KIAS at a 200-foot-per-minute rate of descent. All five people on board were injured, and the aircraft was destroyed.

Type II SD: Aircrewmembers are *aware* that SD circumstances exist and must be addressed before safety of flight is irreversibly compromised.

During a night VFR departure and climbout from an unattended stagefield, the AH-64 entered IMC. The pilot on the controls, who was in the back seat, experienced spatial disorientation due to lack of visual cues. He failed to regain control before the aircraft crashed in heavily wooded terrain. He survived, but the front-seat pilot was killed. The aircraft was destroyed.

What these two accidents have in common is spatial disorientation. How they differ is that the crew in the Type-I scenario was unaware of the SD circumstances at the time of the accident, and the crew in the Type-II scenario, although aware of SD, did not react appropriately to control it.

Reining in a hazard

Basic to any discussion of spatial-disorientation controls is recognizing that there are two types of SD. The challenge of Type I SD is to find a way to apply controls (the appropriate course of action) when you are unaware that you are in an SD situation. The challenge of Type II SD is to apply the right controls to the specific SD situation.

Identifying appropriate controls for both types of SD was an issue at last fall's Tri-Service Spatial Disorientation in Rotary Wing Operations Conference held at Fort Rucker. This conference produced control proposals in four major categories: education, training, research, and equipment. What follows is a discussion of these proposals, modified slightly to include input from the Aviation Leaders' Training Conference and the Aviation Brigade Safety Officer Conference held in January 1997 and input from standardization pilots and human-factor experts at Fort Rucker.

Proposed control: Education

Education initiatives were recommended to increase aircrew awareness of spatial disorientation through regular dissemination of lessons learned from accident analysis, research, and training. Other recommendations were to improve and standardize collection of spatial-disorientation information by accident-investigation boards.

Proposed control: Training

Training initiatives recommended included—

■ **Ground-based lectures.** The thrust of this recommendation involves updating the spatial-disorientation lectures that initial-entry rotary wing (IERW) students currently receive to include information developed in the past 10 years. A cooperative effort to accomplish this is currently under way between the U.S. Army Aeromedical Research Laboratory (USAARL) and the U.S. Army School of Aviation Medicine (USASAM). Additionally, it was recommended that an SD refresher-training program be developed and instituted to emphasize the role of crew coordination and instrument flying in SD situations.

■ **Ground-based demonstration of illusions**. This recommendation is based on the fact that neither equipment nor a specific helicopter profile exists for demonstrating disorienting illusions. This needs to be evaluated for feasibility of development.

■ **Airborne demonstrations**. This recommendation involves evaluation of SD-demonstration flights that demonstrate the limitations of human sensory systems in flight operations. USAARL recently evaluated a British SD-demonstration flight to determine its applicability to Army helicopter operations. The next step is a feasibility study to determine the value of including it in IERW training and refresher training.

■ **Training to overcome spatial disorientation in flight**. Currently being done on an ad hoc basis, this type of training needs to be standardized for both inflight and simulator-based training with formal objectives established in a curriculum.

■ **Review of ATM procedures.** This is perhaps the most important training control. Not only should we review current procedures that cover SD-related circumstances (i.e., IMC, recirculation problems such as brownout and whiteout, NVD flight, etc.), but we need to evaluate the effectiveness of crew-coordination measures already integrated into flight procedures. While it is generally agreed that crew coordination has improved the safety of flight, there has been no coordinated effort to go back and accomplish the fifth step of the risk-management process—that is to objectively assess its effectiveness to recognize its strengths and troubleshoot any problem areas. A specific circumstance that has been repeatedly raised as a worst-case scenario is the OH-58D target-engagement sequence, which requires both pilots to be "inside" the cockpit simultaneously.

Proposed control: Research

A coordinated effort is needed to evaluate the spatial-disorientation issues that are currently affecting Army helicopter operations. Toward this end, some controls identified near-, mid-, and long-term research needed to address both human-performance issues and materiel requirements.

■ **Near-term issues** included tri-service standardization of terminology to enhance sharing of information, and evaluating the applicability of improved instrumentation using current technology.

■ **Mid-term issues** addressed development of hazard/risk/control models to enable aircrewmembers to better risk manage SD situations in operational mission profiles. Also recommended was assessment of low-risk and low-cost technological developments that would assist pilots or be automatic in reestablishing orientation in flight.

■ **Long-term issues** involved evaluating controls that need to be incorporated into the design of current and future aircraft. Also recommended was assessment of high-risk and high-cost technological developments that would assist pilots or be automatic in reestablishing orientation in flight.

Proposed control: Equipment

Equipment initiatives involve looking at both off-the-shelf and future technology to address the SD hazard.

Currently available technology that needs to be evaluated as to its adaptability to military helicopter operations includes:

■ **Audio warning on radar altimeters**. The current visual indication does not seem to be effective by itself. Controlled flight into terrain (CFIT) is the most frequent and costly (in terms of fatalities and damage) endpoint in SD accidents. This fact argues for enhancing the capabilities of current radar altimeters. In the Type I scenario described on the cover, no crewmember noticed the radar altimeter indications or radar altimeter low warning lights.

■ **Ground proximity warning system**. The role a GPWS could play in reducing CFIT needs to be evaluated. According to a recent article in *Army Aviation*[1] magazine, the Navy is in the process of testing the world's first rotary-wing GPWS. The Army currently does not have any such program.

■ **NVG heads-up display (NVG HUD)**. The benefit of this technology is self-evident: It displays pertinent flight information, eliminating the need for pilots to look under the goggles to see the instrument panel.

■ **NVGs with increased field of view**. The Air Force has developed an NVG with a 100-degree field of view (compared to 40 degrees with ANVIS), which is being evaluated by ATCOM. This increased FOV would facilitate scanning and decrease neck fatigue.

■ **Hover lock**. Given that the human vestibular system is better adapted to detect rotational movement and less well adapted to detect lateral movement, it comes as no surprise that drift and descent from a hover is a significant SD problem in helicopter operations, particularly at night or during limited-visibility operations. (For the OH-58D and AH-64, this was the number-one SD situation in Class A-C accidents from 1987 through 1995.) Since the mid-1960's, the Coast Guard has had the capability to lock its position over rescue subjects. (The AH-64 has limited hover-hold capability; however, that system controls only horizontal, not vertical, drift.)

■ **Flight data recorders (FDRs) with voice capability**. While this technology would do little to help pilots reestablish orientation in flight, it would certainly help us determine what went wrong in accidents in which the entire crew perished and there were no witnesses.

Future technology that needs to be considered for development includes the following:

■ **Helicopter-specific instrument panels**. Current helicopter instrument panels are carryovers from fixed-wing aircraft. As a result, they were designed for use in aircraft with vastly different missions and flight profiles. Instrument panels that display pertinent rotary-wing flight parameters such as drift information would be helpful.

■ **Simulators capable of demonstrating spatial-disorientation situations**. Actual flight profiles that resulted in spatial-disorientation accidents could be programmed into simulators to allow aviators to experience the SD accident sequence and then show them how to apply the appropriate controls to fly out of the situation. The Army currently has an AH-64 simulator with a virtual-reality helmet; this needs to be evaluated as a potential platform to develop an SD simulator.

Prioritizing controls

In these days of fiscal constraint, the reality is that not all these recommended controls can be evaluated and implemented immediately. We must apply some form of prioritization that gives us the most return for every dollar invested. In USAARL Report 95-25[2], which surveyed 5 years of Class A-C helicopter accidents, researchers recommended the following potential solutions:

Potential solution	Frequency*
Increased crew coordination	45%
Improved scanning	39%
Audio warning on radar altimeter	22%
NVG HUD	22%
Hover lock	19%
Drift indicators	14%

*Recommended by two or more of the three researchers.

(Note: Frequencies add up to more than 100% because more than one solution may have been recommended per accident.)

It is clear that these researchers felt that training controls would be more effective than equipment controls, particularly in Type II (aware) SD events. However, what is difficult to assess after an accident is the degree to which human-performance issues (fatigue, task saturation, etc.) decreased the efficiency of tasks such as crew coordination and scanning. In short, the question is: Are we addressing a symptom of the problem or the problem itself?

A follow-on USAARL study[3] that extends the original 5-year review by 3½ years provides additional information that can be used in prioritizing SD controls. Table 1 displays, by phase of flight, factors that might be used as the basis for prioritization: cost in both lives and dollars and frequency of Class A through C accidents involving spatial disorientation. For example, if we made accidents involving fatalities our top priority, developing controls for controlled flight into terrain (GPWS, audio warnings on radar altimeters, crew coordination) and IMC (review of instrument flight procedures and crew coordination) would address 85 percent of such accidents. Table 1 also shows clearly that night flight (NVG, FLIR, and night-unaided) accounts for nearly three-quarters of SD-accident losses. If that were selected as the basis for control development, controls might include review of crew coordination procedures, NVG HUD, and NVG with increased field of view. (It is imperative to state that this should not be interpreted as an indictment of NVG, FLIR, or night-unaided flight; it is more an indication of the importance of risk management in these operations.)

Finally, it is important to stress that controls need to be prioritized not only in terms of what is good for helicopter operations in general, but also according to the needs of specific helicopters due to their missions. The nature of SD problems can also vary according to aircraft type (see table 2). For example, while CFIT is the number-one SD problem for most helicopters, descent and drift during hover operations ranks as the most frequent SD problem for OH-58Ds and AH-64s. For the UH-60, recirculation problems (brownout, whiteout) rank as the most frequent SD problem. So while recommendations for controls for CFIT would not change for most aircraft, hover lock for AH-64s and OH-58s and review of flight procedures/crew coordination issues in UH-60s might be additional considerations.

It is important to reiterate that while flight data recorders with voice capability were not specifically cited when control recommendations were prioritized according to cost, visual cue considerations, or type aircraft, they would definitely add vital information to accident investigations.

Table 1. Class A-C Accidents Involving SD By Phase of Flight (1987-95)

	CFIT	IMC	B/W	HOV	TAXI	H2O	MISC	TOTAL
Accidents	104	22	52	76	17	7	13	291
Cost ($M)	225	95	32	69	8	10	28	468
Fatalities	47	46	-	1	-	1	15	110

- Frequency (Top 3): CFIT (36%) + HOV (26%) + B/W (18%)
- Cost (Top 3): CFIT (48%), IMC (20%), HOV (15%)
- Fatalities: CFIT (43%) + IMC (42%) = 85%

	NVG	FLIR	N-U*	DAY	TOTAL
Accidents	107	26	29	129	291
Cost ($M)	187	102	58	121	468
Fatalities	62	0	22	26	110

*Night-unaided

Table 2. Class A-C Accidents Involving SD By Type Aircraft (1987-95)

Aircraft	CFIT	IMC	B/W	HOV	TAXI	H2O	MISC	TOTAL
OH58A/C	**21**	5	1	18	-	1	2	48
OH58D	3	2	1	**8**	1	1	-	16
UH1	**21**	7	10	8	1	2	2	51
UH60	15	4	**25**	9	9	-	3	65
AH1	**16**	1	9	8	-	-	2	36
AH64	17	2	3	**20**	3	-	1	46
H6	**7**	-	-	2	1	1	1	12
CH47D	**4**	1	3	2	2	1	2	15
CH47A/B	-	-	-	1	-	1	-	2
All Groups	104	22	52	76	17	7	13	291

- Top 3 mechanisms: CFIT (36%), HOV (26%), B/W (18%)
- Controls will have to review SD mechanisms by type aircraft

Legend:
CFIT - Controlled flight into terrain
IMC - Instrument meteorological conditions
B/W - Brownout/whiteout
HOV - Drift or descent from a hover
TAXI - (self-explanatory)
H2O - Drift or descent into water
MISC - Phase of flight not reported

Summary

The purpose of this article is to begin to recommend potential controls for a hazard that is contributing to a high cost in terms of lives and resources. The facts surrounding hazards, risks, and controls for spatial disorientation in helicopter operations are being elevated to appropriate agencies within the Department of the Army for consideration. While we are making consistent strides in integrating risk management into aviation operations, there is no doubt that we can do better once we rein in the spatial-disorientation hazard.

—COL Edwin A. Murdock, MD, MPH, U.S. Army Safety Center Surgeon, DSN 558-2763 (334-255-2763)

—LTC Malcolm G. Braithwaite, MB.Ch.B, DAvMed, MFOM, RAMC, USAARL Exchange Flight Surgeon, DSN 558-6815 (334-255-6815)

References

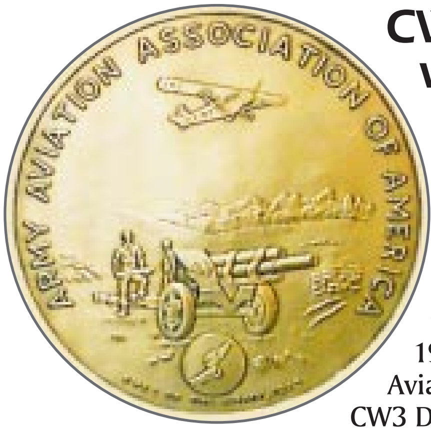
[1]Seidenman, Paul. "Ground Proximity Warning System." *Army Aviation*. 30 Nov 96, pp. 41-45.

[2]Durnford, S.J., J.S. Crowley, N.R. Rosado, J.P. Harper, and S. DeRouche. *Spatial Disorientation: A Survey of U.S. Army Helicopter Accidents, 1987-1992.* USAARL Report 95-25, June 1995.

[3]Braithwaite, M.G. *A Review of U.S. Army Helicopter Accidents, 1987-1995*. USAARL Report 97-13, March 1997.

Pull-out posters on pages 5-8

ShortFAX
Keeping you up to date



CW3 Milligan wins McClellan award

The Army Aviation Association of America has announced that the winner of the 1996 James H. McClellan Aviation Safety Award is CW3 David E. Milligan. He is with 2nd Squadron, 17th Cavalry, Aviation Brigade, 101st Airborne Division (Assault) at Fort Campbell, KY. Formal presentation of the award to CW3 Milligan for his individual contributions to Army aviation safety will take place during the AAAA Annual Convention, 23-26 April, in Louisville, KY.

Snug-up that nape strap

A recent Army Aeromedical Research Laboratory study inspected the helmet nape straps of 420 aviation personnel. About 40 percent of the straps were improperly adjusted. A loose nape strap could allow excessive forward rotation of the helmet during an accident sequence, exposing the head to serious injury.

A snug nape strap is essential to proper helmet fit, and proper fit is critical to maximizing the helmet's protective capabilities. A snug strap also improves the earcup seal, reducing noise bleed.

All aviation personnel should be sure to cinch both the chin strap and the nape strap before each and every flight.

Address any helmet-fitting question to alserp@rucker-emh2.army.mil or call DSN 558-6895/6893 (334-255-6895/6893).

Collision-avoidance systems

Two versions of Traffic Alert and Collision Avoidance Systems (TCAS) are in use by civil aircraft. TCAS-I provides only traffic advisories. TCAS-II, however, calculates the time and point of collision and directs the pilot to climb or descend to avoid conflict. This is the system used on airliners and other aircraft with more than 31 passenger seats. There have been several reports recently of such aircraft having to take evasive action as a result of their TCAS-II being activated by military aircraft.

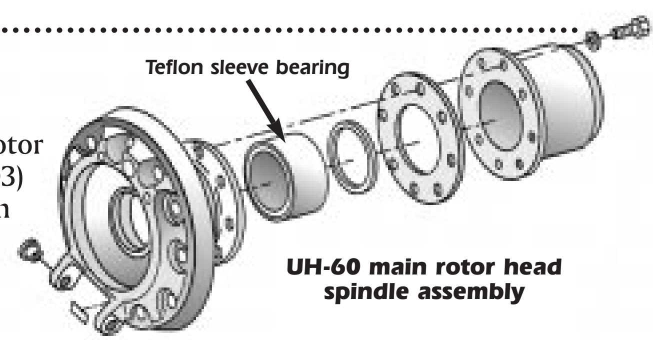
Except for takeoff and landing, most Army aircraft do not operate in the same flight realm as TCAS-II-equipped aircraft. Therefore, the probability of an Army aircraft activating this warning system is small. However, Army pilots must comply with the provisions of FAR 14 CFR 91.111: *Operating Near Other Aircraft*, which prohibits the operation of any aircraft—

- Close enough to another aircraft that it creates a collision hazard.
- In formation flight except by arrangement with the PC of each aircraft in the formation.
- In formation flight any time it is carrying passengers for hire.

Army flight crews must be familiar with the collision-avoidance systems in use and ensure that they maintain adequate separation from TCAS-II-equipped passenger-carrying aircraft.

—POC: Mr. William T. Harrison, U.S. Army Aeronautical Services Agency, Fort Belvoir, VA, DSN 656-4871 (703-806-4871)

Attention Black Hawk users



UH-60 main rotor head spindle assembly

According to the Jan/Feb 97 Black Hawk Newsletter, a main rotor spindle spherical elastomeric bearing (NSN 1615-01-374-7203) that was removed at phase had been installed without the teflon sleeve bearing. As a result, the spindle shank had rubbed the spherical bearing, causing considerable and expensive damage to both pieces. While there is no indication that this is a widespread problem, a couple of reminders couldn't hurt:

- Verify the presence of the sleeve bearing before installing the spherical bearing onto the spindle.
- Order spherical bearing NSN 1560-01-411-8452, P/N 70102-08200-050, which comes with the sleeve installed.

—POC: Mr. Joe Hoover, PM Utility Helicopters, DSN 693-0484 (314-263-0484)

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class D

F series

■ While hovering during live fire, rocket appeared to have hung fire in left inboard launcher tube. Rocket departed tube after about one second. Damage to rocket pod was discovered during shutdown.

Class E

F series

■ Aft fuel boost segment light came on in flight. Circuit breaker was pulled and aircraft returned to base. Light remained lit during 20-minute flight back to home base. Segment light went out after maintenance checked wiring harness on left side.

■ Pilot noticed object going under aircraft during approach to uncontrolled airport. Upon landing, crew found right ammo bay door open. Object pilot saw turned out to be a flight jacket that had been stored in ammo bay. Aircraft was not damaged.

■ Master caution and aft fuel boost segment lights came on during cruise flight. Maintenance replaced aft fuel boost pump.

■ Aircraft made uncommanded 90-degree left yaw while at a hover. Aircraft was controlled and turned back to original heading, then again yawed 90 degrees left uncommanded. Maintenance inspection revealed bad yaw transducer.

AH64

Class A

A series

■ Low-level flight of nine aircraft encountered bad weather at night and descended to maintain VFR. AH-64 struck wires at 70 feet agl. Crew sustained minor injuries.

Class C

A series

■ Aircraft settled about 15 feet while in battle position. PC established climb to altitude with no further incident. Postflight inspection revealed damage to all four tail rotor blades.

Class E

A series

■ Amber feed light came on during cruise flight. Crew accomplished inflight emergency procedures and returned aircraft to airport. While taxiing to parking, No. 2 engine flamed out. Normal shutdown was accomplished with no further incident. Maintenance could not duplicate incident. MOC accomplished and aircraft released for flight.

■ After departure while accelerating at 500 feet agl, torque symbology indicated 120 percent on pilot's helmet display unit and No. 2 engine tgt indicated 874°C on engine instrument console. Pilot continued forward flight and reduced collective. When No. 2 engine failed, pilot executed emergency engine shutdown and returned to home base without further incident.

■ On climbout from FARP, pilot in front seat (on controls) observed 190-percent torque on No. 1 engine and 48-percent torque on No. 2 engine. He reduced collective and attained single-engine airspeed. En route to suitable landing area, pilot observed No. 2 engine indications of 905°C tgt and 28-percent torque and retarded No. 2 power lever to idle. On short final, No. 2 engine-out caution light came on with corresponding engine-out audio sounding at 63-percent Ng. Pilot performed single-engine roll-on landing, after which crew detected fumes in crew station. Maintenance determined that No. 2 engine gas generator rotor failed. No. 2 engine was replaced.

■ During taxi to parking from refuel, No. 1 engine fire light activated and then went out. Smoke was seen coming from No. 1 engine, and aircraft was shut down. No. 1 engine primary exhaust had dislodged from engine.

CH47

Class B

E series

■ While conducting low-level NVG flight over uneven terrain, aircraft was inadvertently flown to the ground, ripping landing gear off. Aircraft was flown 1400 meters to suitable landing area and landed without further damage. Crew did not see approaching ground due to lack of visual cues.

Class C

E series

■ **Flight-related.** Soldier broke left leg and ankle upon landing during fast-rope training. He was wearing rucksack and landed with feet apart.

Class E

D series

■ Crew was delivering external load when ramp tongue separated from aircraft.

■ During straight and level flight for post-phase test flight, No. 2 engine transmission debris screen latch tripped on maintenance panel and would not reset. PC placed No. 2 engine ECL in stop position, and engine shut down. Single-engine roll-on landing was made without incident.

■ Master caution and No. 2 engine chip lights came on during runup. Attempt to reset was unsuccessful. Emergency procedures were accomplished and engine was shut down with no further incident. Engine replacement was recommended by AOAP.

OH58

Class C

A series

■ Crew reported loss of engine power at 15 feet agl during takeoff from field site. Aircraft landed hard, damaging landing gear and transmission isolation mounts. Investigation in progress.

■ Rotor blades struck tree during aerial recon mission at night. Crew was unaware of tree strike and noticed no damage during postflight. Blade damage was found during daylight preflight by another aircrew.

D series

■ IP was holding stationary hover OGE under NVGs while rated student pilot was setting up for simulated missile engagement. Aircraft drifted aft about 25 feet, and tail rotor contacted tree. Damage was found during postflight.

Class E

C series

■ During cruise flight, rotor rpm

indicated zero, audio alarm activated, and master caution light came on. Aircraft landed without incident, and maintenance repaired broken wire to cannon plug for dual tach.

■ Aircraft was at 1000 feet agl and 90 knots when fuel filter caution light flickered and then came on steady. After precautionary landing, maintenance released fuel filter differential pressure switch and aircraft was released for flight.

■ After landing at civilian airfield, PC noted altimeter read 100 feet lower than elevation. Aircraft was shut down, and altimeter was replaced.

■ During run-on landing, front crosstube failed on right front just above attachment point. Groundspeed at time of failure was less than 3 knots and aircraft had started the characteristic shudder as it started to come to a stop. Aircraft was shut down without incident. Fore and aft crosstubes and right skid were replaced.

UH1

Class A

H series

■ Aircraft crashed en route to remote training site at night. All three crewmembers were killed and aircraft was destroyed on impact. Accident is under investigation.

V series

■ During formation flight at 30 to 60 feet agl, Chalk 4 crew noted sparks coming from exhaust of Chalk 3. Chalk 3 descended into trees, killing one and injuring three. Accident is under investigation.

Class B

H series

■ Engine failed at 100 feet agl. During autorotation and upon contact with ground, main rotor blades contacted tail boom, and tail rotor separated. There were no injuries. Accident is under investigation.

Class E

H series

■ During before-takeoff hover checks, pilot noticed that cyclic was binding and hard to move with friction and force trim off. Aircraft was landed and mission canceled. Maintenance found that cyclic jackshaft bearings were dirty and dry. Bearings were cleaned and lubricated and aircraft released for flight.

V series

■ En route to training area at night, crewmembers heard loud report that seemed to come from rear of aircraft. Aircraft simultaneously yawed to right. Precautionary landing was made without incident. Cause unknown.

UH60

Class C

A series

■ Aircraft was ground-taxiing on ramp when main-rotor blades struck telephone pole. All four tip caps were damaged and required replacement.

■ During single-engine roll-on landing, rated student pilot touched down nose high, applied excessive aft cyclic, and reduced collective pitch. Main rotor blades contacted tail boom and severed tail rotor drive shaft.

Class E

A series

■ During cruise flight, crew detected odor of burning rubber or plastic. Windshield anti-ice was turned off and then on, and pilot's windshield anti-ice was determined to be faulty. A crack with burn signs was discovered at the bottom right corner of the pilot's windshield. Maintenance replaced windshield.

■ During postflight after NVG training flight, VHF/FM antenna was found to be broken in half and all four main rotor blades scratched. Suspect main rotor blades contacted antenna due to excessive aft cyclic application during approach to downslope area.

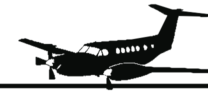
■ During runup, PC switched on fuel boost pump switch and No. 2 boost pump switch advisory light failed to illuminate. Maintenance replaced pressure switch after replacement of control panel didn't clear the problem.

■ During normal VMC takeoff, crew felt mild high-frequency vibration in airframe and pedals when passing through 55 KIAS and 600 feet agl. Pilot made precautionary landing, taxied to parking, and completed normal shutdown. Cause not reported.

L series

■ **Flight-related.** Aircraft was conducting external-load operations with an M119A1 howitzer. With hookup complete, aircraft ascended with sling leg caught on howitzer's breech assembly. As howitzer came off ground, it canted muzzle-down with its left wheel low. Howitzer was set down on its left side, damaging the M187 mount assembly.

C12



Class C

D series

■ Lightning struck aircraft in flight. Postflight inspection revealed that lightning struck left prop and exited through left outboard flap.

Class E

D series

■ When pilot applied power to taxi from ramp after passenger dropoff, he sensed that right-side tires were flat. He canceled the mission and shut down the aircraft. Maintenance replaced two tires on right side. Suspect extreme cold (-34°F) caused tires to go flat.

F series

■ White smoke exited engine cowling during No. 1 engine start procedure. Maintenance cited excess fuel in burner can, and fuel-clearing procedure was begun. After 10 minutes, start was attempted with auto ignition on. No ITT indication ensued. Check valve on fuel purge system was stuck open, allowing fuel to fill up pressure container; following start, fuel was blown back into engine, flooding igniters.

H series

■ No. 2 engine torque began uncommanded rise from 49 percent to 110 percent for 5 seconds. Tgt also increased to 820° for 5 seconds. Reduction of power had no effect. Engine was shut down and aircraft returned to base, where it executed single-engine landing without incident. Fuel control unit on No. 2 engine was replaced.

K series

■ Oil-pressure warning light came on in cruise flight, followed by loss of oil pressure on No. 1 engine. Crew shut down engine and got clearance to return to home station (closest facility). During before-landing check, they noticed nose-gear-unsafe indication. After several recycling attempts, gear indicated down and safe, and aircraft landed without incident. Maintenance found a crack in the oil-to-fuel heat exchanger and a loss of three quarts of oil. Heat exchanger was replaced.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-64-97-ASAM-04, 110905Z Feb 97, maintenance mandatory.
The No. 2L stringer on AH-64s with 1750 or more flight hours is susceptible to cracking. The purpose of this message is to direct a recurring preflight inspection of all AH-64s with 1750 or more flight hours before each flight unless a double reinforcement has been applied or the slot area has been closed. ATCOM contact: Mr. Howard Chilton, DSN 693-1587 (314-263-1587).

C-12-97-ASAM-01, 101909Z Mar 97, operational.
The FAA has issued airworthiness directives relating to aircraft icing. The purpose of this message is to identify changes required for operators manuals, provide recognition cues for flight crews, and to limit or prohibit use of various control devices in C-12 and other fixed-wing aircraft. ATCOM contact: Mr. Larry Nahlen, DSN 693-2046 (314-263-2046).

UH-60-97-ASAM-10, 121841Z Feb 97, maintenance mandatory.
Engineering testing has been completed and the retirement life for the Air Industries main support bridge (P/N 70400-08116-048) is reduced to 1400 hours. The purpose of this message is to annotate aircraft records to reflect the new requirement and require removal of any subject parts that have reached 1400 hours. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-60-97-ASAM-11, 281530Z Feb 97, maintenance mandatory.
Engineering testing has resulted in changes in retirement life of six-lug main rotor blade cuffs. The purpose of this message is to annotate aircraft records to reflect the new requirements. ATCOM contact: Mr. Dave Scott, DSN 693-2045 (314-263-2045).

Safety-of-flight message

C-23-97-SOF-02, 141938Z Feb 97, emergency.
C-23-97-SOF-01 grounded all C-23B(Plus) aircraft due to suspected defects in rudder and elevator skins. ATCOM has since determined the aircraft to be airworthy. The purpose of this message is to release all C-23B(Plus) aircraft for flight. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Safety-of-use message

SOU-ATCOM-97-03, 071619Z Feb 97, urgent.
The lack of standard rigid reach pendants for hookup of certain loads presents a hazard to personnel, lift helicopters, and the equipment being transported. The purpose of this message is to outline procedures to reduce the risks involved. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Maintenance-information messages

GEN-MIM-97-03, 051035Z Mar 97.
The purpose of this message is to advise aviation users of ATCOM's policy for corrosion prevention and control and use of specific corrosion preventive compounds. ATCOM contact: Ms. Gale Rahmoeller, DSN 693-5422 (314-263-5422).

OH-58D-MIM-97-02, 021120Z Jan 97.
The purpose of this message is to advise users of forthcoming changes to maintenance manual that will revise instructions for inspection/repair of Estane erosion strip. ATCOM contact: Mr. Dick Mooy, DSN 693-9315 (314-263-9315).

OH-58D-MIM-97-03, 111529Z Feb 97.
The purpose of this message is to advise users of changes to TM 55-1520-248-10 and TM 55-2840-256-23 concerning equivalent limits and nomenclatures between OH-58D and OH-58D(I) power turbine speed and main rotor speed limits. ATCOM contact: Mr. Jesse T. Gambee, DSN 693-9888 (314-263-9888).

IN THIS ISSUE

Class A Accidents

through February

		Class A Flight Accidents 96	Class A Flight Accidents 97	Army Military Fatalities 96	Army Military Fatalities 97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2		7	
3D QTR	April	1		3	
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	7	3	16	2

*Excludes 1 USAF pilot trainee fatality

U.S. ARMY SAFETY CENTER

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Thomas J. Konitzer
Brigadier General, USA
Commanding General

Flightfax
ARMY AVIATION RISK-MANAGEMENT INFORMATION
MAY 1997 ◆ VOL 25 ◆ NO 8
visit our web site ● http://safety.army.mil

One minute after takeoff, a Huey crashes. All three crewmembers on board are killed. There are no witnesses. How do we find out...

Answering the questions

Any time an aircraft crashes and there are no survivors and no witnesses, how can we ever know what caused the accident so we can prevent it from happening again? The Centralized Accident Investigation (CAI) approach is to examine all possible scenarios to determine the *most likely* cause of the accident. What follows is an example of such a case.

The accident

The mission was to conduct NVG navigation training at low-level, contour, and nap-of-the-earth (NOE) altitudes. The IP and two students were conducting their second NVG training flight. After a successful first period, they entered hot refuel, and the students changed places. About one minute after takeoff, as they made a left downwind departure from the LZ after refueling, the aircraft struck the ground in a left roll, nose-low attitude while traveling at 60 to 70 KIAS. All three crewmembers were killed.

The investigation

The IP was experienced, but he had only recently completed NVG MOI training and was beginning his third class as an NVG IP. The students were on their second NVG training flight, their first conducting terrain flight. The class was behind due to a period of bad weather, but there did not appear to be any undue urgency on the part of the crew.

The local weather update they got before departing their base field gave the crew the weather they needed to train for the entire flight period. As they took off from the LZ, they encountered the beginning of an unforecast inversion layer. While they didn't indicate any problems with the weather, other aircraft reported ground fog in the area several minutes before and 10 to 15 minutes after the accident occurred.

The crew was on the proper ground track for their departure from the LZ, and there was no evidence that they were attempting to maintain VMC flight in IMC conditions. There was also no indication that they were reacting to any onboard emergency at the time of the accident.

Evaluating the materiel condition of the aircraft was extremely difficult due to the extensive damage. However, intense laboratory examination determined that all major components were functional. There was no indication of any maintenance factor or materiel failure that could have adversely affected flight worthiness.

Consideration of these and other factors led to the conclusion that a combination of unforecast weather conditions and limited crew experience contributed to this accident.

It is probable that, while turning from their crosswind to downwind departure, the crew encountered flight conditions that degraded the performance of their ANVIS goggles. This, combined with their limited NVG experience, likely prevented them from recognizing the flight conditions they were encountering. While not "IMC," the inversion layer probably restricted their ability to identify ground references. It is suspected that they continued flight using degraded visual cues that caused them to falsely interpret their altitude and visible horizon. As a result, the crew became spatially disoriented and flew the aircraft into the ground.

What altered their cues and ability to detect hazards? Several factors can be identified: the beginning of ground fog, refraction of the IR searchlight, and a crew with little or no flight experience in these environmental conditions.

The controls

What can be done to prevent future accidents from the same or similar causes? Training, mission planning, and experience are key controls.

Extreme care must be taken when adverse environmental conditions are encountered during NVG operations. Pilots have to be aware that adverse conditions can reduce the effectiveness of their night-vision devices and create unsafe flight conditions. Good crew coordination between pilots can help less-experienced pilots in the identification of adverse conditions and how to properly react to them. Another control would be installation of a radar altimeter to assist the crew in maintaining a safe altitude in situations where visual acuity is reduced.

CAI: What it is, how it works

Safety investigations are done for accident-prevention purposes ONLY. There is no effort to establish accountability or fix liability—indeed, such efforts are explicitly forbidden by regulation.

Army accidents are investigated under a process that is unique to the Army: Centralized Accident Investigation, or CAI. Through this process, begun in 1978, the Army Safety Center heads the investigations of all Class A and selected Class B accidents (both aviation and ground) Armywide.

This doesn't mean that local installations and supported Army aviation units have no role in accident investigation. The Safety Center team, composed of a field-grade officer and a senior warrant officer, is supplemented at the local level by experts such as a flight surgeon, instructor pilots, maintenance officers, and technical inspectors. When needed, the team can also call in additional experts from outside agencies such as ATCOM, CCAD, and even equipment manufacturers.

The CAI process starts with a phone call. Safety Center investigators are on standby 24 hours a day for immediate deployment anywhere in the world. Arrangements between the Army Safety Center and the local unit are handled by the unit safety officer. He or she arranges for local Board members to supplement the CAI team and also arranges for other support such as personnel to search for missing parts of the wreckage or to crate exhibits for shipment to maintenance facilities or labs for analysis.

CAI provides many advantages, not only in determining what caused an accident but also in developing controls to help prevent future accidents from the same or similar causes. Among the advantages are the following:

■ **Professional investigators.** CAI teams represent many years of accident-investigation experience. Under systems where accidents are investigated at the local level, the chances of board members having any investigation experience are slim.

■ **Continuity and standardization in investigations.** A centralized process used over an extended period of time by full-time investigators establishes continuity and a base of institutional memory on which to draw. In addition, a standardized process of identifying the hazards that led to accidents produces more meaningful controls to prevent future accidents.

■ **Impartiality.** Because CAI investigators are not members of the accident unit, they are not influenced by the command and will not be personally affected by the findings and recommendations. This gives the Board the flexibility to look both objectively and subjectively at records, policies, procedures, and command environment. It also affords the Board freedom from repercussions as a result of identifying deficiencies in the chain of command.

■ **Timeliness and responsiveness.** After 7 to 10 days at the accident site, the Board reviews the evidence and develops tentative findings and recommendations, which they staff via phone with the Safety Center. Before leaving the site, the Board president briefs the local chain of command on the findings and recommendations developed up to that time. The team completes the formal report after returning to the Safety Center. If, at any point during the investigation, a safety-of-flight or safety-of-use issue surfaces, appropriate agencies are immediately notified and steps are taken to alert users Armywide. Subsequent actions may include issuance of a safety-of-flight or safety-of-use message or even DA-level action to ground an entire fleet of aircraft or restrict use of ground equipment Armywide.

When the unexpected happens

Dual engines have brought a safety margin to utility and attack helicopters that wasn't possible with single-engine aircraft. However, as mission demands expand, new equipment is added, and areas of operation and environmental conditions become more extreme, we may no longer have that single-engine capability.

Our missions today span from high-altitude operations in the mountains to low-level overwater flight at sea level, from the bitter cold of the Arctic to the heat of the desert. Have we done everything possible to make operating in these environments as safe as possible?

The mission is to attend a briefing at a field site in a high-altitude mountain environment for an upcoming mission. The temperature is 30°C. The mission helicopter is configured with external stores (i.e., wing tanks full of fuel, Hellfire racks, rocket pods). The aircraft is operating at maximum gross weight for the conditions. Twenty minutes into your flight, you are 50 feet above the ground at 100 knots and 100 meters shy of passing through a saddle in the ridgeline. The master caution light comes on, followed by an engine-out audio and associated caution lights. A quick scan of the instruments confirms the indications: one of your two engines has just failed.

What are you going to do?

Your performance planning indicates that you do not have single-engine capability under the current configuration.

Did you calculate when you would have single-engine capability? If you jettison the external stores, will you regain single-engine capability or just slow your rate of descent to the crash site? Have you allowed yourself enough altitude to react to the emergency? Can you jettison your external stores and start a deceleration to best-rate-of-climb airspeed before you impact the ridgeline?

Did your crew briefing cover in detail all actions required by crewmembers for this situation? Who will do the actual jettisoning of your external stores—and on what command? Was it discussed? Rehearsed?

During your risk analysis for this mission, what actions did you take to reduce the risk? Did your crew briefing include a higher altitude, one that would allow you more time to react to such an emergency? Did you review the height-velocity diagrams in the operators manual?

As part of your risk analysis and management, did you consider using more than one aircraft or make other arrangements for refueling to reduce the weight of the aircraft? Did you consider crew mix? Did the chain of command manage the risk by having it approved and briefed at the right level of command?

Had you been properly trained for this mission? Had the unit received prior mission training for this type of mission? Did your predeployment operations include emergency-procedure training in the SFTS in an environment similar to that you'd be operating in? Did it include operations with external stores attached? Had you been properly trained in emergency procedures with external stores?

Were you ready?

If you couldn't answer yes to all of the above questions, are you properly prepared to handle such a real-life emergency and the follow-on results of such a disastrous scenario?

Members of the accident-investigation board could now be standing on the side of that ridge, viewing the wreckage. They would be changing all the above questions into statements and adding them to the accident report as contributing factors to this accident.

This scenario could easily be modified to be an AH-64 crew moving forward to a battle position. The risk analysis and management, training, and crew-briefing considerations also may be applied to any other dual-engine operations.

Let's look down deep before we head out on a mission and evaluate it from top to bottom, assessing the hazards and the risks. We train real hard for the expected; now let's ask ourselves, "Are we properly trained and totally prepared for the unexpected?" Have we done everything to manage the risks and hazards associated with the mission? Are we doing our jobs or depending on two engines to do our jobs for us?

—CW5 Steve Meline, CW5 Ken Trampe, and CW4 Joe Gonzales, DES, Fort Rucker, AL, DSN 558-2442 (334-255-2442)

Inadvertent IMC: No "magic" altitude

In the "Crew Commo" section of the March *Flightfax*, one writer gave some personal philosophy on what to do if you encounter inadvertent IMC. While most of his recommendations were pretty good advice, the altitude of 1200 feet agl should not be looked at as a "magic" altitude. (See article on page 6 on determining proper altitude for IFR.) The writer correctly said, "Climb," and my discussion here is intended to emphasize the importance of knowing what to do and having the confidence to do it if you find yourself inadvertently on the inside of a cloud.

First, let's look at what our weather-related accidents tell us. During the last 10 years, Army aviators have experienced 24 Class A, B, and C IMC-related accidents, 21 (88%) of which happened at night. This shouldn't come as much of a surprise because you just don't see the weather as well at night as in the daytime—even with night-vision devices. In fact, with NVDs, it's possible to find yourself fully enveloped in visibility-reducing weather unless you occasionally check visibility with your unaided vision. Of the 21 night IMC accidents during the study period, 15 (71%) of the aircraft were using NVDs.

A disturbing but not surprising fact is that all but two of the 24 IMC-related accidents were Class A's. Fifteen of these 22 Class A's resulted in 56 fatalities. Now, I'm not including the last statement to shock you but to make the risk clear: *When an accident occurs as a result of inadvertent IMC, it typically results in fatalities.*

Analysis of the study accidents revealed several consistent factors. As already mentioned, the flight usually occurred at night and with night-vision devices. In addition, most of the aviators were slow to initiate a climb. The accident reports typically included verbiage such as, "The pilot failed to immediately execute inadvertent IMC procedures when he lost visual reference with the ground after flying into restriction to visibility." In many cases, the aviators descended—apparently attempting to regain VMC.

Another issue appeared to be a need to "accomplish the mission." Over and over, pilots pushed weather in an attempt to do so.

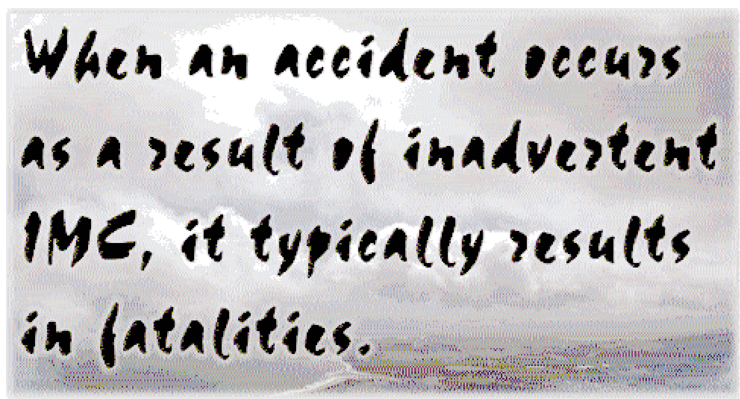
While not specifically addressed in every case, inadequate crew coordination also seemed to be a problem. In several of the cases, both pilots reported that they were attempting to look for VMC and not transitioning to the instruments and committing to IMC.

In many of the cases, ATC tapes indicate the aircrews were anxious and apprehensive. Physiological reactions to fear make concentration on appropriate flight instruments and flight procedures very difficult.

So what can you or your unit do to ensure you don't have one of these accidents?

First of all, no one knows your unit like you, your leadership, or your standardization and safety folks. Those are the people who can identify the most appropriate controls for the hazards I've discussed. Here are some additional ideas that may help:

■ Start with the unit SOP. What are the weather minimums for day and night operations? Are they a repeat of what AR 95-1 says? A prudent approach to establishing unit SOP minimums may be to evaluate aviator experience and proficiency levels in your unit. Don't just consider how many senior aviators you have assigned. What is the overall experience level for all assigned aviators? Are your minimums less than 300-½ day and 500-2 at night? If so, on what do you base that decision? Was the SOP written several years ago and not been changed?



■ Why would aviators be reluctant to commit to the instruments, climb, and execute an instrument approach? In all likelihood, the aviators just didn't have the confidence that they could contact ATC, get a clearance, and execute the approach while maintaining aircraft control. Units should ensure a good instrument training program is in place that is structured, not just simulator time or hood time to burn flying hours. A key objective should be aviator confidence. Individual aviators should also consider the reason for all the practice: To ***know*** you can execute any approach when you need to.

■ All aviators know what it is to "push the weather." What is an alternative? Teach aviators what weather conditions look like when there is 300-½ day or 500-2 at night under NVGs or whatever your SOP calls for. What are acceptable options if the weather starts to deteriorate? Turn around? Land? Unit leadership should be willing to accept that when the weather is below minimums, the mission must be delayed or modified in some way. ➢

■ Crew coordination in the accidents studied was very often missing because in the few cases that could be positively documented, both aviators were trying to see the ground instead of one person on the gauges and the other doing other things.

In the "3 C's" article that prompted these remarks, the writer's concern was that aircrews not try to reestablish VMC simply by descending. Rather than using 1200 feet agl as an altitude that "always works," use the VFR sectional and figure out how high to go. If you depart on a mission in marginal weather, have a detailed plan for each leg of your flight. Make sure all crewmembers are briefed and understand what they are supposed to do. Don't be reluctant to climb, contact ATC, declare an emergency, and get vectors to final for an approach that will get you safely on the ground. Yes, you may have to write a letter, but that is much better than the potential alternative.

—CW5 Bob Brooks, Aviation Systems Section, USASC, DSN 558-2845 (334-255-2845)

Minimum altitude for IFR operation

The article "The Three C's Still Work" in the March 1997 issue prompted me to an immediate response. Specifically, it says that, in the event inadvertent IMC is encountered, you are "perfectly legal" and safe to level off and cruise around IMC/IFR at or below 1200 feet agl in an attempt to remain out of controlled airspace.

FAR 91.3 states, "In an inflight emergency requiring immediate action, the pilot in command may deviate from any rule of this part (FAR Part 91) to the extent required to meet that emergency." I certainly consider unplanned IMC flight as an emergency. It requires an immediate action to include climbing into controlled airspace without a clearance if necessary to safely clear obstacles. You might have to submit a report in writing to the Administrator if asked.

In the event of inadvertent IMC, the appropriate Aircrew Training Manual (ATM) gives specific guidance—with one exception. What is an appropriate altitude? Many of the current ATMs still reference Vertical Helicopter Instrument Recovery Procedures (VHIRP), which no longer exist. This procedure through a letter of agreement with the controlling agency of the overlying controlled airspace of the training area, when activated, would assign an agreed-upon safe altitude if needed. There are no letters of agreement any longer. For this reason it is now the responsibility of flight crews to determine a "minimum altitude for IFR operation."

FAR 91.177 reads as follows:

> *Except when necessary for takeoff or landing, no person may operate an aircraft under IFR below:*
> *(1) The applicable minimum altitudes prescribed in parts 95 and 97 of this chapter, or*
> *(2) If no applicable minimum altitude is prescribed in those parts—*
> *(a) In the case of operations over an area designated as a mountainous area in Part 95, an altitude of 2,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or*
> *(b) In any other case, an altitude of 1,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown.*
> *However, if both a MEA and a MOCA are prescribed for a particular route or route segment, a person may operate an aircraft below the MEA down to, but not below, the MOCA, when within 22 nautical miles of the VOR concerned.*

So what's the minimum altitude for IFR operation? If you are established on a Victor airway, it's the MEA or MOCA, depending on the distance from the navaid. If you are on a direct leg of flight with prior planning, it's 1,000 or 2,000 feet, depending on nonmountainous or mountainous, above the highest obstacle within 4 nautical miles either side of centerline. So if this is unplanned IFR, you probably are not established on an airway, and I doubt you drew the course and determined the highest obstacle 4 NM either side of centerline; you probably will be happy to use an altitude that may be a little higher for safety's sake. If you are within 25 nautical miles of a navaid with a published approach, there will be a minimum safe altitude published in the plan view of that approach chart. If you are greater than 25 NM or you are not sure of the distance, the off route obstruction clearance altitude (OROCA) printed in large, light-brown numbers on the low-altitude en route chart will apply.

—CW5 Ken Trampe, SP/IE, DES, Fort Rucker, AL, DSN 558-3504 (334-255-3504)

What was that lat/long again?

When I deployed to Operation Joint Endeavor, I frequently flew into places accessible only by use of latitude and longitude waypoints. Since our aircraft were new and used the Global Positioning System (GPS) as our primary navigation system, it wasn't a problem—most of the time.

Like most systems, ours stores information internally until someone changes or deletes it. It was common practice to use stored information for current flights. There's nothing wrong with that IF the stored information is correct. However, it's not always.

Life was great flying in and out of Bosnia. No problems. One day, however, as I was approaching a key checkpoint—I thought—the controller asked if I was going to that waypoint. When I said that I was, he replied that he showed it 13 miles northeast of where I was. Since my equipment showed that I was almost there, I decided to check the lat/long information to ensure it was programmed right. It wasn't.

I had depended on someone else's work and lucked out with a high-altitude waypoint that wasn't going to run me into a mountain. You can bet I check my waypoint lat/longs now.

At lower altitudes, a one-digit change could be disastrous, even if it's the last digit in the latitude or longitude. The safety margins in Europe, especially in former Eastern Bloc countries, are not always what they are in the States. Minimal margins may not be met with that last number even one digit off. I didn't really appreciate that fact until I flew my first VMC approach into Sarajevo. After a couple of months of solid IMC approaches and breaking out at or near minimums, it was a real eye-opener seeing all those mountains for the first time!

Systems that update once a month by diskette, as ours do, also need double-checking. Sometimes the original programmed lat/longs are different from what is published on approach plates or en-route charts. I still find those on occasion. New units installed as replacements may not be initialized for your location, either. Be sure to check the initialization page when it's first turned on to verify the correct date, time, and location lat/long. An incorrect date or time may have the unit looking in the wrong part of the sky to find a satellite from which to navigate.

The point is this: Though GPS is a safe and accurate system, it's only as good as its programming—and YOU are the programmer. Verify, verify, and verify again.

—CW4 Keith Lane, ASO, 2d Battalion, 228th Aviation Regiment, Horsham, PA, 215-957-1378

STACOM

STACOM 169 ◆ May 1997

DES has become aware that some UH-60 IPs are initiating stabilator auto mode failures by manually slewing down the stabilator during flight. Doing so above 40 knots will exceed chapter-5 placard airspeed limits and could result in a hazardous flight situation. The next change to TC 1-212 (UH-60 ATM) will include the following procedure change:

"Simulated stabilator auto mode failures will be induced by momentarily placing the stabilator manual slew switch to the UP position or by using the cyclic slew-up switch. Instructor pilots must ensure that the stabilator moves up enough so the placard airspeed limits are not exceeded. At no time will the stabilator be slewed **DOWN** when the aircraft is above **40 KIAS** or to the **FULL UP** position in flight."

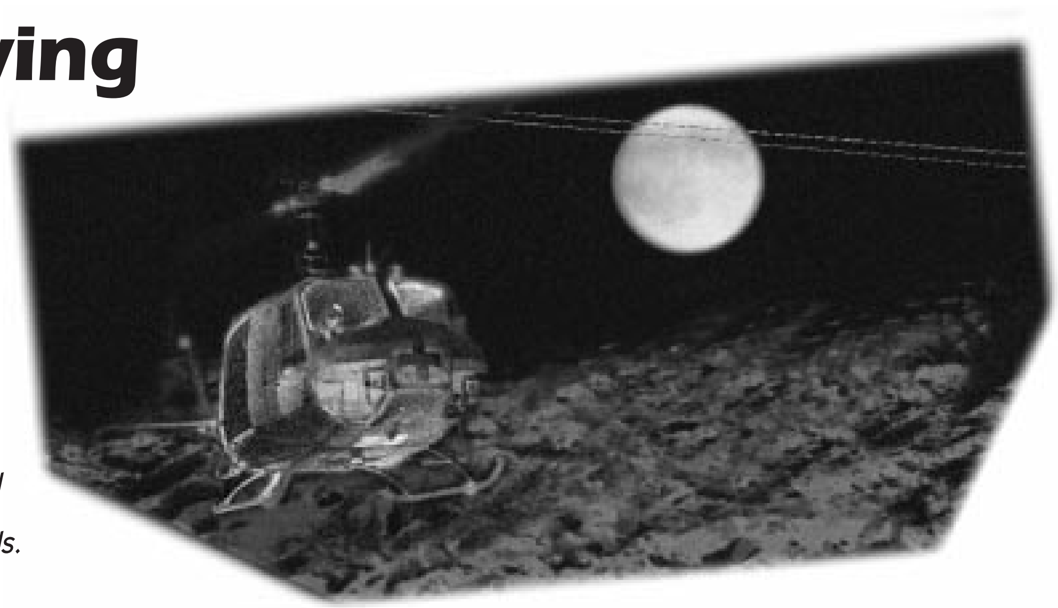
The above pertains to performing the procedure in the aircraft and does not restrict stabilator malfunctions in the UH-60 flight simulator.

—POC: Mr. Craig Cameron, DES, DSN 558-9029 (334-255-9029)

Standardization Communication ■ Prepared by the Division of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5208, DSN 558-2603/2442. Information published in STACOM may precede formal staffing and distribution of Department of the Army official policy. Information is provided to enhance aviation operations and training support.

Broken wing awards

The Army Aviation Broken Wing Award recognizes aircrewmembers who demonstrate a high degree of professional skill while recovering an aircraft from an inflight failure or malfunction requiring an emergency landing. Requirements for the award are in AR 672-74: Army Accident Prevention Awards.



■ *CW2 James L. Coxwell, Jr.*

82d Medical Company (Air Ambulance)
Fort Riley, KS

The mission was to conduct an NVG orientation flight for a flight medic and NVG navigation training for the copilot, a recent flight-school graduate with less than 30 hours of NVG time. Illumination was at 98 percent, and the moon angle was approximately 30 degrees above the horizon, causing the NVGs to darken when the moon was viewed directly.

CW2 Coxwell, the PC, was on the controls of the UH-1V at 90 feet agl and 45 KIAS when he felt the aircraft yaw left, then right, and noted a change in engine noise. A check of his instruments showed rotor rpm in the normal range and N2 at zero. Then the rpm warning light came on, the rpm audio sounded, and the engine chip detector and master caution lights also came on.

Realizing he had an engine failure at low level over hilly terrain, CW2 Coxwell reacted immediately, turning the aircraft to a heading of 330 degrees to clear a mountain upslope. He initiated an autorotation to the only available landing site—an open area with an 8-degree upslope, wires nearby, and a pond to the immediate rear. He had the copilot verify all instrument readings as he landed the aircraft with zero ground run on the uneven, rocky, uphill slope. The aircraft was not damaged, and no one was injured.

■ *Mr. Cortney J. Stratman*

160th Special Operations Aviation Regiment (Airborne), Fort Campbell, KY

The mission was low-level NVG navigation training with a rated student pilot in an MH-6C, a modified OH-6. Mr. Stratman, the IP, was on the controls when, at 400 feet agl and 100 knots, he felt a slight left yaw and noticed the N1 and N2 fluctuating. Being over rolling, tree-covered hills with few open areas, he made an immediate 180-degree turn back to an open field he had just passed. The flat, plowed, snow-covered field was surrounded by 80- to 100-foot trees. When N1 spooled down to 60 percent, he entered autorotation and retarded the throttle to idle. At 50 feet agl, Mr. Stratman began the deceleration. At this time the engine-out light came on, along with the engine-out audio. Just before application of initial pitch at 10 to 15 feet agl, Mr. Stratman saw a 5-foot-high fence directly to his front. He manipulated the controls to extend his glide in order to miss the fence and landed the aircraft without damage.

■ *CW2 Robert G. Wilkey*

1st Battalion, 14th Aviation Regiment
Fort Rucker, AL

CW2 Wilkey's mission was to conduct artillery gunnery training of a rated student pilot. The OH-58D(I) was loaded heavy with fuel and Hellfire and air-to-air stinger missiles. While hovering out of ground effect over a firing pad surrounded by trees, the aircraft exprienced complete hydraulics system failure and started descending and drifting backward in a nose-high attitude.

CW2 Wilkey immediately identified the problem and realized he would not be able to descend from his 60-foot hover to the pad below without damage and possible injuries. He was able to level the aircraft, began a climb, and maneuvered away from the impact area as soon as he was clear of obstructions. He then increased airspeed to a point where the aircraft became more controllable. He continued to execute emergency procedures, finally making a running landing without damage or injury at the nearest suitable airport.

Shortfax
Keeping you up to date

Nonalcoholic beer and flying

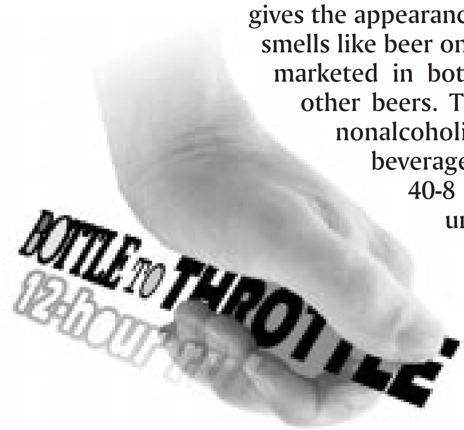
Every member of the Army aviation community is familiar with the old "12 hours bottle-to-throttle" maxim. Specifically, AR 40-8 restricts flying duties for 12 hours from the last drink and until no residual effects remain. Safety is the ultimate concern.

Over the last few years as drinking and driving has become socially, militarily, and legally unacceptable, nonalcoholic beers have hit the market. What are they? They are, in fact, beer—brewed, fermented, malt beverages. However, "nonalcoholic" is a misnomer; the brew is ***low*** alcohol, not ***no*** alcohol.

The average nonalcoholic brew contains 0.5 percent ethyl alcohol, compared to 5 to 7 percent (and occasionally more) in traditional beer. Because it is required by law to be labeled, nonalcoholic beer is classified as an alcoholic beverage.

This brings up the question of Army aviation policy regarding nonalcoholic beer. The Aeromedical Consultants Advisory Panel of the Army Aeromedical Center at Fort Rucker reviewed information on nonalcoholic beer, including "perception" issues. Under AR 600-85, Army Drug and Alcohol Prevention and Control (ADAPC) does not differentiate nonalcoholic from alcoholic beer; rather, beer is beer. As noted earlier, nonalcoholic beer does have some alcohol content, albeit a very small amount. And then there is the "perception" issue to consider. A person drinking nonalcoholic beer gives the appearance of drinking beer, nonalcoholic beer smells like beer on the breath and on clothing, and it is marketed in bottles and cans that are identical to other beers. Therefore, the aeromedical policy on nonalcoholic beer is that it is an alcoholic beverage. The medical recommendation in AR 40-8 of 12 hours from the last drink and until no residual effects remain will not be altered for nonalcoholic beer.

"Twelve hours bottle-to-throttle" remains the rule.



—LTC Wallace Seay, Chief, Aeromedical Education Branch, U.S. Army School of Aviation Medicine, Fort Rucker, AL, DSN 558-7461 (334-255-7461)

Testing of grounding points

FM 10-68 requires that all hangar and flight-line grounding points be inspected and ohms-tested annually or whenever there is a possibility of mechanical damage. However, this requirement will change in the near future when FM 10-68 is superseded by FM 10-67-1. The new manual will change the ohms-testing requirement from once a year to once every 5 years. All other inspection criteria will remain the same.

The new FM is scheduled for fielding by the end of the year. Until then, users have two options: adhere to FM 10-68's annual requirement or file a Memorandum for Record stating that the soon-to-be-released FM 10-67-1 requires testing of grounding points every 5 years.

—MSG Eddie Davis, USASC, DSN 558-3650 (334-255-3650)

UH-60 survey

The U.S. Army Aviation RDEC Aerodynamics Directorate (AAFD), with support from the U.S. Army Aeromedical Research Laboratory, is conducting research to identify engineering changes that could reduce the risk of pilots reacting improperly to single-engine emergencies in dual-engine aircraft. AAFD has developed a survey questionnaire designed to evaluate cockpit pilot vehicle interface issues associated with single-engine emergency procedures (SEEP) based on human-factors criteria. The survey is being sent to all Active Army and National Guard UH-60 units.

POC: Dr. C.A. Simpson, Army Aeroflightdynamics Directorate (AMSAT-R-AB), 415-604-5096, seep@merlin.arc.nasa.gov

ACM: The continuing saga...

You may recall my article in the August 1996 Flightfax that talked about some of the rescue, recovery, and investigation concerns about advanced composite materials (ACM). Well, I received many calls with comments, requests for additional information, and constructive criticism, so I felt compelled to share some of this with you.

I received many requests for SOPs. I have to tell you that there's no existing SOP that you can adopt outright; however, the article contains all the pertinent procedures and policies that you can format to suit your unit and mission. Feel free to plagiarize my article for this purpose.

One correction concerns the handling and disposal of debris. Do not automatically assume that burned composite debris is nonhazardous. Before you allow unprotected personnel to handle or dispose of burned composite materials, consult the local environmental office.

A second issue that begs clarification concerns the application of a fixant to burned debris and the wearing of respiratory protection. Contrary to the original article, ***a respirator is warranted, even after a fixant has been applied, until vapor or mist generation is no longer a concern.***

Thanks for the calls and recommendations.

—MAJ Paul Nagy, USASC Operations Officer, DSN 558-2539 (334-255-2539)

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class E

F series

■ Master caution, alternator, and rectifier lights came on and SCAS channels disengaged during OGE hover check. Aircraft was hovered a short distance to parking after unsuccessful attempts to reset alternator switch.

■ During preflight, hydraulic fluid was found leaking from No. 3 reservoir. Maintenance found a stone-like pellet lodged in the valve between the No. 2 and No. 3 hydraulic systems.

AH64

Class C

A series

■ At 30 feet agl and 15 KIAS during terrain-flight takeoff over a 15-foot berm, No. 1 engine quit due to catastrophic failure of GG rotor section. Without sufficient altitude remaining to fly through minimum single-engine airspeed, aircraft landed 123 feet forward of the berm. The aircraft sustained no airframe damage, but crew could not determine maximum torque applied to and temperature of No. 2 engine during descent. As a result, overtemp/overtorque of No. 2 engine and overtorque of drive components are suspected.

■ **Aircraft-ground accident.** During runup, power levers were advanced to FLY. At about 89-percent Np/Nr, maintenance test pilot felt a shudder and retarded power levers to idle. All indications were normal, and a normal shutdown was completed. Postflight inspection revealed significant foreign-object damage to No. 4 tail-rotor drive shaft next to utility hydraulic manifold and surrounding components.

Class E

A series

■ On final approach at night, collective in both crew stations suddenly became very loose. IP landed aircraft without incident. Cause not reported.

■ During refueling with No. 2 engine off, aft fuel tank started to overpressurize. Refueler had completed fueling aft tank and was starting to fuel forward tank when aft tank began to vent overboard from the overflow vent. Refueler signaled aircrew, who shut down aircraft with no further incident. Inspection revealed failure of NIU check valve and aft tank pressure-relief valve.

■ During OGE hover at 300 feet agl, pilot saw an 8- to 12-percent torque differential between No. 1 and No. 2 engines. He immediately accelerated through single-engine airspeed and landed without incident. Maintenance replaced electrical control unit, performed operational checks, and released aircraft for flight.

■ During departure from range at night, No. 1 nose gearbox oil hot and chip lights came on at 100 feet agl and 40 knots IAS. After identifying and having CPG verify power lever No. 1, pilot pulled it to idle. Maintaining approximately 100-percent torque single-engine, he climbed to 3700 feet msl and flew without incident to destination. Cause not reported.

■ During preflight, pilot found that cooling fan in aft avionics bay would not spin freely. Maintenance replaced fan and submitted QDR.

■ During taxi after landing, crew smelled hydraulic oil. Utility hydraulic psi light came on and psi gauge read zero, followed by utility low light. Postflight inspection found utility hydraulic line in catwalk area had blown out middle. Line was replaced.

CH47

Class B

D series

■ **Aircraft-ground accident.** About 5 hours after being parked on the frozen ground of an LZ, one CH-47D slid 150 feet down slight incline and banged into another. The aft pylon of the sliding aircraft was damaged, as was the No. 2 engine and mounts of the stationary aircraft.

Class C

D series

■ Two blades of forward rotor system struck drogue during aerial refueling with MC-130. Aircraft landed at nearby airport without further incident. Inspection revealed damage to both red and yellow forward blades.

■ **Flight-related.** At 50 feet agl on short final, load consisting of 30kW generator and water purifier fell to the ground. Cause unknown.

■ During run-on landing to unimproved, snow-covered strip at night, aft rotor system contacted tree. All aft main rotor blades were damaged.

■ No. 2 engine failed at 1000 feet agl at 120 KIAS. Aircraft continued to descend despite attempts to maintain flight, and rotor rpm continued to decrease. During landing to plowed field, aircraft bounced, landing nose-gear first. Chin bubbles and antennas were damaged.

Class E

D series

■ Oil was seen leaking from aft transmission area during refueling. Packing in aft transmission auxiliary oil pressure switch was replaced.

OH6

Class C

J series

■ During landing on high-gross-weight training mission, aircraft sustained engine overtorque by 2.8 psi (over 84-psi max).

■ On go-around for landing during high-gross-weight training, aircraft sustained engine overtorque by 5.6 psi (over 84-psi max).

OH58

Class B

D series

■ During power recovery after simulated engine failure at altitude, aircraft regained insufficient (50%) engine power. Aircraft settled to ground, rocked forward (damaging chin bubbles), then rearward, at which time main rotor blades severed tail boom.

Class C

D series

■ During approach to assembly area after departing FARP at night under

NVGs, crew realized they were descending on a tent. During left turn to avoid the tent, aircraft began settling with power. As power was applied to arrest descent, aircraft experienced MAST overtorque to 102 percent and engine overtorque to 132 percent.

■ Crew was conducting simulated engine failure. Upon termination with power, aircraft touched down and became airborne again, rotating 240 degrees to the right before coming to rest upright. Landing gear was damaged, as was airframe in vicinity of left aft landing gear mount.

A series

■ During confined-area takeoff from field site with three personnel on board, aircraft was unable to sustain flight at 40 KIAS. Aircraft descended into rice paddy, rocked 180°, and came to rest upright. Main rotor blades struck tail boom and windscreen, damaging all three components.

Class E

D series

■ Total electrical failure occurred when IP switched on No. 1 battery switch (No. 2 was off) for charging. Engine supervisory control defaulted to the high side, and manual operation was required to maintain Nr and Np in normal ranges. Crew initiated proper emergency procedure and landed at airfield without incident.

UH1

Class E

H series

■ Engine chip-detector light came on during climb to cruise altitude. PC landed aircraft in field. Cause not reported.

■ Crew heard muffled pop during straight and level flight at 110 knots and 44 psi torque. Ten to fifteen seconds later, crew noted engine oil pressure gauge decreasing through 45 psi, followed shortly by master caution and engine oil pressure segment lights. Engine torque gauge dropped to zero during the 4-mile flight to landing site, where aircraft landed without incident. Cause of problem not reported.

■ Master caution and DC generator segment lights came on during cruise flight. Maintenance replaced voltage regulator.

V series

■ During crosswind turn after takeoff, pilot noticed antitorque pedals required unnatural force to keep aircraft in trim. He returned to airfield and landed without incident. Maintenance found a racheting bearing on a bellcrank for the antitorque pedals.

■ Cyclic control began to pull to the right forward quadrant with increasing force during cruise flight. Aircraft was landed at next intended way-point. Cause not reported.

■ Master caution and engine chip lights came on during level-off check, and aircraft returned to airfield. Maintenance pulled engine chip plug and found it covered with flakes and slivers. Category I QDR was submitted.

UH60

Class C

A series

■ Main rotor blades contacted side of 45-degree slope during troop insertion at night under NVGs. Two blades sustained damage requiring depot-level repair and all four tip caps required replacement.

■ Crew was conducting training flight with secondary mission to determine whether master caution light would illuminate while panel lights were in dim mode. Crew had performed decelerations in attempts to illuminate the master caution light. During terrain flight deceleration at 125 feet agl and 95 KIAS with aircraft in 15-degree nose-up attitude, nose cowling opened. Crew landed in field, assessed damage, and secured cowling. Aircraft returned to home station without further incident.

L series

■ Suspect that main-rotor blades contacted tree during confined-area operations at night under NVGs. All four tip caps were damaged.

Class E

A series

■ Aircraft turned right when PC applied left pedal during maintenance test flight. More left pedal was applied, but aircraft did not respond appropriately. Inspection revealed that the pressure and return lines on the tail-rotor servo had been reversed.

■ Slight oscillation was observed periodically on No. 1 engine during maintenance test flight. After a few minutes, full oscillation was observed. Crew executed emergency procedures, and the aircraft landed safely. Maintenance determined that ECU failed. It was replaced and the aircraft released for flight.

■ Postflight inspection revealed damage to tail rotor drive shaft cover, which had been left unsecured.

■ **Flight-related.** During ground taxi, a tiedown chain that had not been removed from the cargo hook became caught in the hook. It pulled a tiedown anchoring point from the ground as it brought the aircraft ground taxi to a halt. The crew chief removed the chain from the hook, inspected the aircraft, and noted no damage.

■ Stabilator failed the self-test during runup. Runup sequence was aborted. Maintenance replaced air data transducer.

■ Crew noticed aircraft leaning to left during runup. Crew chief inspected right drag beam and found that it was cracked. The drag beam was replaced, and aircraft was released for flight. QDR was submitted.

C12

Class E

C series

■ Pilot felt bumpy feedback and sluggishness in rudder pedals during taxi from ramp to taxiway. A look in nacelle-mounted mirror revealed flat nose-gear tire. Nose wheel was replaced.

D series

■ When gear handle was selected down during approach, nose-gear indicator showed unsafe. PC performed emergency gear extension and aircraft was landed without further incident.

■ When gear handle was selected to up position during climb after departure, gear remained down with transit light in gear handle illuminated. PC cycled the gear handle down, then up, and gear retracted. PC then placed gear handle down, and gear went down with a safe, down and locked indication. Aircraft was landed with no incident.

R series

■ No. 1 torque gauge dropped to zero during downwind for landing. All other instruments were normal. After uneventful landing, maintenance reseated connector to torque gauge, correcting the problem.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-1-97-ASAM-02, 211335Z Mar 97, maintenance mandatory.
An inflight fire on a UH-1 has been determined to have originated from a cracked high-pressure fuel fitting. Both UH-1 and AH-1 helicopters use this fitting on the T53 engine. The purpose of this message is to require one-time replacement of the aluminum high-pressure fitting with a stainless-steel fitting. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

C-12-97-ASAM-02, 021555Z Apr 97, operational.
A software problem exists in the AN/ASN-149(V1) global positioning system receiver that manifests itself as a control display unit lockup whenever the receiver is tracking satellite PRN 30, which, for most of the world, is visible twice daily for about 4 hours each time. The purpose of this message is to inform users of the problem and to outline partial work-around procedures to resolve the problem. ATCOM contact: Mr. Mike Heard, DSN 693-1591 (314-263-1591).

CH-47-97-ASAM-04, 131514Z Mar 97, maintenance mandatory.
Hydraulic check valve, P/N 4C3074, manufactured by Crissair, Inc. may have a rivet missing from its poppet. The purpose of this message is to require replacement of the old three-piece configuration of the 4C3074 Crissair check valve with the current improved one-piece design. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

CH-47-97-ASAM-05, 131508Z Mar 97, maintenance mandatory.
There have been three reported instances of AN320-12 castellated nuts found cracked. The purpose of this message is to require inspection of forward and aft rotor system and controls installations and replacement of AN320-12 castellated nuts that have a capital-G vendor identification impression stamp. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

CH-47-97-ASAM-06, 021555Z Apr 97, operational.
See C-12-97-ASAM-02 above.

OH-58-97-ASAM-01, 281600Z Mar 97, maintenance mandatory.
In 1996, a power-off-maneuver restriction was imposed based on incidents involving actual engine failure during the power-recovery transition of a simulated forced landing. The purpose of this message is to remove that restriction from all aircraft after installation of the latest configuration fuel control that has the internal orifice removed. ATCOM contact: Mr. Robert Brock, DSN 693-1599 (314-263-1599).

UH-1-97-ASAM-02, 131315Z Mar 97, maintenance mandatory.
Past practices that configured UH-1H/V aircraft for NVG compatibility included various methods of reducing glare from external navigation and position lights. The purpose of this message is to require a one-time inspection of the position lights and removal of any materials that obscure normal operation of the lights. ATCOM contact: Mr. Bob Brock, DSN 693-1599 (314-263-1599).

UH-1-97-ASAM-03, 211335Z Mar 97, maintenance mandatory.
See AH-1-97-ASAM-02 above.

UH-60-97-ASAM-12, 101220Z Apr 97, informational.
Safety-of-flight message UH-60-96-02 (252130Z Nov 95) removed from service the tail inboard retention plate (P/N 70358-06612-042) made by Fenn Manufacturing Company (cage code 82001). The purpose of this message is to rescind SOF message UH-60-96-02. Results of engineering testing indicate that this part has successfully completed fatigue testing and is now acceptable for use to the published service life of 12,000 hours. ATCOM contact: Mr. Dave Scott, DSN 693-2045 (314-263-2045).

IN THIS ISSUE

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Class A Accidents

through March

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3D QTR	April	1		3	
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	**7**	**5**	**16**	**3**

*Excludes 1 USAF pilot trainee fatality

U.S. ARMY SAFETY CENTER

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Thomas J. Konitzer
Brigadier General, USA
Commanding General

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ARMY AVIATION
RISK-MANAGEMENT
INFORMATION
JUNE 1997 ◆ VOL 25 ◆ NO 9
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They SHUT DOWN the WRONG ENGINE!

On a clear night, two UH-60s were flying over water along a coastline. About 15 minutes into the flight, the crew of the trail aircraft radioed Chalk 1: "Hey, guys, your number-two engine is on fire!" They received no reply, but they watched as Chalk 1 immediately turned toward shore. Shortly thereafter, descending at 1200 feet per minute, Chalk 1 hit the water at 214 knots, appeared to explode, and sank. All four crewmembers died instantly. This tragedy was the result of the crew's mistaken reaction to a single-engine emergency: gas-generator turbine failure on the No. 2 engine. Their mistake?

Why?

As a result of this accident, the U.S. Army Aeromedical Research Laboratory (USAARL) undertook a study to determine whether pilots' reactions to single-engine emergencies in dual-engine aircraft are a systemic problem and whether the risks of such actions can be reduced. The goal of what has become popularly referred to as "The Wrong-Engine Study" was to examine errors that trigger pilots to shut down the wrong engine during such emergencies.

A two-part study was used to determine the extent and possible causes of errors made in response to single-engine emergencies.

Part I: Field survey

USAARL and the Army Safety Center jointly developed a survey that would determine how often the errors of interest occurred but were detected and corrected before they caused an accident. The survey was mailed to all brigade safety officers and medevac units down to company level with instructions to distribute copies to all dual-engine aviators. Participation in the survey was voluntary.

Of a target population of about 4100 aviators, at least 350 responses were required for a reliable sample. Nearly twice that many—676—were returned, all of which were included in the analysis.

Two questions yielded particularly important insight into the problem:

- Do you believe there is a potential problem of shutting down the operating engine during a single-engine failure/malfunction?
- Have you ever moved or started to move the wrong power-control lever during a simulated or actual emergency?

Just over 70 percent of the pilots surveyed believe there is a potential problem of shutting down the operating engine in a single-engine emergency. In response to the second question, 39 percent affirmed that they had confused the power-control levers during simulated or actual emergencies. Nearly half of those (18% of the total) had actually shut down the "good" engine or moved the power-control lever.

The survey also asked pilots who had experienced confusion with the power-control levers to indicate what caused them to move the wrong lever. Nearly half of these aviators (111 of 224) indicated that their action was preceded by an improper diagnosis of aircraft condition. Other reasons given included design of the PCL (13), design of the aircraft (19), use of NVGs (10), inadequate training (34), negative habit transfer (10), hurrying (23), and inadequate written procedures (4).

As to the question of how to prevent aviators from shutting down the wrong engine, 75 percent of those responding recommended training solutions, while the other 25 percent recommended engineering fixes. Recommendations with a response frequency greater than five are shown in table 1.

Table 1. Aviator recommendations

Training

- Improve Aircrew Coordination Training (129)
- Increase requirement for emergency-procedures training in simulator (96)
- Increase individual-proficiency training (79)
- Increase malfunction-analysis training (29)
- Changes to –10 (11)
- More detailed systems knowledge (11)

PCL design

- Label and illuminate (80)
- Change spacing/angle (25)
- Shape code knobs (15)

Aircraft design

- Master warning lighting (15)
- Electric stop based on engine parameters (8)
- PCL audio "1" or "2" (5)

Behavior

- Slow down; stop hurrying (80)
- Think (27)
- Don't touch PCLs for single-engine emergencies (22)

Part II: Flight-simulator study

Flight simulation was used to observe pilots in artificial emergency situations. Resulting data helped identify procedural and design modifications that could help reduce the risk of shutting down the wrong engine during single-engine emergencies.

The only inclusion criterion for the simulator study was that all subjects must be qualified in the UH-60. Informed consent was not required as the experiment involved "normal training or other military duties as part of an experiment wherein disclosure of experimental conditions to participating personnel would reveal the artificial nature of such conditions and defeat the purpose of the investigation" (USAMRDC Reg 70-25).

Initial estimates called for 500 aviators (250 two-pilot crews). However, due to normally scheduled training, some aviators were observed on more than one occasion. Altogether, the 272 two-pilot crews observed included about 450 aviators.

There was no direct interaction with the subjects nor interference with their normal training. Subjects were briefed as usual by a rated aviator (usually the simulator operator or instructor pilot) on the mission profile to be flown and were required to conduct all preflight planning. Following the preflight briefing, the subjects entered the simulator and completed a 2-hour training flight. During the flight, the simulator operator exposed the crew to at least one of six randomly assigned conditions (engine fire, engine failure, high speed shaft failure, compressor stall, or torque split high and low side failures) that called for employment of single-engine emergency procedures. In addition, a failure presenting false indications of engine failure (an engine-out light and audio warnings associated with an alternator failure) were assigned at random to some subjects. Subjects' reactions to these conditions subsequently were analyzed to examine their information-processing and decision-making skills under simulated emergency conditions.

Results were that 15 percent of the participants in the simulator study reacted erroneously to the selected emergency procedures. One out of four of those erroneous reactions resulted in dual-engine power loss and simulated fatalities. Analysis of pilot reactions to indications of engine failure points to problems with the initial diagnosis of a malfunction (22 of 47) and errors in actions to correct the problem (15 of 47). Other errors included failure to detect cues arising from changes in the system (3), failure to choose a reasonable goal given the circumstances (for example, try to get home vs. land immediately) (2), and failure to execute proper procedures (5). The severity of these errors ranged from immediately realizing and correcting the mistake with no impact to actually shutting down the "good" engine, resulting in loss of the aircraft.

Conclusions

The bottom line is that malfunctions that call for employment of single-engine emergency procedures are relatively rare events. However, such situations produce a one-in-six chance that the pilot will respond incorrectly to the emergency.

The study identified training measures to reduce this identified risk. In his 7 March 1997 message to aviation commanders, the Aviation Branch Chief outlined actions the Army Aviation Center (USAAVNC) has taken to implement these recommended changes in the training arena:

■ **Increase aircrew coordination training.** USAAVNC is rewriting affected ATMs to ensure they adequately cover all single-engine failures and malfunctions and more strongly emphasize crew coordination.

■ **Expand school training on correct engine malfunction analysis and emergency procedures.** During academic portions of courses at USAAVNC, the GG-rotor problem is highlighted during the engine systems class and engine malfunction analysis class. In flight phases, the GG-rotor problem is addressed during the contact phase of training. Engine malfunction analysis is stressed, and the "two-pilot" mentality and crew coordination are emphasized.

■ **Increase simulator training with emphasis on malfunction analysis and emergency procedures to include all engine malfunctions associated with single-engine failures.** In the simulation phases of courses at USAAVNC, engine malfunction analysis is stressed, emphasizing correct identification and crew coordination before pilot action. In addition, iterations of engine malfunctions have been increased.

■ **Revise -10 and checklist emergency procedures to remove ambiguity and stress control of the aircraft and time allowed for reaction.** USAAVNC reviewed emergency procedures in all multi-engine helicopter operators manuals to ensure compliance with GG-rotor messages and "Wrong-Engine Study" recommendations. Changes to UH-60 and AH-64 operators manuals will be fielded as manual revisions within 90 days. Several of the changes will emphasize that the most important single consideration is helicopter control and that all procedures are subordinate to this requirement.

■ **Increase individual aviator proficiency training.** The Aviation Branch Chief requested the assistance of field commanders in this area: "Although we have applied risk-control measures to our manuals and to the way we train in the schoolhouse, I need your help in increasing individual proficiency training. The AH-64 combat mission simulator and the UH-60 flight simulator are cost-effective platforms to conduct the application and correlation levels of learning. During each simulator period, recommend you conduct at least one iteration of all engine malfunctions associated with single-engine failures, with emphasis on helicopter control, correct identification of engine malfunctions, and emergency procedures and crew coordination. The Division of Evaluation and Standardization will continue to emphasize performance planning, crew coordination, risk analysis, and single-engine emergency procedures on all field evaluation and assistance visits."

In addition to these training measures, further research is being conducted to identify possible engineering changes that could reduce the risk of pilots reacting improperly to single-engine emergencies in multi-engine aircraft.

—CPT Robert M. Wildzunas, Ph.D., USAARL, Fort Rucker, AL, DSN 558-6879 (334-255-6879)

NOTE: UH-60 GG-rotor work was completed on 17 March 1997. The Black Hawk PM is working with the Apache PM to assist with the AH-64 GG-rotor program. The UH-60 POC is Mr. Dave Lizotte, 314-263-0485; AH-64 POC is Mr. Bill Reese, 314-263-6794.

Update of Brigade ASO Conference issues

What follows is an update on the status of issues discussed during the January 1997 Aviation Brigade Safety Officer Conference held at Fort Rucker. Watch for future updates in *Flightfax*, on ASOLIST, and on the USASC Bulletin Board. POCs for questions or comments are CW5 Bob Williams at the Aviation Branch Safety Office, DSN 558-3000 (334-255-3000), and CW4 Lee Helbig at the Army Safety Center, DSN 558-2381 (334-255-2381).

Issue 1: Standardized procedures for joint/multinational (combined) operations. FORSCOM has the lead on developing a standardized SOP for joint/multinational operations. At the Army level, FM 100-5 provides standard doctrine for both joint and combined operations. TRADOC has proponency for integration of risk management into FM 100-5. At the Aviation Branch level, standardized doctrine for joint/multinational operations is in FM 1-100: *Aviation Operations* and 100-series TTP manuals. The USAAVNC Directorate of Doctrine, Training, and Simulation (DOTDS), in concert with the Aviation Branch Safety Office (ABSO), has the lead for integrating risk management into aviation FMs.

Issue 2: Development of exportable risk-management training and status of aviation safety NCO qualification training. The Army Safety Center has developed two training support packages (TSPs) for risk management. Available today is the TSP for leaders at company and platoon level. Very soon, a TSP for battalion and brigade commanders and staff will be available. Although currently in hard copy only, the intent is to provide the TSPs on CD and through the USASC Bulletin Board. Aviation safety NCO qualification training has been curtailed by the Safety Center due to funding constraints. The Army Safety Center is working with the Aviation Branch to incorporate aviation-specific NCO safety tasks into aviation NCOES.

Issue 3: Status of AR 385-95. The Commanding General of the Army Safety Center has approved the fielding of AR 385-95 as a separate regulation. A working group consisting of USASC and USAAVNC personnel are updating the 1995 draft and expect to have a staffing document completed by the end of FY 97. The new AR focuses on integrating the risk-management process into aviation command, staff, and unit functions, eliminating requirements proven to be of little value to accident prevention, and expanding guidance on management of a unit aviation safety program. Expect this new AR to clear up several issues discussed during the Conference, including—

- Clarification of the ASO/commander relationship.
- Added emphasis on continuing education for ASOs.
- Expanded crew-endurance guidance based on USAARL studies.
- The requirement for a Commander's Accident Prevention Plan.
- Clarification of requirements for Reserve Component units/facilities.

Issue 4: Changes to DODI accident-classification criteria. There is no current DA initiative to change the DODI criteria.

Issue 5: Consolidation of aviation regulations/publications onto CD ROM. The USAAVNC DOTDS has the lead on this issue. Within the next 2 years, all new aviation doctrinal publications will be available on CD ROM and on the Fort Rucker Home Page (http://www-rucker.army.mil). Currently, many aviation doctrinal publications can be accessed in the Army Digital Library through the Army Home Page (http://www.army.mil).

Issue 6: Electrical grounding and bonding procedures differ among MACOMs. This issue exists because the proponent of FM 10-68 proposed changes that some MACOMs acted on and some did not. The new FM 10-67-1, which should be fielded by September 1997, will supersede FM 10-68 and clarify the requirements for grounding and bonding aircraft and refueling vehicles. Until the new FM is fielded, comply with your MACOM's interim directives or FM 10-68 as applicable.

Issue 7: Protection of aircraft crash sites from hazardous materiel. The current DA Pam 385-40 (para 2-2b(2)) addresses the need for preaccident plans to provide procedures to protect personnel from hazardous materiel.

Issue 8: 12th Edition Guide to Aviation Resources Management vs. a DA-level checklist. The development of a DA-level checklist for aviation accident prevention surveys has been declined by the USAAVNC Directorate of Evaluation and Standardization (DES). Therefore, the ABSO will update the "Guide" and field it in FY 98 as the 13th Edition.

Issue 9: The effect of elimination of MIL STD 980 on aviation unit FOD-prevention programs. Unit FOD-prevention programs are not affected by elimination of this MIL STD. Aviation unit FOD-prevention programs are as specified in AR 385-95.

Issue 10: All aviation intermediate maintenance (AVIM) units do not have TOE positions for a qualified ASO. One of the successes of the Aviation Restructure Initiative was a change to place a qualified ASO on the TOE of AVIM units not having a parent aviation headquarters. The "bill-payer" for this adjustment was an O-3 position in the old TOEs. During the Conference, a question arose pertaining to the Theater AVIM company in Korea. No ASO position exists on their TOE. Further research shows that this unit is forward deployed away from their parent battalion, which does have a TOE position for an ASO. This case requires that the command request an exception and adjustment to the unit MTOE.

Issue 11: HAZCOM requirements for U.S. Army units. HAZCOM programs are conducted IAW DODI 6050.5. The Army Safety Center commander published message 251431Z Oct 95 to clarify the Army position. AR 385-10 and AR 40-5 implement all DA labor standards, including HAZCOM. Recordkeeping and training are MACOM functions. USASC POC: MAJ Wallace, DSN 558-1122 (334-255-1122).

Issue 12: What is the DA position on the TRIMAX fire-suppression system? DA does not endorse any one manufacturer of fire-suppression systems. However, the compressed air/foam (CAF) fire-suppression system has been evaluated by ABSO, USASC, and many field units with favorable results. The DA Fire Prevention and Protection Office is currently developing a position on the CAF system for aviation use.

(continued on page 9)

Issue 13: The ASO community needs electronic access to safety-of-use (SOU) messages, safety-of-flight (SOF) messages, and Aviation Safety Action Messages (ASAMs). ASOs are required to monitor the SOU/SOF/ASAM program, which is managed by the Aviation Maintenance Officer (AR 385-95). ASOs should ensure that they are on the local distribution list for these messages. ASOs can also electronically receive *unofficial* SOU/SOF/ASAMs through the ASOLIST. These messages are archived on the USASC Bulletin Board System.

Issue 14: The time requirement for reporting Class C through E mishaps is too short. The next change to AR 385-40 will expand the time requirements.

Issue 15: Reporting requirements for "common" materiel failures, such as the CH-47 clamshell, need to be modified. The Army Safety Center sees no need to modify current reporting requirements. It is important that all materiel-failure mishaps be reported in order to correct "common" materiel deficiencies.

Issue 16: Units need an additional ASO. Although it's always nice to have additional personnel, the ABSO does not see this as a critical need. Most units function very well with one qualified ASO managing the program for the commander. Additionally, creating a position for a second ASO would require elimination of some other position. It is doubtful that most commanders would agree to this.

Issue 17: Safety awards should be recorded on DA Form 759 (Flight Record). TC 1-210 requires that safety awards be recorded on DA Form 7122-R in the Individual Aircrew Training Folder. This permanent document provides a sufficient record of safety awards and should be readily available for the ASO to review.

Issue 18: There needs to be more DA emphasis on OH-58D hot starts. This issue is being worked in more than one direction. There is discussion covering the two batteries, and some discussion exists covering training.

Issue 19: Requirements for closing flight records in the event of an accident should be more specific and regulatory. FM 1-300's requirement to close the flight record at the direction of the president of the accident-investigation board is sufficient. The reason for closing flight records in the event of an accident is to obtain information necessary to complete the accident report. If data is not needed by the board president, there is no need to close the record. Provisions exist in FM 1-300 for local commands having other reasons to close records.

Issue 20: Why does it take so long to publish or change a safety regulation? The current system of safety regulations is under DA-level review. The Army Safety Center is pursuing an initiative to reduce the total number of regulations. This initiative has caused a delay in publication of safety regulations while decisions are made at senior-Army-leader level.

Issue 21: How can we focus on risk management and still meet regulatory and statutory requirements? Regulatory and statutory requirements, as well as local policies and procedures, are an integral part of the risk-management process. Such requirements should be considered controls to reduce risk and must be evaluated for their effect on the mission. As with any control, the residual risk that exists when the control is or is not applied (or complied with) must be accepted by the appropriate authority. Your commander may or may not have the authority to accept the risk associated with waiving a regulatory or statutory requirement, but, if a waiver is justifiable through risk management, it should be requested from the appropriate authority.

Issue 22: Unit evaluations should include a dynamic process of observation of performance. The ABSO and USASC agree strongly that internal safety evaluations are most effective if actual task and behavior performance can be evaluated. Unit ASOs should focus surveys on observing both individuals and units in actual mission performance. Unfortunately, external safety evaluations usually have the opposite of the desired effect. When someone from outside the unit is observing performance, it is usually considered by the local command to be distracting and disruptive of the mission. Both DES and the ABSO, along with several MACOMs, have attempted this "dynamic" process with little success. Additionally, external evaluators are usually severely limited by time and must evaluate as much as possible as quickly as possible. Because of this, external evaluations will most likely continue to focus on how programs are being managed, which lends itself to the static process of records review and questions and answers, with a minimum of task and mission observation.

Issue 23: There is no TACOM requirement to report completion of Army motor vehicle (AMV) modification work orders (MWOs) or SOU message directives. MWOs applied to vehicles are reported through channels to the Program Manager of the system, not to TACOM.

Issue 24: Use of "noncrashworthy" fuel pods for CH-47 "FAT-COW" operations presents a high risk. The ABSO is working with the Directorate of Combat Developments to reassess the risks of using 600-gallon fuel pods for "FAT-COW" operations.

Issue 25: Many units are not in compliance with AMV driver-training requirements. AR 600-55 and AR 385-55 refer trainers to TC 21-305-100 and series for training drivers. These ARs are under revision and will become one regulation. Units must use the training circulars to ensure quality training. The Army commercial drivers license program is available on CD ROM (CAI 551-10: *The 88M Army Motor Transport Unit and Operations Multimedia Interactive Library*). USASC POC is Mr. Don Wren, DSN 558-9864 (334-255-9864).

Issue 26: The aviation community wants* Aviation Digest *back. The *Aviation Digest* is a victim of Fort Rucker's reduced budget. No funding is currently available for a Branch periodical and none is planned for the future.

Issue 27: OERs should reflect risk management/safety performance. AR 385-10, paragraph 1-5f, currently requires this.

Issue 28: AR 385-95 requirements for semiannual surveys and quarterly safety councils should be reevaluated for Reserve Component units. These requirements have been evaluated and coordinated with the NGB and USARC safety offices. Frequency requirements will not change with the new AR. However, guidance on what is expected from the surveys and councils will be expanded, which should help program management.

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class E

F series

■ Alternator came off line as N2 began descending below 91 percent upon entering simulated engine failure. Suspecting inverter failure, IP opened throttle and engine rpm was regained. Maneuver was terminated to a hover, and SCAS was reengaged. Crew chief opened battery compartment while aircraft was at flight idle and saw the inverter smoking. Aircraft was shut down and inverter was replaced.

AH64

Class C

A series

■ APU start was attempted during ground taxi to parking. Crew heard loud humming noise from rear of aircraft, and master caution and fire APU lights came on. PI pulled APU fire handle, activated the primary fire bottle, and shut down the APU. Fire light went out, and crew performed emergency shutdown. Investigation revealed damage to APU, PTO clutch assembly, and APU drive shaft. Caused by failure of PTO duplex bearing.

Class E

A series

■ During approach, No. 2 engine experienced compressor stall, high tgt, popping sound, and low torque. Pilot reduced collective and stall ceased. Aircraft landed without further incident. Maintenance replaced the turbine rotor (GG rotor) assembly.

■ No. 2 generator caution light came on during ground run taxi from parking. Caution light remained on despite attempt to reset No. 2 generator. Aircraft was ground taxied back to parking and shut down. Maintenance replaced No. 2 generator.

■ During ground taxi to refuel, utility hydraulic pressure indicator confirmed total loss of utility hydraulics system. Crew immediately returned aircraft to parking and shut it down. Maintenance replaced ruptured hydraulic pressure hose.

CH47

Class A

D series

■ Aircraft was in cruise flight at 1100 feet agl and 135 KIAS when it experienced an uncommanded nose-down pitch and left roll. Aircraft became inverted, then righted itself. Crew was able to decelerate just prior to ground contact, and aircraft touched down upright at near-zero airspeed. Observer suffered minor injury; the other three crewmembers were uninjured. Aircraft sustained extensive engine, transmission, and drive-train damage; the airframe, however, remained intact. Investigation continues.

Class C

D series

■ Copilot's jettisonable door separated from aircraft during cruise flight at 3500 feet msl and 150 KIAS.

■ During final approach for landing at night, CE inadvertently pressed cargo-hook release button, unintentionally jettisoning a 1¼-ton truck.

■ During engine health indicator check, aircraft experienced engine overspeed (118%).

Class D

D series

■ Left aft pylon work platform separated at some point during flight at night. Suspect latch assembly failure.

Class E

D series

■ During approach, aircraft developed unusual shaking and oscillating condition prior to airspeeds associated with effective translational lift. Suspecting the rotor system had developed an out-of-balance condition, the PC took the controls and landed. Inspection revealed that aft rotor head assembly, yellow blade, and horizontal hinge pin had seized. Head assembly was replaced.

■ During rapid refueling, flight engineer noticed fuel port dripping fuel. Aircraft was shut down. Maintenance replaced O-ring in external refuel port.

■ While on ground, CP smelled hydraulic fluid. Inspection revealed hydraulic fluid was spraying inside front pylon and leaking down side of aircraft. Caused by hole in fluid line of No. 1 flight control module.

OH58

Class B

D series

■ Crew heard thud during low-level multi-ship training flight at night and made precautionary landing. Inspection revealed three damaged main rotor blades and missing components (laser designator and shroud to mast-mounted sight). Local investigation board was convened.

Class E

D series

■ During hover at 50 feet agl, low engine oil quantity caution light came on. Inspection revealed no oil in tank but no visible leaks. Further inspection revealed oil in freewheeling unit because scavenge pump was unable to pump oil back to engine. Caused by overservicing the engine oil.

■ Aircraft was started with exhaust pillow installed. Engine combustion blew smoldering pillow to rear and clear of aircraft. Aircraft was not damaged, but pillow reportedly was toasted.

■ During start sequence tgt appeared to rise normally. Right-seater glanced down momentarily to check oil pressure, then looked up to see tgt shoot up to 943°C. He completed appropriate emergency procedure. Maintenance completed hot-end inspection and released aircraft for flight.

■ Aircraft lost all instrument lighting during flight at night, and pilot smelled smoke. Aircraft landed and maintenance replaced inverter.

UH1

Class B

H series

■ Engine rpm increased and rotor rpm decreased in cruise flight. Crew autorotated into swamp area, and aircraft rolled over after touchdown. Crew sustained minor injures.

Class E

H series

■ Master caution and engine chip segment lights came on during engine start. Inspection revealed excessive metal chips on detector. Engine was replaced.

■ At 300 feet agl during approach to landing at night, PI noticed right tail-rotor pedal not responding to pressure. When PI applied extra pressure, control broke loose and pedals responded. PC took controls for landing. Just before touchdown, right pedal stuck again. PC successfully completed a run-on landing. Maintenance towed aircraft to hangar and replaced mag brake.

V series

■ Transmission chip detector light came on during engine runup. Aircraft was shut down without incident. Maintenance replaced transmission because size of metal chips exceeded TM specs.

■ After entry into simulated engine failure at altitude, rotor and N2 needles did not split. Throttle was rolled on and aircraft landed. Caused by input quill failure.

UH60

Class C

A series

■ During final phase of blowing-snow approach, PI applied excessive aft cyclic, and main rotor blades contacted intermediate drive shaft cover. Neither IP nor PI noticed anything unusual. En route to attempt pinnacle approach, IP noticed lateral vibrations and flew aircraft to home station. Postflight inspection revealed damage to tip cap and intermediate drive shaft cover.

L series

■ PI prematurely released load during slingload operations. M119 weapon system fell from approximately 5 feet agl and sustained Class C damage. The aircraft was not damaged.

■ Main rotor blades contacted tree during confined area operations. All four tip caps were damaged.

Class D

L series

■ During an NVG external load hookup of an M119 howitzer, Chalk 5 in a flight of 7 drifted after securing the load but prior to lifting it off the ground. The M119 rolled onto its left rear, coming to rest upside down. The gun sight mount was damaged.

■ During runup crew noticed crack in left windshield. Orange glow was also noticed in upper left corner of windshield. When crew checked position of anti-ice switches, they found left switch on. Suspect switch was inadvertently turned on while taking No. 2 engine fuel selector to crossfeed for engine runup.

Class E

A series

■ During cruise flight, pilot observed No. 2 engine intermittently reaching overspeed limits. Aircraft landed without incident. Maintenance found No. 2 engine ECU cannon plug loose.

■ During maintenance test flight, left cargo door's front window remote-control lever broke. Window then fell away from the aircraft.

L series

■ Postflight inspection after cross-country training flight revealed that APU access door had separated from the aircraft. The forward hinge showed evidence of twisting, and there was superficial damage to the surface of the No. 1 harness exhaust fairing.

■ During NVG cruise flight, aircraft was struck by bird in vicinity of No. 1 engine. Aircraft returned to home station, where maintenance flushed and bore-scoped engine. No damage was found.

■ During NVG training mission, 15-percent torque split developed between engines, and engine and rotor rpm surged from 100 to 105 percent. Both malfunctions were intermittent. Maintenance test pilot discovered that power-available spindle had been improperly rigged. Adjustment was made to push-pull cables that connect to quadrant levers.

■ Pilot detected abnormal flight control inputs during cruise flight and made precautionary landing. Caused by malfunction of roll trim actuator.

C12

Class A

N series

■ Aircraft crashed at high rate of descent into dry marsh area about 300 yards from ocean waters. It had been on a training mission involving upper-air work. Both crewmembers were killed. Accident is under investigation.

Class B

C series

■ Aircraft was descending on an instrument approach when it encountered icing. Residual ice was reported despite proper use of de-icing equipment. Crew then encountered VMC and configured aircraft for normal VMC landing. About 30 feet above the runway, airspeed decayed and sink rate increased. Power was applied without success, and aircraft descended vertically from 10 feet, resulting in hard landing.

Class C

G series

■ During cruise flight, crew saw bright flash out left window. Suspecting a lightning strike, crew returned to home station without incident. Postflight inspection revealed damage to No. 1 (left) engine propeller, No. 1 engine magnetized gears, and left and right tip antennas.

Class E

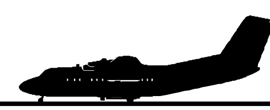
C series

■ Crew attempted to taxi aircraft with prop in feather, resulting in engine overtorque.

F series

■ During braking on single-engine landing, left outer main tire failed. Tower reported seeing smoke from left main landing gear during landing rollout. Pilot taxied to parking without further incident. Postflight revealed left outer main tire was flat, with tread worn through 4 layers of cord.

05



Class E

DHC-7

■ During cruise, right hydraulic quantity went to maximum, and pressure began fluctuating. System then lost all pressure, and gear was manually pumped down. At this point, outboard spoilers and half the rudder had failed. Caused by ruptured high-pressure hydraulic line.

■ No. 1 engine would not develop required torque during takeoff roll. Caused by failure of fuel control unit.

■ Nose wheel steering failed during taxi. Caused by failure of power-steering actuator.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-1-97-ASAM-03, 281430Z Apr 97, maintenance mandatory.
Some units have been using TB 1-1500-341-01 as authority to use the UH-1 K-flex drive shaft on AH-1 aircraft. The only authorized K-flex drive shaft for use on the AH-1 is listed in TM 55-1520-236-23P or TM 55-1520-234-23P. The purpose of this message is to direct a one-time inspection of all AH-1 series aircraft to confirm the correct K-flex drive shaft assembly is installed and replace incorrect drive shaft assemblies with the correct one. ATCOM contact: Mr. Howard Chilton, DSN 693-1587/2178 (314-263-1587/2178).

AH-64-97-ASAM-05, 241546Z Apr 97, operational.
On 26 October 1996, a failure of the embedded global positioning system inertial navigation system (EGI) on an AH-64A occurred without notification to the flight crew. This failure caused inertial flight data and associated symbology to freeze in the last valid state. The purpose of this message is to alert AH-64A and AH-64D flight crews to a potential EGI failure mode, describe the characteristics of this failure, and provide operational guidance to prevent mishap in the event of its occurrence. ATCOM contact: Mr. Howard Chilton, DSN 693-1587/2178 (314-263-1587/2178).

CH-47-97-ASAM-07, 141323Z Apr 97, maintenance mandatory.
The CH-47 is designed with two redundant three-phase 400 Hz ac electrical power distribution systems. The two systems are normally isolated and operate independently of each other. However, inherent cockpit water intrusion is subjecting CH-47D and MH-47D/E power distribution panels to water entry. Subsequent moisture and salt-water induced corrosion is causing a conductive path buildup that can lead to arcing, which results in a short circuit between phases. The purpose of this message is to outline procedures to deal with the problem. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

CH-47-97-ASAM-08, 221759Z Apr 97, maintenance mandatory.
TB 1-1520-240-20-77 was issued to have specific rod end bearings inspected and lubricated at the next phase and every first and third phases thereafter. Since this TB was issued, several bearings in the closet area have been identified as also requiring lubrication. The purpose of this message is to inform users of the requirement to inspect and lubricate rod end bearing grease fittings in the flight control closet area of CH-47D and MH-47D/E aircraft. ATCOM contact: Mr. Dave Scott, DSN 693-2045/2085 (314-263-2045/2085).

GEN-97-ASAM-04, 101430Z Apr 97, maintenance mandatory.
This message was transmitted in two parts. Its purpose is to provide consolidated and updated information on aviation NVG messages. It also lists current points of contact for NVG issues. This message is not intended to replace any publication, and it does not address NVGs used for ground operations. ATCOM contact: Mr. Bob Brock, DSN 693-1599 (314-263-1599).

The upcoming holiday is one we celebrate with enthusiasm, usually outdoors or away from home in various recreational activities. It would be particularly tragic for this uniquely American celebration to end in accidental death or injury. To reduce this possibility for yourself and your family, make the risk-management principles you practice at work your way of life off duty as well. Have a spectacular Fourth!

IN THIS ISSUE

Class A Accidents *through April*

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3D QTR	April	1	2	3	2
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	7	7	16	5

*Excludes 1 USAF pilot trainee fatality

U.S. ARMY SAFETY CENTER

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Flightfax

ARMY AVIATION
RISK-MANAGEMENT
INFORMATION

JULY 1997 ◆ VOL 25 ◆ NO 10

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Night accidents:

a look at the numbers

A look at the numbers

In FY 96, Army aviation achieved the safest year on record. The numbers are good news, and we all can justifiably be proud of the achievement. If, however, we dig into the numbers a little, not ***all*** the news is good. The bad news is that, overall, our night rates are headed in the wrong direction.

The tables below compare the FY 95 and FY 96 rotary-wing statistics. (Note: "Night systems" are the Apache PNVS/TADS. The comparatively high night-system rate is due, in part, to the relatively low number of hours flown for the year. The Apache had only one more Class A accident in FY 96 than in FY 95.)

Our night rates are an indication that our night environment is a tough place in which to operate. They say we're doing tough, realistic training. They also say we still have a lot to learn. The positive side of this is that we're doing a lot of things right. We're flying a larger percentage of our total flying-hour program at night than ever before. We also fly aided almost three times the number of hours we fly unaided.

Unfortunately, at this point, it's looking like the numbers for FY 97 are going to be even higher than FY 96. But let's look beyond the numbers. What's causing these increases in our night accident rates?

As we look at the kinds of accidents we had in FY 96 and are continuing to have this year, the hazard of tree strikes is a consistent problem. Very often these tree strikes result from inadvertent drift while at a hover. The aircraft experiencing these kinds of accidents are most frequently the OH-58D and the AH-64. As we look at the missions these aircraft routinely conduct (e.g., target hand-off, weapons engagements), it's not surprising that aircrews tend to fixate on the tactical situation and lose situational awareness. Typical accident reports read like this:

"The aircraft drifted rearward from a 70-foot OGE hover during a target hand-off maneuver for readiness level progression training. The rearward drift was toward rising terrain and continued until the tail rotor struck a 50-foot-tall tree at approximately 20 feet agl."

Rotary-Wing Class A Flight Accidents*

	FY 95	FY 96
■ Day	.50	.28
■ Night	2.02	2.77
Night unaided	1.27	0.00
Night aided	2.37	3.95
Night systems	6.39	11.27
Night goggles	1.46	2.39
Total	.86	.87

Rotary-Wing Class A-C Flight Accidents*

	FY 95	FY 96
■ Day	7.59	7.69
■ Night	9.72	13.87
Night unaided	6.37	9.31
Night aided	11.28	15.80
Night systems	17.15	22.54
Night goggles	11.97	14.37
Total	8.09	9.14

*Rate per 100,000 flying hours

Aircrews conducting night operations that include tasks such as "Select a combat position," "Recommend a holding area," or firing position operations should include as a sub-element the need for good hover reference points. These reference points should be clearly discernible with the ANVIS or FLIR in order to help crews maintain situational awareness. Under some circumstances it may even be necessary to place a chem stick, beanbag light, heat pad, or other position marking device to aid crews in maintaining position. Attempting to hover over areas of poor contrast or definition is made worse when moon-illumination levels are very low or the moon angle is low on the horizon. It may also be necessary to keep a deliberate, almost mechanical scan going in order to avoid fixation during these demanding tasks.

Another key factor we're seeing in accident reports is crew-coordination failures. Typical findings include shortcomings in crew-coordination fundamentals such as crews directing assistance, announcing actions, and offering assistance. In more than 25 percent of all the Class A-C flight accidents for FY 96 and so far in FY 97, crew-coordination errors were specifically identified. In many of the other accidents, while not specifically identified, crew-coordination failures were present.

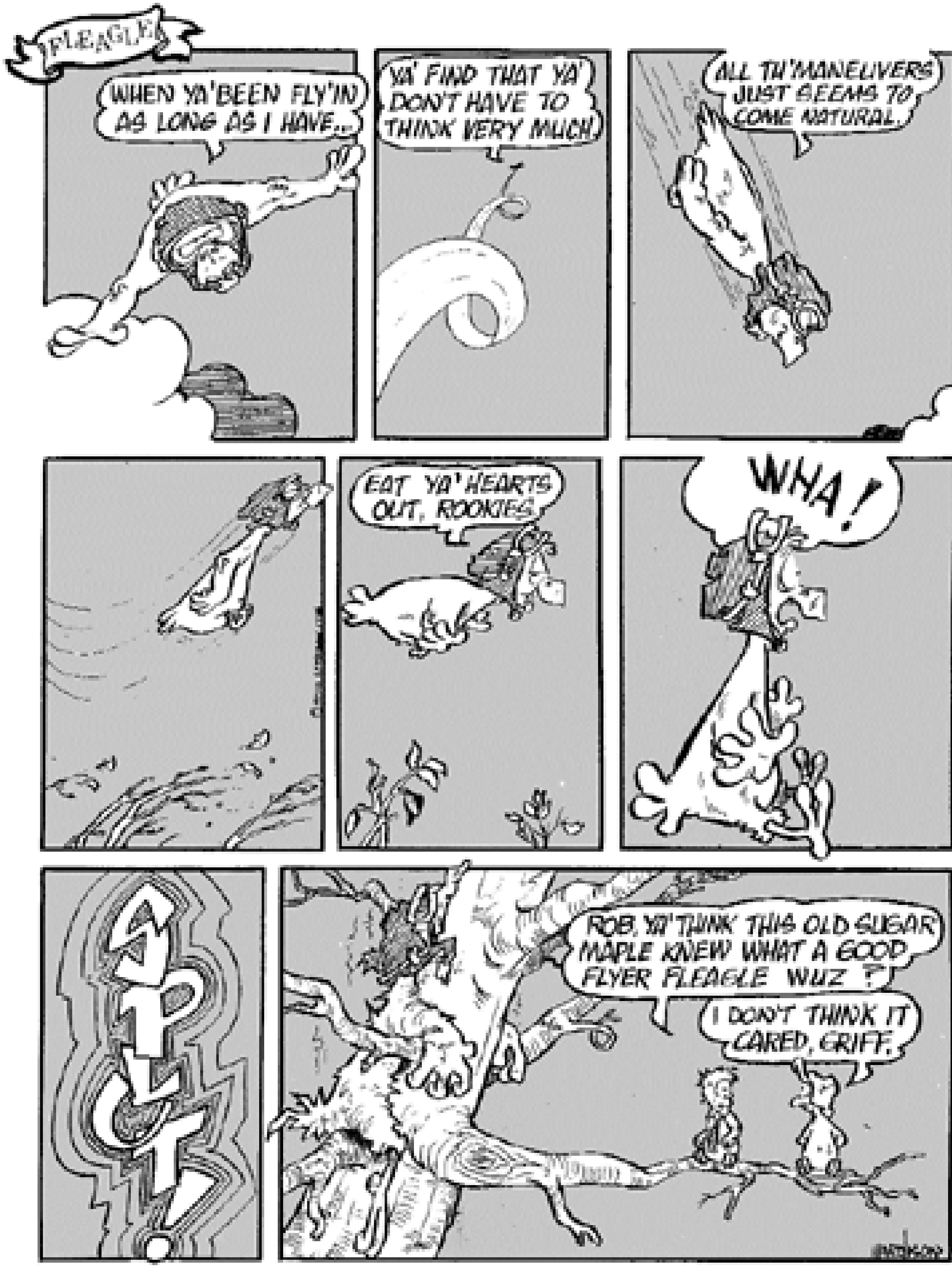
In many instances, aircrew awareness of a problem is enough to prevent similar accidents. In addition to awareness, though, aircrews should, during pre-mission planning, anticipate critical points of the mission and plan to ensure that someone will be looking outside to maintain aircraft control and remain situationally aware.

Also missing in some cases is detailed pre-mission planning on how teams or elements will function and coordinate actions. Actions in battle positions, firing positions, or holding areas should be developed into SOP items to ensure security, obstacle avoidance, and aircraft separation.

As usual, most of the FY 96 night-accident cause factors related to human performance. In many of the accidents, instructor pilots were conducting readiness-level progression training and became engrossed in training and evaluating and lost situational awareness. In some of these instances, pre-mission briefings on the specific critical tasks may have prevented both aviators from becoming fixated on tasks inside the aircraft.

This article is intended to increase awareness among aircrews so we can prevent night accidents. The suggestions here are just that. Aircrewmembers in the unit are the best source of information and ideas on how to prevent these kinds of accidents.

—CW5 Bob Brooks, Aviation Systems Section, USASC, DSN 558-2845 (334-255-2845)



Reprinted from *Tac Attack (Combat Edge)* courtesy of Stan Hardison

It's not just the new kid that's trimming trees with tail rotors. Senior stick wigglers and IPs are also showing up in accident reports. Heads up, folks!

Army safety web site

Update—we're growing our site

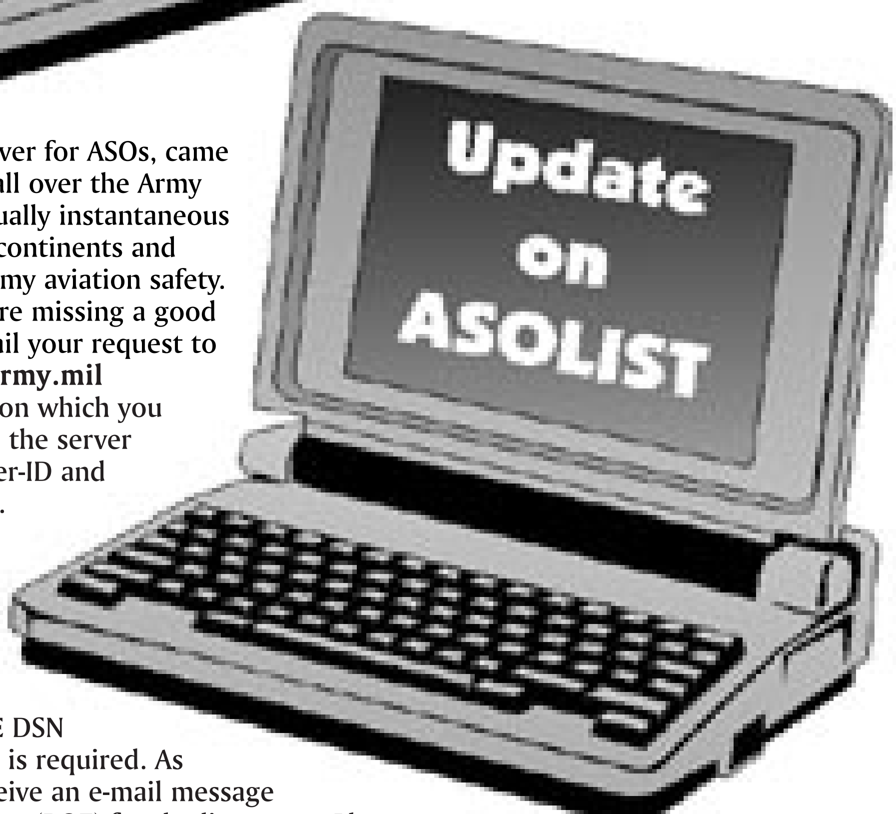
The Army Safety Center is working diligently to develop more effective and better communications with our customers. Much of our effort these days is being directed toward developing the Army Safety Web Site. We're pleased to report that it's growing bigger and better every day.

Our goal is to give you the ability to access the accident-prevention information you need to do your job safely. We want the Army Safety Web Site to be truly customer focused; the ultimate aim is to make it interactive to the point that you can, with a few clicks, tailor its products to your individual needs whether you're a general officer or a basic trainee. But that's down the road a bit.

We are, however, at the point where we need your input. We want to give you what you need in a format that you can use right now. We hope you'll take a look at what's there at the moment and give us some feedback on what you think. Hit our Webmaster with a note (webmaster@safety-emh1.army.mil), or send your comments to flightfax@safety-emh1.army.mil. We'll be tracking the site to see who's interested based on who's responding. Those results will determine in large measure what gets on and stays on the web today and in the future. Please take advantage of this opportunity to make our web site your own.

POC: Mr. John Hooks; Chief, Media & Marketing Division, USASC; DSN 558-3014 (334-255-3014)

The Army Safety Center has a new e-mail service for brigade-level commanders and MACOM safety officers. Through this service, we send these customers accident briefs and lessons learned from on-going Centralized Accident Investigations. This limited audience receives information as it develops, weeks before the formal accident report is completed. This directs useful accident-prevention information to the field immediately—and to the level at which corrective action can be taken immediately. Future plans are to expand the service to include all O6- and equivalent-level aviation decision makers, including program managers and PEO-Aviation. Customers in these categories can get on the list by calling USASC Operations, DSN 558-3410/2660 (334-255-3410/2660).



Last fall ASOLIST, a new list server for ASOs, came on line. More than 200 ASOs all over the Army have taken advantage of this virtually instantaneous way to talk to each other across continents and oceans on topics important to Army aviation safety. If you haven't yet signed on, you're missing a good deal. Signing on is easy. Just e-mail your request to **lstserv3@pentagon-hqdadss.army.mil** Be sure to use the e-mail system on which you want to receive ASOLIST, because the server will automatically detect your user-ID and e-mail address from your request.

The first line of your request must read: SUB ASOLIST YOUR NAME YOUR POSITION YOUR LOCATION DSN [or commercial phone number] (example: SUB ASOLIST JOHN SMITH ASO FT ANYWHERE STATE DSN 555-5555). No other information is required. As soon as you sign up, you will receive an e-mail message giving you the rules of engagement (ROE) for the list server. Please review these rules before sending a message to ASOLIST.

One reminder. In the simplest terms, ASOLIST automatically distributes messages to everyone on the list. So, although ASOLIST is a closed rather than a public list (not just anyone can subscribe), you should be sensitive to the information you transmit.

POC: CW4 Lee Helbig, USASC Training Development Branch, DSN 558-2443/2381 (334-255-2443/2381)

Wildfires: Stay away, stay alive

A basic primer on how to avoid wildfire areas

Wildfires have no respect. They'll burn anywhere, regardless of the airspace above them. We've had wildfires under Class B airspace at such places as Los Angeles and San Francisco. Wildfires also occur under Class G and E airspace. You would think that fires under E and G would present no threat to aviation, right?

Wrong. Not only is Class E and G airspace laced with military training routes for which the fires have absolutely no respect, but most air traffic in these areas is operating under visual flight rules. Some pilots flying out here get a false sense of security. They really don't have to talk to anyone and if they're low enough, they can't talk to anyone anyway.

Let's look at a possible wildfire incident. The incident is fictional but, trust me, it can happen this way.

MAJ Joe (honest, that is his first name) is our hero for the day. He is a competent aviator. He checked his aircraft, checked his weather and NOTAMs—he even filed a VFR flight plan. No mention was made in the NOTAMs of a wildfire near his route. Why? The fire has just been reported. It is spreading fast. The firefighting air cav is on the way. The air attack supervisor arriving on scene sizes up the fire and starts ordering aircraft. These range from light helicopters with water buckets to large air tankers. Then, he will most likely request a Temporary Flight Restriction (TFR) over the fire. This will be accomplished through the Air Route Traffic Control Center (ARTCC). He then calls the FAA in Washington, DC, and the TFR is entered into the computer. Now the TFR is a NOTAM—but it's too late; MAJ Joe is already airborne.

At this time, MAJ Joe notices a large column of smoke about 30 miles away, just north of his intended route. In his aircraft, 30 miles takes about 15 minutes. In that same 15 minutes, an OV-10 lead plane and five air tankers are converging on the scene. The air attack supervisor is now sequencing the tankers for their drops to attempt to build a retardant line around the fire. An OV-10 Bronco, with a C-130 close behind, is lining up for a retardant drop. Out of the smoke pops MAJ Joe. He just wanted to take a little look-see!

Breathe easy, boys and girls, there was no collision. Our hero did get a very rough ride from convection off the fire and C-130 wake turbulence. The rough ride doesn't end here. Depending on how he is dressed (civvies or nomex), MAJ Joe is going to receive a registered letter from the FAA mentioning something about an enforcement action or an invitation to stand in front of his commander.

How could our hero have avoided this nasty situation? Easy. If you see what appears to be a wildfire, from a safe distance note its location and call Flight Service. If it is a working fire, the FSS will notify you of the TFR.

Then, all you have to do is avoid the area. If the fire has not yet been reported, Flight Service will report it for you. Then all you have to do is still avoid the area. In short, if you're near a wildfire and you aren't helping to put it out, you're in the way!

Stay away, stay alive.

For more information on TFRs, see FAR 91.137 and Advisory Circular 91-63B.

—CW4 (Ret.) Dave Kyle, Aviation Technical Specialist, Branch of Fire & Aviation Management, California State Office, Sacramento, CA, 916-979-2910

Gremlins lurking in the weather office?

It was mid July, and I was to fly an OH-58 out of a commercial airport in the Midwest. As I headed out to the ramp, I noticed the sky darkening far to the northwest. My weather brief was about 30 minutes old, so I decided to go back inside and get an update. I called Flight Service at 1700 and was told that an AIRMET had been issued for thunderstorms. The prediction was that these storms would not arrive at my location before 2200. The controller then added, "It may get there a little sooner than forecast, but you should have at least 2 to 3 hours."

As we took off at 1715, I looked to the northwest and saw black clouds. It was difficult to tell how far away they were, but they seemed a little closer than they had been at 1700. A few minutes later, my crew chief asked, "How far away does that storm look to you?" I looked around; it was definitely closer now. I replied, "Too close!"

The storm cloud was black, and we could now see that it was spitting lightning rapidly. The tower confirmed that it was headed toward the airfield from which we had just taken off and "closing rapidly." I notified the tower that we wished to land ASAP. At that point, we were 1 to 2 minutes from the airfield. I glanced at the clock; it was now 1737. It had been only 22 minutes since we took off.

What had happened to the forecast 5 hours and the assured minimum of 2 to 3 hours we would have before any foul weather appeared? As we approached our landing spot, we could see what looked to be horizontal tornadoes of dust spooling across the plowed fields to the northwest. We landed and dropped off our passenger without shutting down.

The storm had a forward-sloping leading edge, which, at a few thousand feet agl, had already passed over us by a couple of miles. We took off into the wind and built up airspeed and altitude before turning downwind and away from the approaching storm. We set maximum endurance airspeed power for possible turbulence penetration.

We continued flying out from underneath the upper leading edge of the storm for 3 or 4 minutes. There was only light turbulence and no rain or visibility restrictions. The leading edge seemed to be getting higher and higher above and further behind us and we were breaking out into clearer skies. I set cruise power. It looked as though we had outrun the storm and had a clear path back home.

Just then, we abruptly encountered turbulence that was as strong as any I have ever encountered in a helicopter. We were at about 1100 feet agl.

I reduced torque back down to that for maximum endurance airspeed for turbulence penetration and no less. The engine governor was already struggling with N2 upper excursions in this turbulence.

And then we were out of it. It was gone as suddenly as it had appeared.

It all turned out well, but what can we learn from this experience? The way I see it is that we pilots can get into enough trouble on our own without being lured into false security and poor decision making by inaccurate and incomplete weather information. It's a given that we cannot expect perfection in weather forecasting, but we should be able to expect a reasonable degree of accuracy on forecast weather. And we should expect ***very*** accurate, detailed, and complete reporting of ***current*** weather conditions.

Weather is a realm of constant, ongoing change and evolution. Forecasts are continually becoming present weather. Current weather is moving elsewhere—and usually evolving into something different as it moves along. What we can do to reduce the risks inherent in ever-fluctuating weather is to make the very most of new-generation Doppler radar and satellite coverage. It is, fortunately, becoming widely available at flight facilities across North America. This on-line weather service allows us to "visualize" weather. Its time-motion sequence enhancements and wide variety of other tools enable us to be as thorough as we wish to be in obtaining weather information.

We should be cautious and skeptical anytime we must receive a weather briefing solely by telephone or radio. In such cases, we should ask a lot of questions. If we have even the slightest doubt about the briefing, we shouldn't hesitate to call the nearest military weather office—even if it is some distance removed from our location. Our first choice should be to get a genuine "full-service" military weather briefing. If that's not possible, we should try to get input from more than one source. This is not "shopping for weather" if we remain suspicious and promote a mindset that the worst forecast is probably the most accurate.

—CW4 Don C. Thomson, Missouri ARNG, DSN 555-9330/9347 (573-526-9330/9347)

Change to ATM task

The OH-58D(I) community has experienced some mishaps in the past few months involving ATM Task 1053: Simulated Engine Failure at Altitude. These mishaps have resulted in Class E through Class B accidents, with damage ranging from overtorques to major damage. Indications are that crews training this task are failing to recover the throttle to full operating rpm before termination with power. The reasons for these failures may have resulted from failure to properly divide attention, incomplete cross checks, inadequate aircrew coordination, and/or inadequate written procedures.

In an effort to prevent further mishaps without reducing the training benefit of this task, the following modification to the ATM task description will be used by all aviators training OH-58D(I) simulated engine failures at altitude:

Before reaching 400 feet agl with the aircraft in a safe autorotative profile, the IP will begin smoothly advancing the throttle to full open and will state one of the two commands described below:

a. "Power recovery." Upon receiving this command, the P* will maintain trim with pedals and continue autorotative descent as the IP confirms normal operating rpm by throttle pressure and by visually checking that the Np rpm is at 100 percent. When operating rpm has been confirmed, the P* will apply sufficient collective to establish a normal climb. The P* will complete the recovery prior to reaching 200 feet agl.

b. "Terminate with power." Upon receiving this command, the P* will continue the autorotative descent. Before reaching 100 feet, the IP will confirm normal operating rpm with throttle pressure and visually check that the Np rpm is at 100 percent. The P* will trim the aircraft with the pedals and continue autorotative descent. During the....

The remaining text and the first two notes remain the same as written in the ATM. However, a third note should be added as follows:

Note 3: If time permits during the descent, the IP will announce "Throttle confirmed" when he is certain that the engine is back to operating rpm.

Additional training benefit is derived by having the IP control all throttle movements in that the student's attention is not divided between performing the simulated engine failure and throttle manipulation, which he normally would not do during an actual engine failure.

The simulated engine failure at altitude is an important training task. In the rare event of an actual engine failure, proficiency in this training task can be a lifesaver. Kiowa Warrior aviators must therefore continue to train, but train smart, applying established aircrew coordination fundamentals.

—adapted from Aviation Branch Chief Sends, subject: OH-58D(I) (Kiowa Warrior) Simulated Engine Failure Training Accidents, 142138Z Apr 97. Fort Rucker POCs: Mr. Ron Cox, Aviation Branch Safety Office, DSN 558-3000 (334-255-3000); CW4 John Sparkman, DES, DSN 558-2427 (334-255-2427)

MMS upper shroud security

As the OH-58D(I) system manager at the Army Safety Center, I have just received a Class B accident report involving the departure of an MMS upper shroud from the aircraft during flight. This makes number three. This latest incident resulted in three damaged blades as well as the loss of the $125,000 upper shroud itself.

Maintainers, you should take extra care when you're reinstalling the upper shroud after maintenance. Rumor in the field has it that the six captive bolts can be properly torqued even if they're not seated, resulting in a loose upper shroud. Therefore, you need to ensure that the shroud is seated and the captive bolts are properly installed before you torque them.

Pilots, during preflight you need to check—not just visually, but hands-on—the upper shroud for security.

The next revision to TM 55-1520-248-10 will contain an additional step in the preflight check in chapter 8. It will read "Check upper shroud for security."

And, hey, if you come up with a fix for the problem, please call me.

—CW5 Bill Ramsey, Aviation Section, Army Safety Center, DSN 558-2785 (334-255-2785)

Shortfax
Keeping you up to date

New fuel card coming

You will soon be seeing a new credit card for purchasing aviation fuel and related ground services. The AIR (Aviation Into-plane Reimbursement) Card will replace the U.S. Government National Credit Card (SF 149) and can also be used instead of the manually prepared SF 44, U.S. Government Invoice—Voucher. However, unlike the SF 149, each AIR Card will be embossed with the aircraft tail number and will stay with the aircraft when it is transferred to another unit. The tail number will be the link to billing data and other information in the AIR Card data base used to manage fuel purchasing.

AIR Card use will be implemented in stages. It will begin with testing in selected units to ensure that control and billing procedures are effective. At this time the AIR Card will be approved for use only at commercial facilities (Fixed Base Operators) that do not have Into-plane contracts. Identaplates will continue to be used at DOD airfields and at commercial locations with Into-plane contracts.

Once testing is completed, AIR Cards will be issued to all Army aircraft, and these cards will be used for all commercial transactions. The Identaplate will be retained for use at DOD airfields only. A long-range goal is to eventually replace the Identaplate with the AIR Card and give aviators a single card to use for all fuel purchases. However, this will not take place until airfields are equipped with appropriate card readers and data-collection systems.

Keep in mind that we have priorities for obtaining fuel for Army aircraft. By following them you can save fuel dollars and get more flying time.

First, use DOD facilities; you will be billed the stock fund standard price. For 1997, this is $.77 per gallon for JP8.

Second, plan your flights to take advantage of Into-plane contracts at commercial airfields; you will be billed the standard Into-plane price, which is $.99 for 1997.

Only if necessary should you stop at a commercial facility where you will have to pay posted price. An unstructured sample of commercial facilities showed an average price of just over $2.00 per gallon. It's easy to see the reason for our priorities.

POC: Phil Richards, Army Petroleum Center, New Cumberland, PA, DSN 977-7040 (717-770-7040), prichard@usapc-emh1.army.mil

Obsolete flak vests

Some soldiers are still being issued the obsolete 1960's era olive-drab nylon flak vest. This vest provides less than half the ballistic protection afforded by the Personnel Armor System Ground Troop (PASGT) vest (NSNs 8470-01-092-8498, -8499, -8500, and -8501). This is a critical soldier survivability issue.

The PASGT vest has greater capability than the old nylon vest to stop or slow fragments. It will reduce the number and severity of wounds from exploding conventional and improved conventional munitions. Estimates are that use of the PASGT vest in combat could reduce fragmentation-caused casualties by 18 to 51 percent, depending on the threat.

The PASGT vest is superior to the obsolete nylon vest not only in ballistic performance but also in terms of comfort and camouflage properties provided. Overall fit is greatly improved, and the vest is more flexible due to both the materials used and the vest design.

Commands should dispose of all obsolete olive-drab nylon flak vests. For the sake of soldier safety and survivability, only the PASGT vest should be used.

Black Hawk PMO moving

The Black Hawk Project Manager's Office is relocating from St. Louis to Redstone Arsenal, Alabama. A rear detachment will remain in St. Louis through 15 November, but business will be conducted from Redstone effective 18 August. Updated phone listings will be published in the July/August issue of the Black Hawk Newsletter.

—COL Tom Harrison; Project Manager, Utility Helicopters; DSN 693-1700 (314-263-1700)

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class D

F series

■ Postflight inspection revealed foreign-object damage. Damage included puncture of exterior skin material and significant dent in leading edge of one tail rotor blade.

Class E

F series

■ During approach, crew heard hydraulic pump cavitate, and master caution and No. 1 hydraulic pump segment lights came on. IP accelerated to 70 knots and initiated climbout. After coordination with ATC, IP executed running landing. Maintenance replaced ruptured hose and No. 1 hydraulic pump.

■ Master caution and engine chip lights came on while turning base. PI reset master caution and proceeded to land to grass strip. Observing rising rotor rpm and loss of N2 tach, he initiated overspeed emergency procedures, took manual control of throttle, and continued approach. IP took controls just prior to landing. Maintenance suspects failure of lock cup. Engine removed and sent to ATCOM for analysis.

■ Aircraft was at 20-foot hover during aerial gunnery training preparing to fire rockets. Upon reaching 10 knots, No. 2 hydraulic caution light came on. PC took controls, turned on emergency hydraulic pump switch, and landed. Maintenance replaced hydraulic solenoid cannon plug, correcting the problem.

AH64

Class E

A series

■ At 60 feet agl and 10 KIAS after takeoff from FARP, No. 1 engine failed at 88- to 90-percent torque. PC lowered collective and applied cyclic, and PI noted No. 2 engine torque reading 115 percent. Aircraft landed without further incident.

■ Crew reported failed day-sighting system during NOE flight. Postflight inspection revealed that TADDS day shroud (right side) was missing.

■ During training autorotation, crew heard loud pop and SDC light came on. Maneuver was terminated and aircraft was landed and shut down without further incident. Maintenance replaced SDC due to sheared shaft.

CH47

Class E

A series

■ During postflight, crew found that second cabin window on left side was missing. Suspect window blew out during practice smoke and fume elimination procedure.

D series

■ After engine start, No. 2 torque needle on both pilot and copilot torque indicators rotated clockwise continuously. Crew shut down engines. Torquemeter indicator was replaced.

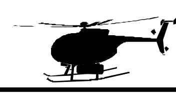
■ During hover checks, as No. 1 AFCS was selected, aircraft started uncommanded left roll and vibrations were felt through the fuselage. Maintenance replaced No. 1 AFCS.

■ During normal cruise, maintenance panel indicated No. 1 flight control hydraulic pressure fluctuation from zero to 300 psi (normal is 2500-3200). Maintenance replaced No. 1 hydraulic pressure indicator.

■ Unusual noise and vibration were detected from forward transmission area during final approach, and hydraulic filter return light on maintenance panel came on. Caused by failure of No. 1 flight control hydraulic pump.

■ No. 1 engine transmission latch tripped on maintenance panel but not on segment panel. Caused by faulty wire on back of maintenance panel. After further inspection, latch was removed and replaced.

OH6



Class C

J series

■ Crew felt severe vibration as aircraft touched down. Postflight inspection revealed damage to both tail rotor blades and severed tail rotor drive shaft. Suspect damage occurred upon touchdown.

OH58

Class A

D series

■ Aircraft was one of flight of 10 conducting NVG NOE zone recon when tail rotor struck trees and separated from aircraft. Directional control was lost and aircraft crashed, killing the PC. Postcrash fire consumed the aircraft.

Class C

D series

■ Aircraft began to settle while in NOE movement to contact. PC applied torque to arrest descent, and engine torque went to 151 percent for 5 seconds.

Class D

C series

■ Aircraft was Chalk 3 in flight of four. During landing, downwash from Chalk 2 (an AH-1) caused Chalk 3 to rapidly descend from 10 feet agl to 5 feet. Pilot applied collective to prevent striking runway, resulting in overtorque of 110 percent for one second. Maintenance replaced K-flex drive shaft.

Class E

A series

■ Master caution and engine chip lights came on during hover. Aircraft was landed and shut down without further incident. Maintenance replaced engine.

D series

■ During rearming procedures for aerial gunnery, pilot receiving instruction inadvertently launched 2.75-inch folding fin aerial rocket. Rocket went over protective berm. No injuries or damage reported.

UH1

Class C

H series

■ Crew reported high-side governor failure while at a hover. Aircraft was autorotated to ground without further incident. Suspect engine overspeed/ overtorque.

■ Tiedown chain had not been removed from skids, and aircraft plummeted to ground during takeoff to hover. Main rotor blade contacted WSPS, resulting in 10-inch hole in one main rotor blade.

Class E

H series

■ At 50 feet agl, 50 KIAS, and climbing at 500 feet per minute, crew noted increase in aircraft noise accompanied by right yaw. Master caution, low rpm, and engine chip detector lights came on. Suspect N2 gearbox failure.

■ Aircraft was at engine idle after normal approach and landing when 90-degree gearbox chip detector was seen hanging by the safety wire. Aircraft was shut down, and maintenance replaced defective part and serviced gearbox. QDR was submitted.

■ Oil pressure fluctuated in cruise flight, and pilot made precautionary landing. Inspection revealed oil on the left side of fuselage, tail boom, and engine deck; engine oil reservoir was empty. Packing on engine chip detector had failed and oil had leaked out through the ODDS engine chip detector. Packing was replaced.

■ Master caution and hydraulic segment lights came on at 50-foot hover. Pilot felt significant feedback in cyclic and upward feedback in collective, and cockpit and cabin area filled with smoke. PC flew forward to regain airspeed and completed a run-on landing at airfield. Cause not reported.

UH60

Class B

A series

■ Upon setting down on helipad during landing, one engine experienced internal failure and exploded. Engine casing opened just aft of compressor and debris damaged cowling.

■ Lightning struck aircraft at 6000 feet agl. Aircraft landed without further incident.

Class E

A series

■ During cruise flight at 4000 feet msl, crew noted roaring sound accompanied by shudder vibrations and illumination of various caution lights and master caution light and audio. During emergency descent, left-hand input module chip light came on. Crew set engines to idle and main transmission oil light illuminated. Aircraft made power-on landing.

■ Aircraft was on last leg of ferry flight following complete overhaul. While in cruise flight, main transmission oil temperature began rising, maxing at 160° for 1 minute, and main transmission oil pressure dropped to 20 to 30 psi. No. 1 generator caution light came on during landing, and main transmission oil temperature overhead caution light came on during shutdown. Cause not reported.

L series

■ After completing rappelling exercise, aircraft landed to change rigging for STABO exercise. During rerigging, CE noticed fluid seeping from the ceiling on the left side, just to the right of the cargo restraint net ring at station 3080. Maintenance inspection revealed cracked hydraulic drain line downstream from manifold drain. Hydraulic drain tube was replaced.

C12

Class C

C series

■ Crew attempted to taxi aircraft with prop in feather, resulting in engine overtorque.

Class D

R series

■ Left wing struck blast fence while aircraft was being marshaled into parking.

Class E

D series

■ Aircraft was at about 9000 feet agl when white/blue smoke suddenly filled cockpit during 1.5-mile final approach. Caused by overheated forward vent motor.

■ No. 2 dc generator failed during climbout and would not reset. After leveling off, No. 1 dc generator also failed and would not reset. Caused by failure of starter generator.

F series

■ Right bleed air fail light came on during climbout. Aircraft returned to airport after holding for 40 minutes to ensure landing under 12,500 pounds. Maintenance determined that poly flow tubing melted near wing spar, causing bleed air light to illuminate.

■ Gear would not retract after takeoff. Maintenance replaced left-hand weight on gear switch.

C20

Class E

E series

■ CP windscreen outer layer imploded in flight, and crew made precautionary landing. Cause not reported.

F series

■ During taxi for takeoff and during before takeoff check, PI indicated that the flight hydraulic indicator was reading zero. After pulling off taxiway, FE's visual inspection confirmed that reservoir was empty.

C23

Class E

B series

■ During after takeoff checks on climbout, hydraulics-content gauge indicated in low-yellow caution range. Maintenance system pressure remained in normal area. Suspecting air in system or stuck hydraulic cylinder, maintenance personnel bled and reserviced entire hydraulics system.

■ FE noticed excess fuel on right side of aircraft after landing. Maintenance determined fuel was siphoning from aft fuel tank. Unlike the B series, the B+ has no check valve between the forward and aft fuel tanks. As a result, topping off can cause an overpressure situation on the aft tank because the forward tank sits higher, which can cause siphoning action that vents fuel.

O5

Class E

DHC-7

■ No. 1 engine would not start due to failure of starter generator.

■ No. 1 engine would not develop required torque during takeoff roll. Caused by failure of fuel control unit.

■ Nose wheel steering failed during taxi. Caused by failure of power-steering actuator.

■ After takeoff, altimeters began fluctuating +100 feet and IVSI +1000 feet per minute. Troubleshooting revealed water in static lines. Static system was purged.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-1-97-ASAM-04, 221400Z May 97, maintenance mandatory.
This message revises AH-1-97-ASAM-02 and UH-1-97-ASAM-03 (211335Z Mar 97), which required replacement of aluminum high-pressure fuel fittings with stainless-steel fittings on all AH-1 and UH-1 helicopters. The purpose of this message is to provide additional task compliance time to preclude widespread grounding because of depletion of replacement parts. The level of risk has not increased by extending the compliance time. ATCOM contact: Mr. Robert Brock, DSN 693-1599 (314-263-1599).

CH-47-97-ASAM-09, 291851Z May 97, operational.
A Category I QDR has been submitted on the Sundstrand APU T-62T-2B. The APU compressor wheel failed during the startup sequence, separating into three equal sections that went through the APU air inlet housing. Two pieces were retrieved from the aft pylon. The third section appeared to have exited the aircraft. Investigation determined that fatigue cracks emanating from bolt holes on the back face of the APU compressor wheel caused the failure. The purpose of this message is to emphasize operational restrictions for the T-62T-2B APU and require reporting of APU serial number, time since new, and time since overhaul. ATCOM contact: Mr. Dave Scott, DSN 693-2045/2085 (314-263-2045/2085), scottd@stl.army.mil.

UH-1-97-ASAM-04, 221400Z May 97, maintenance mandatory.
See AH-1-97-ASAM-04 above.

UH-60-97-ASAM-13, 051517Z Jun 97, maintenance mandatory.
Spherical elastomeric assemblies procured under a spares contract initially did not include the sleeve bearing. Two instances of the elastomeric spindle bearing assembly being installed onto aircraft without the sleeve bearing have been found. Lack of the sleeve bearing will cause early failure of the assembly because of excessive play and direct contact of the bearing and spindle. The contract has been updated, and new bearing assemblies are now delivered with the sleeve bearing installed. The purpose of this message is to require a one-time inspection of main rotor spindle bearings, P/N SB7001-048, for missing teflon sleeve bearings, P/N SB5203-202. ATCOM contact: Mr. Dave Scott, DSN 693-2045/2085 (314-263-2045/2085), scottd@stl.army.mil.

Maintenance-information messages

AH-64A-MIM-97-04 281632Z Feb 97.
Some replacement shock strut mounts for AH-64A main landing gear do not have shoulder pins installed. These shoulder pins should be installed per procedures outlined in TM 1-1520-238-23, paragraph 2.77a. The purpose of this message is to outline modified inspection and maintenance procedures. ATCOM contact: Mr. Ken Muzzo, DSN 490-2257 (314-260-2257).

AH-64-MIM-97-05, 191031Z Mar 97.
The purpose of this message is to extend the life of AH-64 tail-rotor swashplate bearings (P/Ns 7-311527069 and 7-311527069-3) from 1000 to 1250 hours. The information in this MIM may be used to change the DA Form 2408-16: *Aircraft Component Historical Record* to reflect the new retirement life of these bearings. ATCOM contact: Mr. Ken Muzzo, DSN 490-2257 (314-260-2257).

IN THIS ISSUE

Class A Accidents *through May*

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3D QTR	April	1	2	3	2
	May	0	1	0	1
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	7	8	16	6

*Excludes 1 USAF pilot trainee fatality

U.S. ARMY SAFETY CENTER

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Burt S. Tackaberry
Brigadier General, USA
Commanding General

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SNOW?

IT'S AUGUST, AND WE'RE GONNA TALK ABOUT SNOW?

Risk management in the Hunter UAV Project

ANY INDIVIDUAL, FROM THE PROGRAM MANAGER TO THE NEWEST EMPLOYEE, MAY INTRODUCE AN ISSUE THAT EXPOSES THE PROGRAM TO RISK.

Thunderstorms: A primer

MOST LIGHTNING STRIKES TO AIRCRAFT OCCUR. . .

The rest of the story . . .

THERE'S A SMALL PHOTO ON THE WALL IN FRONT OF MY DESK; IT SHOWS A HAND HOLDING TWO PIECES OF 5/8-INCH, 7-STRAND STEEL SUPPORT CABLE.

"I have the controls,"

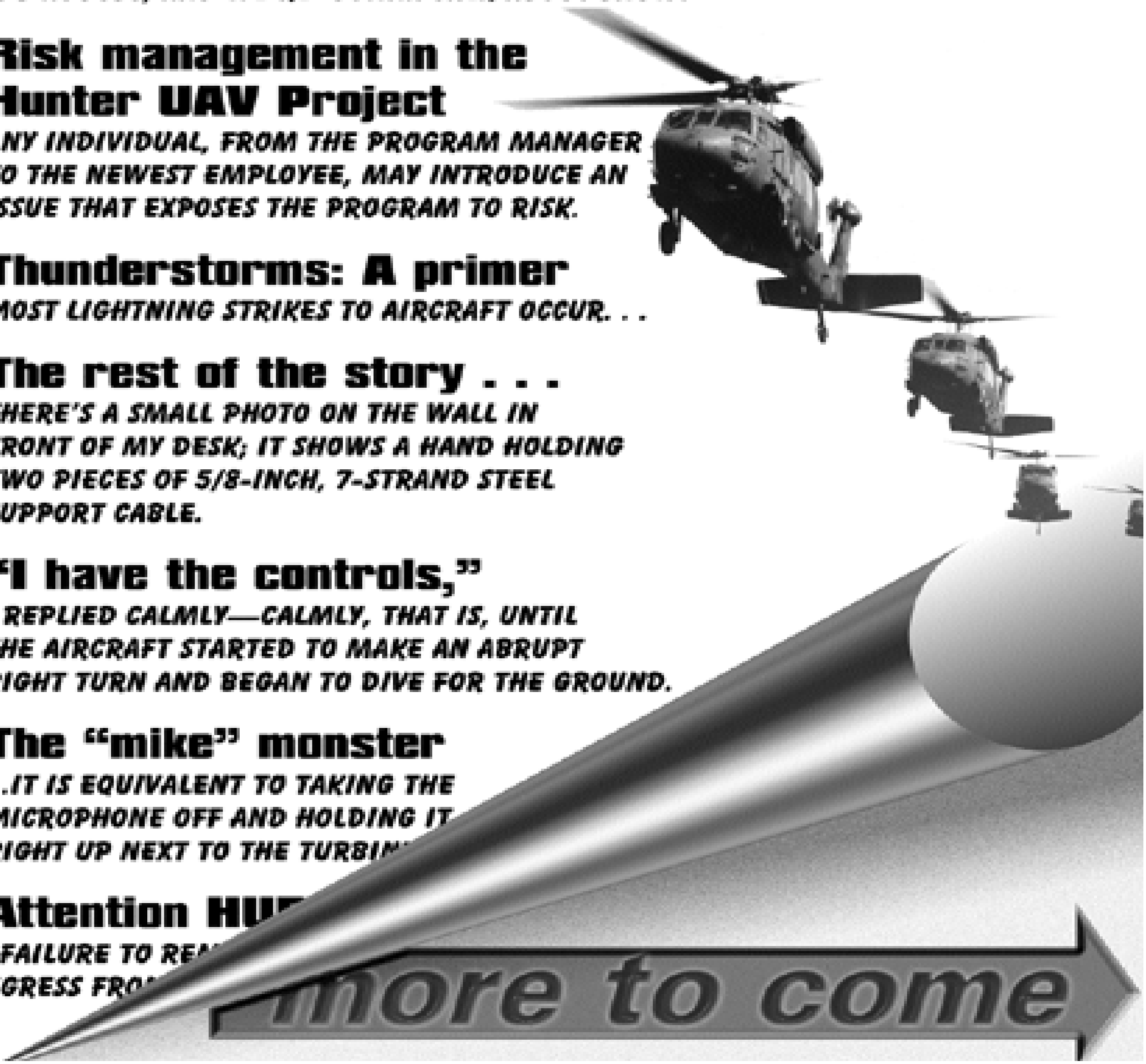
I REPLIED CALMLY—CALMLY, THAT IS, UNTIL THE AIRCRAFT STARTED TO MAKE AN ABRUPT RIGHT TURN AND BEGAN TO DIVE FOR THE GROUND.

The "mike" monster

...IT IS EQUIVALENT TO TAKING THE MICROPHONE OFF AND HOLDING IT RIGHT UP NEXT TO THE TURBIN

Attention HU

"FAILURE TO REA EGRESS FRO



Snow + flying – caution = trouble

SNOW? It's August, and we're gonna talk about snow? You bet. In some parts of the world, the snow's about ready to fly. And even if that's not the case where you are, it's not too soon for you think about getting up to speed on winter flying. Units that haven't already begun at least academic training in cold-weather flying should start it now. Once an aircrew is involved in whiteout during an approach or experiences spatial disorientation over a snow field, it's too late to talk about training.

Inexperience or lack of recent training is a frequent contributor to snow-related accidents. If you are new to an area where a lot of snowfall is expected, get into FM 1-202: *Environmental Flight* as well as all the local SOPs and TTPs. Also ask local instructors and safety folks questions—lots of questions.

But even if you have lots of winter-flying experience, the summer hiatus degrades winter-flying proficiency. So don't think you're exempt from the need to review. Remember, overconfidence can lead to an accident just as surely as inexperience can.

Following are a couple of examples.

Blowing snow

The PC was confident in his abilities, and he had reason to be. He had more than 5500 hours of military flying time, 4450 of them in the UH-1. The PI had almost 4200 total military flying hours, more than 2400 in the UH-1.

The PI was at the controls when the Huey approached the designated landing area. There was a 400-foot ceiling, partial obscuration, snow, fog, and estimated winds of 210 degrees at 8 to 10 knots. Using techniques outlined in FM 1-202 for snow operations, the PI terminated the approach at a high hover. He then maintained the hover for 1 to 2 minutes in order to blow away newly fallen snow on top of the 1½ to 2 feet of crusted-over snow that already covered the landing site.

When the Huey landed on the crusted snow, the rear of the skids broke through, putting the aircraft in a nose-high, tail-low attitude. When the crew chief reported that the tail was only 2 to 3 feet above the snow, the pilots decided to reposition to another spot to level the aircraft. Because the PC had good visual reference on a grassy area outside the right window, he took over the controls.

As the PC picked up to a 3-foot hover to reposition to the grassy area, he lost his visual reference in blowing snow. The aircraft began drifting left, and the tail rotor struck trees. As the PC attempted to set the aircraft down, the left forward skid struck the snow-covered ground, and the aircraft rolled over onto its left side.

This crew attempted to reposition their aircraft without a plan on what to do if they lost visual contact with the ground. The PC probably should have executed a takeoff when he lost ground reference.

Lesson learned: A takeoff under these conditions amounts to an instrument takeoff (ITO). Practice ITOs until they are routine maneuvers.

Snow-covered landing areas

It was winter, and two flights of five UH-60s were on a troop-insertion mission to unimproved landing areas. Chalk 3 in one flight was piloted by the unit operations officer. Because of his unit duties, he had flown only 17 hours in the past 4 months. In addition, he had not been able to attend mandatory unit training in which snow-landing techniques and procedures were reviewed, nor did he attend makeup classes or engage in hands-on snow-landing operations training.

The flights proceeded normally with 7 miles visibility and 1000-foot ceilings in scattered snow showers. Then the two flights separated and began a series of false insertions.

Chalk 3's flight encountered a snow shower as they began a formation approach, and visibility was reduced to about 1 mile. The LZ was a large, open, snow-covered field with an apparent upslope in the direction of landing. The crew of Chalk 3 could see a large amount of snow circulating through the rotor systems of the two aircraft ahead of them.

The pilot of Chalk 3 selected a touchdown point downslope and to the left rear of the lead aircraft. Using the upslope aircraft and distant tree lines as visual references, the pilot made his approach. As effective translational lift was lost at about 20 feet above the ground, with a left quartering tailwind of 15 to 25 knots, a snow cloud enveloped the aircraft. The pilot decided to continue the approach without outside references and reduced power to put the aircraft on the anticipated upsloping terrain. The UH-60 touched down hard in a complete whiteout condition on a combination upslope to the front and downslope to the left. The helicopter rolled over and came to rest on it left side.

Several factors contributed to the difficulty of landing at this site:

- The flight was landing downwind to an upslope.
- The aircraft were landing during a snow shower

Be cautious out there in that winter wonderland

to an LZ with very loose, dry snow.

■ There were only limited stationary visual cues.

The worst thing that happened was that the pilot continued the approach when he lost visual contact with his ground references. He had to monitor two slopes and his position simultaneously, which is a difficult task, especially for a pilot with limited recent snow experience. In addition, the rate of descent was excessive, even for an approach to level terrain. FM 1-202 states that an approach to the ground should not be made in dry-powered snow unless the touchdown area is known to be level and free of obstructions. In this case, the pilot was aware of both the slope and the looseness of the snow. However, he was not aware of his downwind condition.

Lesson learned: Approach and go-around planning are essential for any formation flight. They are even more essential in snow environments. Planning should include—

■ Instructions to execute a go-around if visual contact with ground references is lost or if it becomes apparent that visual contact will be lost.

■ Timing and spacing aircraft into LZs to reduce effects of blowing snow.

■ Specific go-around instructions in premission briefs (what direction to turn, where to land on subsequent approaches, and takeoff procedures).

Other snow hazards

One of the most dangerous snow environments may just be the main airport. The large open areas found at most airports do not provide the contrast and definition needed to maintain orientation, especially when snow starts circulating through rotor blades. Moving around the typical airport is a little easier when you can "air taxi" (high hover at a speed just ahead of ETL). Just remember to keep a good scan going to keep from inadvertently descending.

On airfields, the snow banks that result after snow plows have gone through are usually dirty and provide some contrast and definition unless there is fresh snow. In those cases, watch out for those well-camouflaged snow banks.

Each geographical location has its own set of winter hazards. Typically, each aviator has some good ideas on how to mitigate the risk associated with those hazards. As part of the winter academic program, it may be useful to survey aircrews to determine which hazards they consider the most severe and then evaluate the effectiveness of controls that are in place. Necessary upgrades and development of new controls can then be accomplished.

Summary

Winter has been following summer for hundreds of years. There's nothing we can do about that, even if we wanted to. That very predictability of the seasons can be in our favor. It gives us time to plan our training for the different kinds of flying problems each season can bring. If you haven't already done it, get your refresher training, review FM 1-202, and be cautious out there in that winter wonderland.

—CW5 Bob Brooks, Aviation Systems Branch, USASC, DSN 558-2845 (334-255-2845)

Risk management in the Hunter UAV Project

Some level of risk is inherent in everything we do. In a project that includes an unmanned flying platform controlled by operators on the ground, aviation issues are compounded by electronic data link issues along with the usual ground-equipment issues that require continual risk assessment. Especially in the case of experimental payloads being tested and evaluated aboard this platform, risk is a constantly changing factor in our operations and must be addressed and mitigated continually. In the Joint Tactical Unmanned Aerial Vehicle (JTUAV) Project, we address these risks through a Risk Management Council. Since the establishment of the Council, we have enjoyed sustained operations of more than 2,000 flight hours, including two National Training Center (NTC) rotations, with no incidents attributed to system failure. We have been labeled "indispensable" by commanders rotating through the NTC. This article addresses the background leading to formation of the Risk Management Council and its impact on daily operations.

Dirty laundry

The Joint Tactical Unmanned Aerial Vehicle Project was born in the fast lane and has been accelerating ever since. To provide tactical commanders the best intelligence in the fastest manner, this system was pushed hard through the acquisition cycle. The result was incidents and mishaps that had to be addressed. In September 1995, the system was grounded, allowing the team to determine root causes and corrective actions. During this down period, all aspects of the program were reviewed intensely. While the engineering aspects were cleared up, we also determined that we needed a forum for candid discussion of inherent risk issues. The Risk Management Council was the result, leading to our return to flight in December 1995 and unbridled success ever since.

The Risk Management Council

The Risk Management Council is a chartered organization that meets both regularly and on an as-required basis. The Council, chartered to oversee identification, assessment, and management of technical and programmatic risk exposures, reports directly to Program Management (PM). The Council is authorized to assign actions and recommend resource allocations to avoid, eliminate, or mitigate identified risks within the contractual constraints of the program. The Council includes a core membership of personnel from the JTUAV Program Office, Defense Contract Management Command, Israel Aircraft Industries, Inc., and TRW, Inc., our prime contractor. It is augmented as required with personnel from other contractors and in-house experts. The core membership recommends courses of action to PM, which then approves or disapproves mission plans.

The Risk Management Council has classified program risk into four major categories: programmatic, hardware, personnel, and flight operations. These basic categories enable us to efficiently tailor membership to particular issues. However, all members of the Council are on equal footing during discussions of risk. Any member may raise any issue, and the issue may not be closed without general consensus of the Council's core membership.

No "nay sayers" are allowed on the Council. All issues are addressed with the assumption that the mission will be undertaken; our sole purpose is to identify risk and recommend mitigation to PM. If a course of action is deemed too risky for the project, PM makes the decision not to undertake the mission. In such cases, PM may modify requirements based on the best information available from the Council.

Risk management in the Hunter UAV Program follows a seven-step process:

1. Identify the risk
2. Gather data and analyze the risk
3. Review analyses, assess impacts, and assign levels
4. Prepare the risk-mitigation plan
5. Implement the plan and track progress
6. Re-plan efforts if plan is not being met
7. Monitor low/retired risks for status changes

The first step, identification of risks, is the most important aspect of the entire process. Any individual, from the Program Manager to the newest employee, may introduce an issue that exposes the program to risk. In fact, everyone is charged with the responsibility to identify risks. Input from the people who do the day-to-day work is crucial. Likewise, it is absolutely critical that, once identified, all issues are given full and impartial hearings until the best method of mitigating each risk is discovered and implemented.

As the Hunter UAV Project continues and expands into payload testing and further deployments, more risks are identified and processed through the Risk Management Council. Meetings are held weekly, and special meetings for time-sensitive subjects may be called at any time. The ability of the Council to discuss complex issues and come to resolution on the least-risky course of action for a given mission has become a cornerstone of our daily operations.

—MAJ Paul B. DiNardo, Joint Tactical Unmanned Aerial Vehicle Project Office Field Site Manager, Sierra Vista, AZ, 520-452-9060/9044

Thunderstorms: A primer

What is a thunderstorm? Simply stated, it's a storm that generates lightning and thunder. But it's also capable of generating a lot more, including high winds, hail, flash flooding, and tornadoes.

During their formative stage, thunderstorms are characterized by strong updrafts that can force the storm to a height of more than 60,000 feet. Moisture in the lowest levels of the atmosphere becomes the fuel that fires up the thunderstorm development process. As tiny moisture particles are forced upward, condensation causes them to develop into droplets. As they collide with other droplets, they merge and grow in size. When they become too large for the updrafts to support, the droplets begin to fall. This falling precipitation creates a ***downdraft***.

As the downdraft reaches the surface, it produces a diverging pool of cool air, which becomes the ***gust front*** or ***downburst***. A downburst with winds extending 4 kilometers or less is known as a ***microburst***. Microburst, and its accompanying ***wind shear*** (rapid changes in windspeed or direction), can be difficult to detect and predict because of its small scale and short lifespan.

On a larger scale, one of the most potentially severe events is the ***squall line***. The squall line is a line of thunderstorms that can form along a front or develop 100 to 300 kilometers ahead of it. The mechanism for this event is the angle of the wind flow at about 10,000 feet. A wind flow aloft that is parallel to the front will generally keep most squall-line activity along the front. However, a perpendicular flow can cause squall-line development well ahead of the advancing frontal system. As the thunderstorms in the line develop downdrafts, downbursts may generate new thunderstorms ahead of the squall line. As the advancing downburst winds advance, they may force warm, moist air aloft ahead of it, generating a new squall line.

Strong upper-level wind flow may cause individual thunderstorms to develop rotation in their core. If a large-enough portion of the core is rotating, it's called a ***mesocyclone***. Within the mesocyclone, there may exist a smaller, more intensely rotating updraft that can lead to the birth of a ***tornado***. This violently rotating column of air descends from the base of the storm, at which point it takes on its familiar appearance. If the tornado, with its windspeeds of more than 180 knots, doesn't reach the ground, it's called a ***funnel cloud***.

One of the greatest threats to aviation is that of ***lightning***. As a thunderstorm develops, an electrical charge builds up in the cloud. The exact cause of this electrification is unknown, but what is known is that unlike charges attract each other. The manifestation of this attraction is the lightning stroke (or bolt), an electric discharge that can have a current as great as 100,000 amperes. A charge of this magnitude can damage an aircraft's fuselage and electrical components; it could even cause fuel combustion.

Most lightning strikes to aircraft occur near the freezing level during ascent and near the tops of thunderstorms in level flight. As an aircraft flies through the air, it develops a charge, which in turn could attract an opposite charged lightning strike. The use of composite materials in aircraft skins increases the buildup of a charge during flight, increasing the probability of attracting a lightning strike.

One final phenomenon associated with thunderstorms is ***hail***. As the updrafts in the storm carry moisture aloft past the freezing level, water droplets freeze into ice. As these ice particles are held aloft, they pass through areas of moisture and acquire further coats of ice. This process continues until the ice buildup makes the particle too heavy to be supported aloft, and it falls. This falling particle is hail, which could be encountered aloft during flight even in areas where the freezing level is high enough that the hail melts before it hits the ground.

Despite all the recent advances in technology, there are still limitations to what can and cannot be done to support aviation when it comes to thunderstorms. Even with Doppler weather radar and new lightning-detection capabilities, the oldest axiom still applies—avoidance is still the best rule to live by.

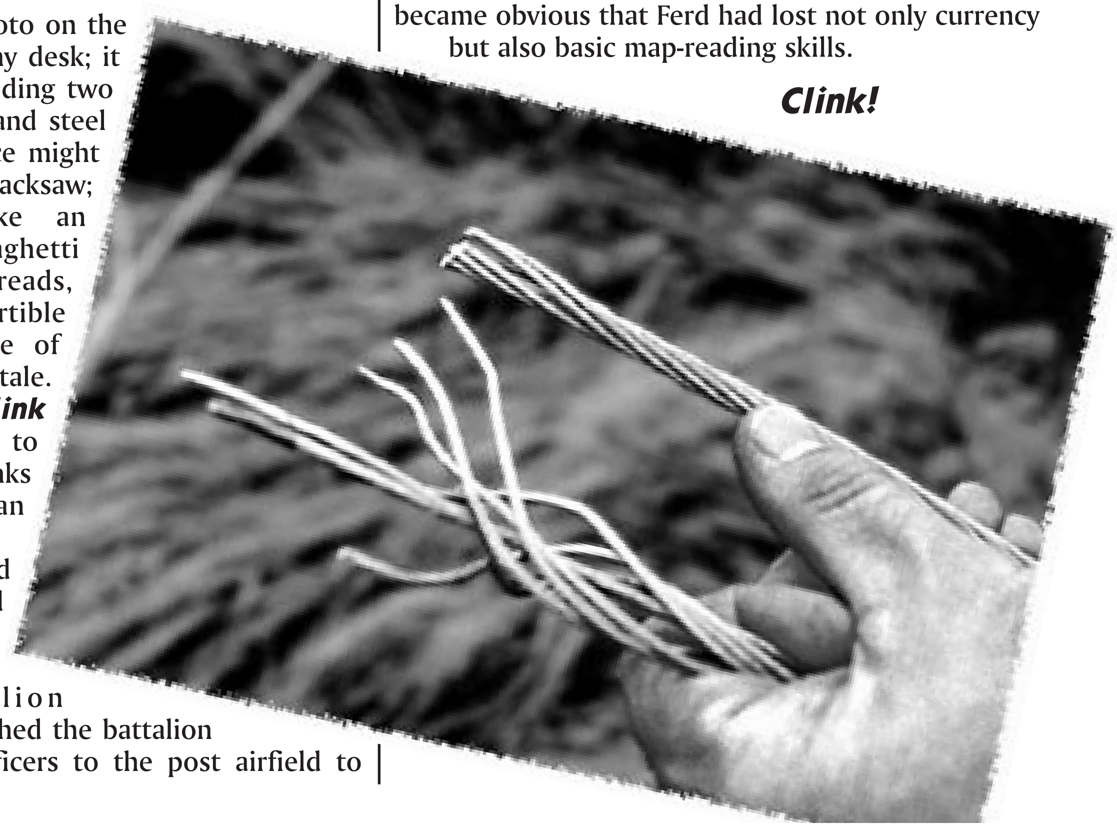
—MSG Ray O'Brien, U.S. Air Force Weather Service, Fort Rucker, AL, DSN 558-8270 (334-255-8270)

"During NOE training mission, crew heard a thump and felt aircraft lurch slightly upward. IP immediately landed aircraft with power in grass-covered field. IP turned controls over to pilot and got out to inspect aircraft for damage. About 100 meters behind the aircraft he found a wire that had been cut by the WSPS. A second wire had passed along the underside of the skids and scraped against the FM antenna before being cut by the tail-rotor blade. Wires were not marked on hazard map."

—***Flightfax*, 20 June 1990**

The rest of the story ...

There's a small photo on the wall in front of my desk; it shows a hand holding two pieces of 5/8-inch, 7-strand steel support cable. One piece might have been cut with a hacksaw; the other looks like an explosion in a spaghetti factory. The caption reads, "Tuttle's Incontrovertible Proof of the Existence of God." And therein lies a tale. And, oh, the sharp ***clink*** you'll notice from time to time is the sound of links being forged in an accident chain.



My National Guard Attack Battalion had deployed to our Annual Training (AT) site a week earlier. The battalion commander had dispatched the battalion and company safety officers to the post airfield to make copies of the Master Hazard Map, from which we would create our individual maps. They brought back good news: The hazard map showed only a few areas with wires—mostly around and through permanent campsites. The Engineers had been busy over the winter; they'd run most of the telephone and power lines underground. Based on this, the Boss decided to forego our usual wire recon and proceed with the training schedule.

Clink.

The first day of our "Three-Day War" tactical exercise was hazy with a good ceiling. During the morning mission briefing (Battalion Deep Attack), I got pole-axed with, "Tuttle will be lead Scout. He'll also be giving 2LT Magellan a currency ride and some mission training. Got to get the rest of the staff up soon or they'll need refresher training too!"

Standard joke. Standard reactions—laughter from the line pilots, rueful grins from the staff.

I'd qualified Ferdinand Magellan in the OH-6 and he'd been pretty sharp. As we marked the mission graphics on our maps after the briefing, I asked Ferd how long it had been since his last flight.

"Early December, I think. Things have been pretty hectic at work."

As it was now the middle of May, the phrase "refresher training" lost some of its humor. I told him I would fly during the mission and use the VHF; he would navigate and use the FM and UHF. We'd break off from the flight after the mission for the currency ride—as briefed.

During our NOE flight to the release point, it became obvious that Ferd had lost not only currency but also basic map-reading skills.

Clink!

I radioed our admin bird that I'd be slowing down for Magellan's benefit and got, "Okay, but why haven't you been acknowledging the radio calls?" A quick check confirmed that both FM and UHF volumes were tuned to whisper mode. Why? "Because I couldn't hear what you were saying with all the radio calls going on."

Clink!!!

"Tell you what, Ferd. I'll fly ***and*** handle the radios. You concentrate on the map. Look at the landmarks I'll point out, keep us on the map, and confirm my call at the control points, okay?"

"Okay. You've got the radios and the controls."

CLINK.

We headed southeast into the midmorning sun toward a long, narrow field bounded on the left by a tree line paralleling our flight path. To the right was a large brushy area fading to woodland; an isolated pair of 40-foot trees stood about midway down the field. As we came abeam the pair of trees, we felt the aircraft lift very gently and heard that soft thump later written up in *Flightfax* . . . .

The Engineers had indeed put the telephone lines underground; however, they had not put all the *wires* underground. Hidden behind the tree line to our left was a telephone pole; lurking between the pair of 40-foot trees to our right was another pole. What I had hit were two of three 5/8-inch support cables (nicely oxidized to a soft, pale gray) strung between the poles—supporting nothing.

There are so many lessons in this little horror story: crew coordination, risk management, aviator overload, just plain basic crew communication. Go back to the beginning; count the ***clinks***. I'd had that "Something's wrong" feeling during most of them, but I'd adjusted only enough to assuage the feeling, not eliminate it.

Our battalion again does a wire recon as the first mission at AT; we also fly a monthly wire sweep of our home tactical training area. When the newbies ask why, somebody usually says, "Ask Tuttle."

Oh yeah, the photo caption. On the OH-6, there's a gap about the length of a U.S. Government pen between the tip of the lower wire cutter and the skid toes. I'd caught the first wire an inch above the breakaway tip and the second one about an inch below the skid toe cap. An inch higher or lower and one of the wires would have passed through the gap and flipped us. If I'd been flying slower, the cutter wouldn't have cut the top wire completely; if I'd been flying faster, the wire would have snapped the cutter tip and flipped us. If I hadn't been flying the only Loach on post with skid shoes, the skid cleats would have snagged the middle wire and flipped us.

We were flying at the only possible combination of altitude, attitude, and airspeed in the only possible Loach that would ensure our surviving a multiple-wire strike.

I figure that's Divine Intervention. It sure wasn't due to any skill on my part.

—CW4 William S. Tuttle, New Jersey ARNG, DSN 445-9261 (609-530-4251)

"I have the controls"

There I was in the left seat of an OH-58D(I): 80 knots and 200 feet agl, not a worry in the world; VFR, and not a cloud in the sky. A simple training mission: go out, burn a fuel load, and do some ATM training. Nothing could be easier. Or could it?

It started with "You have the controls," something you hear all the time. Of course, being a crew-coordination graduate, I had all the right responses. "I have the controls," I replied calmly—calmly, that is, until the aircraft started to make an abrupt right turn and began to dive for the ground.

As hard as I tried, I could not stop the turn nor could I get the nose of the aircraft out of the steep dive. I looked over at my right-seater. A brand-new OH-58D(I) pilot fresh from flight school, he was looking at me, trying to figure out why I was trying to impress him with my flying skills. I mean, we were only 200 feet above the trees and making a run for the ground. Of course, by this time, 200 feet was only a far distant memory. About this time, it struck me that the cyclic was not moving like it should. In fact, the cyclic was not moving at all.

All at once, it came to me like a bad meal. My stomach began to churn as I realized what was going on. I had not checked the flight controls on my side during preflight, and guess what? The cyclic was locked out.

A thousand times I had preached to pilots: Whenever you go flying, check to make sure the cyclic is not locked out. Now, here I am, running out of altitude and ideas with no place to run, and my cyclic is locked out. Thanks to my right-seater's ability to recognize fear in the eyes of his left-seater, he was able to take the controls, maneuver the aircraft right side up, and keep us out of the trees.

Of course, we didn't come away completely unscathed. We overtorqued the engine and transmission, and maintenance may have to replace the seats.

I have come to realize that complacency can strike anyone at any time and that warnings in the operators manual are there for a reason: to save lives. If I can leave you with one thought, it is this: Check the flight controls before you fly. It sure is hard to keep a helicopter upright with only the collective and pedals.

—CW5 Bill Ramsey, Aviation Section, Army Safety Center, DSN 558-2785 (334-255-2785)

The "mike" monster

At the end of the hearing-test portion of my annual Class II flight physical, the technician handed me the chart. My eyes focused on "-70" in the 6000 Hertz section for my right ear. "Minus 70?" I thought. The previous year it had been -55, and the year before that it was -50. I obviously was losing my hearing, but I didn't know why. I knew that most of the high-time aviators in my unit had some hearing loss. The loss was substantial for a few of them. Now I was joining their ranks. Some of them were approaching 8000 hours, but I had only about 4000.

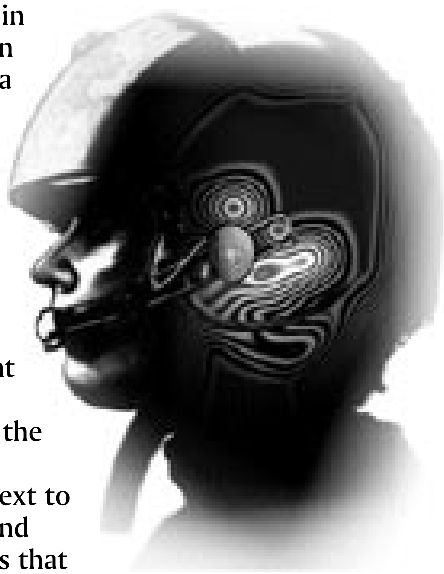
On the drive home, I began to think about how I was damaging my hearing. I'm conscientious about wearing earplugs, changing my helmet earcup seals before they become hard, and keeping the elastic straps behind the earcups tight. I wear bayonet stems on my glasses and make sure they go above the earcups and don't penetrate the earcup seal. I carry earplugs at all times and use them any time there is an aircraft turning on the flight line, when encountering loud music, when driving with the windows down, and when using power tools or lawn mowers. For pistol qualification, I use both earplugs and earcups. What more could I do? I knew that I had better do something fast or I would be going the route of hearing-waivers before very long.

I knew I must reduce my noise exposure to prevent further hearing loss. But to do this, I needed to identify the source of my maximum exposure. I decided to try to be alert for any harsh, shrill, or loud noises. It didn't take long.

During startup on my very next flight, I noticed a shrill whine, the sound of my helicopter's turbine engine. But why was it so loud? I had on my well-fitted SPH-4B helmet with new earcup seals and the chin strap pulled tight.

The answer was that the pilot must keep the mixer panel (C-6533/ARC) mike switch in the "hot mike" position during startup to make required calls to the left seat when both hands are occupied on the starter switch, collective, throttle, and throttle idle detent release button. I had known that this hot-mike switch created a noise problem and had asked my left seaters in recent months to leave their mike switches off during startup and instead use the foot switch. This kept the number of open mikes to a minimum. I also always turn my hot-mike switch off as soon as possible during the starting sequence to minimize our exposure to the one open (hot) mike.

As I began to think about hot mikes, several things became apparent. First was that although we had increasingly been trying to limit their use, there had still been a number of times when we had had one to three mike switches in the hot-mike position for up to 2 hours at a time during difficult missions.



An open switch for the boom mike on an aviator's helmet totally bypasses all the hearing protection provided by the flight helmet. Worse, it is equivalent to taking the microphone off and holding it right up next to the turbine engine and transmission. It takes that noise, amplifies it, and broadcasts it directly into your ears from the speakers located in the earcups of your flight helmet. The only possible salvation here is earplugs. If you do not wear them, your hearing days are surely numbered.

Using the hot-mike position also creates a length-of-exposure problem. The loud whine of the transmission and engine can be heard every time a crewmember keys the mike, even for a moment. The theory is that the microphone is right up against the crewmember's lips and is designed to receive only the crewmember's voice. But the fact is that if the volume is set high enough to hear other crewmembers' communications, then the high-pitched and shrill cockpit background noise is being picked up and amplified anytime a crewmember keys the mike. Perhaps a future solution to this problem will be use of a "notch filter" in the amplifier, or downstream of it, that totally blocks out the primary frequencies that comprise the engine whine.

My sole purpose here is to address the problem of the inadequacy of some of our equipment and to caution young Army aviators of the certainty of things to come if they do not use every possible means to protect their hearing.

—CW4 Don C. Thomson, Missouri ARNG, DSN 555-9330/9347 (573-526-9330/9347)

Attention HUD/ODA users

A recent inquiry to the Night Vision Devices Branch at Fort Rucker involved the ANVIS lanyard that goes around the neck and its use when operating the head-up display or optical display assembly.

In May, change 9 to the OH-58D(I) operator's manual added the following warning: "Failure to remove the ANVIS neck cord prior to operation of the ADSS may prevent egress from the aircraft in an emergency."

GEN-97-ASAM-04 (101430Z Apr 97) said in paragraph 8e(4), "Installation of the ANVIS/HUD DU requires removal of the standard ANVIS neck cord assembly to facilitate egress from the aircraft in the event of an emergency. An additional (removable) neck cord assembly is provided with the ANVIS HUD. This cord must be removed from the ANVIS when the ANVIS/HUD is installed and must be replaced prior to flying with the basic ANVIS. The assembly consists of a neck cord (strap, webbing), P/N 125302, NSN 5340-01-396-1746, and barrel fastener (cylinder), P/N 125301, NSN 5340-01-393-4890. This neck cord can also be used to replace the lanyard used on any standard ANVIS system."

The original intent for this special lanyard was for users of the AN/AVS-7 HUD, but the lanyard will work fine with the OH-58D(I) version of the HUD also.

The ANVIS -10 requires that the lanyard be in place when operating the ANVIS in flight. A change is in the mill to address operations with the HUD/ODA attached to the ANVIS without the lanyard installed. The folks at PM-Night Vision say that, until that change comes out, it's all right to operate the ANVIS without the lanyard installed as long as the HUD/ODA is attached.

The bottom line is, if you are using a head-up display that attaches to the ANVIS—whether you call it a "HUD" or an "ODA"—remove the neck cord to facilitate egress in the event of an emergency.

—CW5 Bob Brooks, USASC Night Vision Systems Manager, DSN 558-2845 (334-255-2845)

STACOM

STACOM 170 ◆ August 1997

Contractor flight crewmembers

The Army uses contractor flight crewmembers in many capacities and situations, and specific guidelines have been established to cover their use. AR 95-20 establishes the minimum qualification requirements contractor flight crewmembers must meet. For example, a contractor instructor flight crewmember who is contracted to instruct U.S. Army pilots (student or rated pilots) must—

- Meet FAA Part 61 Certified Flight Instructor certification requirements, OR
- Be a graduate of a Department of the Army instructor-pilot course of instruction in the category in which he or she will instruct.

These personnel are authorized to perform only the instruction contracted for and only to the students specified in the contract. They may not administer the Aircrew Training Program as defined by AR 95-3. Personnel who are not under contract to instruct or evaluate Army personnel are NOT authorized to do so. Contractor instructor flight crewmembers operating within other contracts are authorized to administer instruction and flight evaluations to other flight crewmembers employed by the contractor if approved by the Government Flight Representative (GFR).

The terms *Maintenance Evaluator* or *Maintenance Test Flight Evaluator (ME)* and *Standardization Pilot* or *Standardization Instructor Pilot (SP)* are U.S. Army specific terms. A contractor flight crewmember can receive his or her annual evaluation and any no-notice or other required evaluation from a U.S. Army ME or SP, or from a contractor instructor flight crewmember who is qualified to perform the duties being evaluated (i.e., MTP or IP) if approved by the GFR. U.S. Army IPs, SPs, IEs, and MEs can administer flight evaluations to contractor flight crewmembers only when authorized in the contract or approved/directed by the GFR or the individual's commander.

Note that separation from military service automatically terminates Army orders as IP, SP, IE, MP, or ME. Separated personnel must meet the qualification requirements of AR 95-20, the contract, and the contractor's procedures.

—CW4 Joseph Gonzalez, DES, DSN 558-2532 (334-255-2532)

Standardization Communication ■ Prepared by the Division of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5208, DSN 558-2603/2442. Information published in STACOM may precede formal staffing and distribution of Department of the Army official policy. Information is provided to enhance aviation operations and training support.

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class C

F series

■ N2 rpm decreased and low rpm audio/light activated during area recon training. PC lowered collective to regain rpm. Upon applying collective to arrest rate of descent, rpm again decreased, and engine failed at 40 feet agl. PC autorotated to muddy, uneven terrain. On touchdown, aircraft skidded about 15 feet, tilted forward on skid toes, and rocked back before coming to rest. Landing gear was damaged, WSPS breakaway rivets sheared, and sheet metal was damaged.

Class E

F series

■ Back-seat pilot saw aft fuel boost segment and master caution light come on (fuel gauge showed 950 pounds) and transferred controls to PI. PC pulled aft fuel boost circuit breakers and aircraft landed without incident. Maintenance found that a required washer was not installed IAW change 22 to the TM. Change was not posted because maintenance was awaiting change 21.

AH64

Class C

A series

■ Postflight inspection revealed damage to No. 2 engine cowling door. Suspect door opened in flight.

Class E

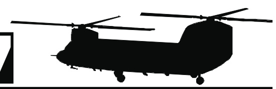
A series

■ While ground taxiing in from runway, tower advised crew that No. 1 engine cowling was open. Normal shutdown was completed. Maintenance inspection revealed damage to ribs of cowling.

■ In cruise flight just after takeoff, BUCS failure caution light came on, and pitch and roll DASE channels dropped off line. Crew landed aircraft back at airfield and attempted to clear malfunction. During subsequent start, BUCS failure light again came on along with oil psi main transmission No. 1 caution light. Maintenance replaced longitudinal servo actuator.

■ Torque gauge changed from 64 to 44 percent during hover. Suspect malfunction of data converter for torque gauge.

CH47



Class E

D series

■ Crew had just completed before-takeoff checks to be followed by VMC takeoff. Just before takeoff, aircraft started to vibrate. Within 3 seconds, vibrations had become extreme, particularly in forward transmission and cockpit areas. Emergency shutdown of both engines was performed. Forward transmission was replaced.

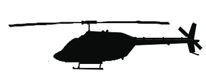
■ Forward hook open light came on after load was lifted. Cable assembly was replaced.

■ Aircraft encountered turbulence in cruise flight, resulting in unusual pitch attitude. Master caution and aft transmission lights came on momentarily. Flight engineer heard noise from vicinity of tunnel area and smelled burning oil. After landing, oil was observed in combining-transmission area. Cause not reported.

■ Flight engineer heard unusual noise in vicinity of forward transmission and felt high-frequency vibrations. Sync shaft sliders were cleaned, and vibrations checked okay.

■ No. 2 hydraulic caution came on in flight. Flight engineer confirmed loss of fluid and high temperature. Aircraft landed with no damage, and maintenance replaced No. 2 hydraulic flight control pump.

OH58



Class A

A+ series

■ Pilot entered autorotation due to suspected underspeed. Control was lost, and aircraft crashed and burned. Two of three persons on board were killed; the other was injured.

Class B

D(I) series

■ PI initiated deceleration during simulated engine failure training. IP took controls and applied collective to arrest perceived high rate of descent. Aircraft touched down hard, damaging main rotor blades, severing tail boom, and collapsing landing gear. No injuries.

Class C

D(I) series

■ Engine flamed out following activation of analog test switch (engine overspeed test procedure) during engine runup. IP noted smoke from engine exhaust during coast-down, performed engine shutdown, and instructed student to monitor tgt and to depress starter if it appeared that tgt would exceed limits. After IP egressed to make initial accident notification, student noted tgt rising and depressed starter. Upon engagement, tgt rose rapidly to 1029° for 3 seconds.

A+ series

■ Crew aborted start due to low N1 reading (14%). Using AH-1F battery, crew attempted second start. N1 peaked at 17 percent prior to opening throttle. Start appeared normal until tgt spiked to 1000°C. Engine replacement required.

UH1

Class A

H series

■ Aircraft was transporting six passengers to remote radar site when it crashed into the side of a pinnacle and rolled downhill. No fatalities, but aircraft was destroyed. Accident is under investigation.

Class D

H series

■ While performing masking/unmasking operations at 20-foot hover, N2 bled off. Collective was lowered, and all indications returned to normal. Aircraft was landed and, after discussing indications, PC decided to conduct OGE power check. During power increase, compressor stalled. Suspect linear actuator became momentarily jammed by dirt and dust, then was cleared by vibration from compressor stall. Both 40-

and 90-degree gearboxes were replaced, but engine was not.

Class E

H series

■ After 1-hour flight, crew noticed wet spots on concrete pad after taxiing aircraft to Compass Rose. Investigation revealed fuel drops coming from fuel vent line, but no leaks were found in engine compartment. Maintenance replaced overspeed governor due to fair wear and tear.

■ Pilot felt cyclic binding in aft quadrant during pickup to hover. Troubleshooting revealed that cyclic controls were not properly rigged, and stops were contacted prematurely in forward CG situations. Controls were rerigged.

■ During cruise flight at 1400 feet msl, smoke filled cockpit, followed by master caution but no segment light. Feedback was felt in controls. PC diagnosed hydraulic failure. Smoke cleared when left-side cabin door was opened, and run-on landing was made without incident. Maintenance found hole in left servo inlet line and replaced hose. Suspect hoses are rubbing against each other. Maintenance personnel are checking every hydraulic line in all UH-1s.

V series

■ During maintenance test flight, power was being applied to TEAC engine when a pop was heard. N2 went to zero, rotor rpm started to climb, aircraft yawed, and engine chip light came on. Collective was increased to further load rotor, and throttle was controlled manually under emergency governor operations. Aircraft was landed to open field without incident, and emergency shutdown was completed. Cause not reported.

■ During 2-minute shutdown for cold refuel at FBO, PC unlatched left cockpit door. Door was immediately slammed open by 20- to 25-knot tailwind, and lower left hinge cracked. Hinge was replaced after mission completion.

■ PC noticed lack of N1 indication on engine start. Maintenance replaced N1 indicator gauge and released aircraft for flight.

UH60

Class C

A series

■ Input module exploded while aircraft was in cruise flight at 900 feet msl. Aircraft was landed without further incident. Explosion damaged hydraulic system, engine, and fuselage.

Class E

A series

■ No. 1 hydraulic pump caution light and backup pump advisory light came on while on the ground. Inspection revealed hydraulic fluid on left wheel and exiting overboard drain. Cause not reported.

■ No. 1 generator caution light came on in cruise flight. After emergency procedures were performed, main transmission temperature entered precautionary range then rose beyond max temperature range within 10 seconds. Main transmission module, both input modules, and accessory modules are being submitted for analysis.

■ No. 1 tail rotor caution, No. 2 tail rotor advisory, and backup pump lights came on in cruise flight. Crew executed emergency procedures and made roll-on landing. When tail rotor switch was placed to normal during shutdown, all caution advisory lights went out.

■ Severe lateral vibration occurred during cruise flight, and crew landed as soon as possible. Vibration stopped when maintenance officer turned off SAS 1.

■ During runup for maintenance test flight, aircraft shook abnormally when rotor blades began turning. Aircraft was shut down. Cause not reported.

C12

Class D

R series

■ Aircraft was struck by lightning while in cruise at flight-level 280. Postflight inspection revealed pinprick entry points on radome and exit points on left aileron and elevator.

Class E

C series

■ During No. 2 engine start, battery charge light failed to illuminate after No. 2 generator was engaged. Loadmeter indicated 20 percent without usual spike associated with generator coming on line. Aircraft was shut down. Caused by failure of right-side current limiter.

D series

■ During takeoff roll, No. 2 engine would not produce calculated power of 84 percent at 31°C. Engine produced only 81 percent at tgt limit. Takeoff was aborted and aircraft was taxied to parking without incident. Maintenance adjusted tgt-sensing unit.

■ Autopilot/yaw damp system would not disengage during taxi to active runway, and mission was aborted. Caused by failure of autopilot engage switch on mode controller.

■ Right fuel gauge indicated 300 pounds less than actual amount in right main tank during cruise flight. Mission was aborted and aircraft returned to base. Suspect faulty probe.

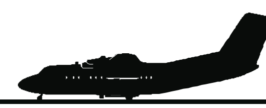
F series

■ Right generator went off line after climbout and could not be reset. Crew returned to home station, where voltage regulator was replaced.

R series

■ When power was reduced to begin descent from flight-level 280, left engine torque would not reduce below 65 percent with engine power lever at flight idle position. No. 1 engine was secured, and single-engine landing was completed without incident.

O5



Class E

DHC-7

■ No. 3 engine would not accelerate beyond 35 percent during startup. Troubleshooting revealed faulty flow divider.

■ No. 3 engine oil pressure fell below 75 psi on short final. Engine was secured and landing completed. Inspection revealed garlock seal on hydraulic pump mounting pad was leaking. Seal was replaced.

■ During takeoff roll, No. 3 engine exceeded 800° at 3500 pounds of torque. Takeoff was aborted and aircraft was returned to ramp. Troubleshooting revealed faulty turbine temperature indicator.

■ No. 1 engine would not light off during engine start. During second attempt, white smoke was seen in vicinity of intake and start was aborted. Troubleshooting revealed failed starter generator assembly.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-64-97-ASAM-06, 161826Z Jun 97, maintenance mandatory.
Cracks have been discovered in fastener holes of the No. 1 stringer in the area of fuselage station 385. This is the area where the anti-flail bearing mount connects to the stringer. In addition, gaps have been found between the stringer and mount. The purpose of this message is to direct a one-time inspection of the No. 1 stringer for cracks in the fastener holes and gaps in the interface of the stringer and the forward anti-flail bearing mount between fuselage stations 383 and 386. ATCOM contact: Mr. Howard Chilton, DSN 693-1587 (314-263-1587).

UH-1-97-ASAM-05, 011330Z Jul 97, maintenance mandatory.
UH-1-97-ASAM-02 directed that all units remove obscuring material from the red and green navigation position lights because masking violated FAA regulations when aircraft were operated in National airspace at night. The original intent of masking these lights was to prevent disruptive glare during NVG operations. Once the masking was removed, an unacceptable level of glare persisted for NVG operations. A masking scheme has now been developed that complies with both FAA regulations and NVG user requirements. The purpose of this message is to require a one-time masking of the red and green position lights to the exact specifications outlined in the message. ATCOM contact: Mr. Bob Brock, DSN 693-2718 (314-263-2718), brockb@stl.army.mil.

Maintenance-information messages

AH-64-MIM-97-06, 160941Z May 97.
Dry film lubricant, dirt, and debris collecting in the lead lag link joint may cause binding and can significantly degrade the life of components and increase the failure rate of AH-64 main-rotor strap packs. The purpose of this message is to outline inspection and correction procedures. ATCOM contact: Mr. Ken Muzzo, DSN 490-2257 (314-260-2257).

OH-58A/C-MIM-97-04, 081054Z May 97.
An incorrect change was incorporated into TM 55-1520-228-23-2, page 11-41, paragraph 11-101r through Change 9, dated 28 February 1997. The purpose of this message is to correct that error and serve as authority to implement the correction until the printed change is received. ATCOM contact: Mr. Kevin Cahill, DSN 490-2252 (314-260-2252).

UH-60-MIM-97-02, 101135Z Jan 97.
Different stabilator actuator assemblies require different electromagnetic environment (EME) tests. This message explains which EME tests are to be performed on which assembly. ATCOM contact: Mr. Derek Dinh, DSN 490-2264 (314-260-2264).

UH-60-MIM-97-03, 241638Z Jun 97.
In October 1996, change 4 to TM 1-1520-237-23-1 changed the retirement life of the H-60 main rotor spindle nut from 2500 to 500 hours. At the time, it was cheaper to buy a new nut and replace it every 500 hours than to overhaul the old nut until retirement at 2500 hours. Present economic conditions dictate that it is more cost effective to overhaul until the retirement life is reached. The purpose of this message is to change the overhaul/retirement life and SMR code of the main rotor spindle nut. ATCOM contact: Mr. Derek Dinh, DSN 490-2264 (314-260-2264).

IN THIS ISSUE

Class A Accidents

through June

Quarter	Month	Class A Flight Accidents 96	Class A Flight Accidents 97	Army Military Fatalities 96	Army Military Fatalities 97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3D QTR	April	1	2	3	2
	May	0	2	0	1
	June	1	2	6	1**
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
	TOTAL	7	11	16	7

*Excludes 1 USAF pilot trainee fatality
**Excludes 1 Air National Guard passenger

U.S. ARMY SAFETY CENTER

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Brigadier General, USA
Commanding General

Flightfax

ARMY AVIATION
RISK-MANAGEMENT
INFORMATION

SEPTEMBER 1997 ◆ VOL 25 ◆ NO 12

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VIRTUALLY EVERYBODY IN THE UNIT KNEW HOW THE PC FLEW, BUT NOBODY STOPPED HIM. EVENTUALLY HE TOOK ONE CHANCE TOO MANY AND PAID FOR IT WITH HIS LIFE.

Everybody knew

As Army aviators, we've all heard it, and most of us have said it at one time or another: "I knew something like this was going to happen!" These words are almost always uttered after a breach of flight discipline results in an accident.

When an Army aviator routinely takes unnecessary risks, somebody in the unit knows about it. Sometimes a lot of people know about it. That was true in the following case, which happened several years ago. However, accidents from similar causes continue to this day.

The accident didn't just happen on the day the OH-58 crashed into a lake. It really began long before then. It had its roots in the kind of flying the PC had been doing for the past year—and maybe even longer. In the 12 months before the accident, four operational hazard reports (OHRs) had been filed against him in addition to at least two verbal reports about his flying.

So, a lot of people knew.

Other aviators knew

Several aviators had reported the PC for his "cowboy" style of flying. They called him a "hot dog," and some of them refused to fly with him. OHRs mentioned seeing him accelerate down a runway at 60 to 70 knots during takeoff from an airfield that was below VFR minimums. Two pilots reported him for placing his helicopter in an extremely nose-low attitude during takeoff. Another aviator—the pilot of the lead aircraft in a flight of five OH-58s—had to execute a go-around to avoid this PC's aircraft when it taxied onto the runway in front of him. The PC then brought his aircraft to a hover as the third aircraft in the flight terminated its approach, endangering the landing aircraft.

The crew chiefs knew

Some of the enlisted crewmembers in the unit enjoyed the "thrill" of flying with this PC. They liked his aggressive style of flying; they found other aviators boring by comparison.

The standardization officer, the safety officer, and the platoon leader knew

Not only were they aware of the OHRs and other reports about the PC's flying, they had heard rumors about still other incidents. They had discussed the problem among themselves, and after the second verbal OHR (the last of a total of six), they went to the acting unit commander and requested that the PC be grounded.

The unit commander knew

Although he knew about the OHRs, written and verbal, and rumors about the PC's flying habits, the commander apparently looked at each of the reports as a separate incident and never considered them as an indication of a pattern. When his staff recommended that the PC be grounded, the commander decided that verbal counseling was the better route to take, although he had grounded aviators in the past for one reason or another. He had flown with the PC several times, and each time it was a "by-the-book" flight.

The accident

The mission was cross-country training. The aircraft took off around 0900, and the flight proceeded normally. After two stops for fuel and to eat lunch, the crew removed the doors from the OH-58 and again took off. The PC was at the controls from the left seat. As the aircraft neared a large lake, he brought the helicopter to within 5 feet of the water and began flying along the long axis of the lake at 90 to 100 knots. After about 3 minutes, the aircraft hit the water with explosive force and immediately sank.

VIDEO AVAILABLE

The accident described in this article was recreated in a Crashfax Video ("High-Risk Aviator," CFV 46-2, PIN 707997), which is still available through Training Aids Service Center film libraries at installations Armywide. The video opens the door to self-examination, not only by individual aviators but by the unit as a whole. It prompts commanders, ASOs, and aviators alike to ask, "Could that happen in my unit? Do those conditions exist here? Could that be me?"

History of flight

The copilot had been at the controls during the early stages of the mission, handling not only the flying but also the navigation and the radios. When he began falling behind the aircraft, the PC took over the controls and the radio, leaving the copilot to handle navigation.

When they took off after lunch, the PC was still at the controls and the copilot was navigating. The PC initially descended to about 30 feet agl, although that was below the 400-foot restriction for the OH-58. The PC continued to allow the aircraft to descend as it approached the lake. He told the copilot to navigate a direct route back to the airfield and to handle the radio calls. The copilot was looking at his map when the aircraft hit the water.

The copilot managed to surface and grab hold of a piece of floating debris. Two boats reached the crash site, and the crew of one pulled the copilot from the water while the other began searching for the PC. It was several days later before Navy divers recovered the PC's body from the bottom of the lake. He was still strapped in his seat.

Why?

Why did this PC continue to fly the way he did even after he had been reported and counseled? Why did his friends delay in reporting his unsafe behavior? Why didn't the crew chiefs realize that a "thrill" could cost them their lives? Why didn't the unit commander see the reports on this aviator for what they were: not isolated incidents but signs pointing almost inevitably to an accident?

Why didn't somebody stop this aviator before he killed himself? After the accident, he was described as "high risk." But he was also described as intelligent, bright, and an aviator who loved to fly. While his fellow aviators recognized his technical proficiency in the cockpit, everybody knew he was headed for trouble.

Acting on that knowledge might have saved his life.

SPEAK UP

You may know about aircrews or aircrewmembers who may not have four to six OHRs filed on them but are beginning to become overconfident. Sometimes it's enough to just say something like, "Is that type of flying really necessary?" or, more pointedly, "I think you're getting too aggressive. No joke."

As Barney Fife always said, "Nip it in the bud!"

TOUGH CARING

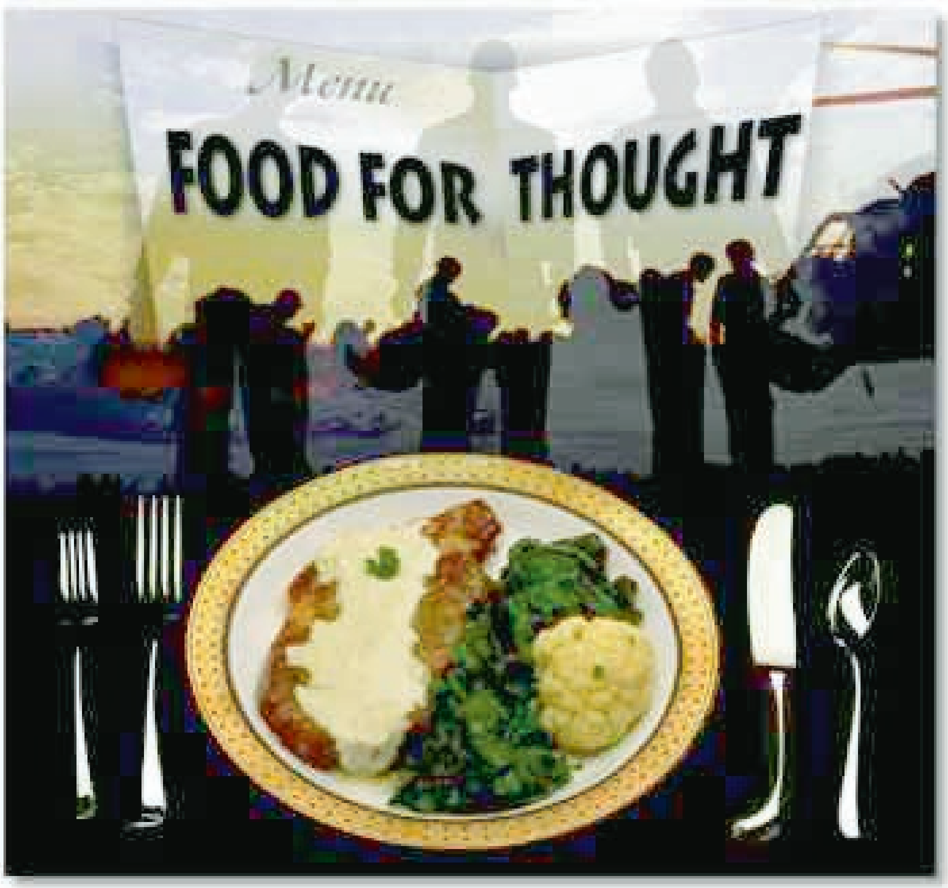
This accident graphically illustrates what can happen when there is a lack of "tough caring." Tough caring is people caring enough about their own professional performance and the performance of other members of their unit to police themselves and their fellow soldiers. Tough caring is also leaders caring enough to fix accountability, tighten supervision, set standards for performance and parameters for operations, and require that all operations be conducted within those parameters.

All in the family

We members of the Army aviation family fly aircraft, maintain aircraft, rearm and refuel aircraft, and drive Army vehicles. And most of us do it safely most of the time. But sometimes—for some reason—some among us will abandon professionalism and take unnecessary risks. They'll push themselves or their equipment beyond safe limits, and they'll have an accident. And one or more members of our Army family will die.

In FY 96, accidents took the lives of 16 Army aviation family members. Through July of this fiscal year, we've lost 15 more. In some of these accidents, there was a pattern of unsafe behavior or unprofessional attitudes, but nobody said or did anything to correct it. And somebody died.

Awareness of unsafe behavior or unprofessional attitudes is important. But awareness alone is not enough. We must care enough to ***take action*** to prevent that unsafe behavior or unprofessional attitude from causing an accident. The longer it goes uncorrected, the more likely it is to continue. Undisciplined behavior rarely corrects itself. It continues until someone is killed or someone cares enough to take corrective action.



When there's an undisciplined member in our unit family, it's never a secret. We know. We talk. The question is, do we care? Do we care enough to do the tough thing—the caring, professional thing—and report our brother or sister? That's tough to do, but it's not as tough as wondering after an accident whether something we could have done might have saved someone's life.

Are we our brothers' keeper? In Army aviation, we have to be. To just stand by and watch one of our own endanger himself and others is a violation of the special trust and responsibility we have as members of the Army aviation family. We must care. We must act.

It's a family matter.

The consequences of silence

How seriously do we take our professional and personal responsibility for the safe-keeping of our fellow aviators? When we see substandard performance or a reckless attitude, do we look the other way and hope nothing bad happens? Do we avoid personal conflict by convincing ourselves that a fellow aviator's lack of professionalism is none of our business?

On the other hand, how receptive are we ourselves? How would we react to a fellow aviator calling our hand about a breach of flight discipline or an occasional failure to perform to standard? Would we take offense, or would we take it to heart as a sign of caring?

We hesitate to confront each other for many reasons. The main one is that confrontation is hard. But even harder would be living with the consequences of our silence when the worst happens.

Think about it.

Aircraft recording devices

What to do if the worst happens

Many Army aircraft today contain flight data recorders (FDRs), cockpit voice recorders (CVRs), voice and data recorders (VADRs), or other recording devices. These devices provide important data to the accident-investigation process and, even more important, to the accident-prevention process. Most ASOs know that, in the event of an accident, they should secure any recording device and report its presence to the Army Safety Center during the initial mishap-notification process.

However, these days, aircraft recording devices are incorporated into a wide variety of aircraft systems beyond the easily recognizable and labeled FDR and CVR "black boxes," which, by the way, are often painted bright orange. Recording devices today are built into mission processors, backup controllers, fire-control computers, data-transfer systems, and other aircraft system "black boxes" that really are painted black. This can result in their being overlooked during the confusing and stressful first hours after an aircraft accident. In addition, many of these recording devices have volatile memory, which means that, if the device loses electrical power, the data will be lost. Therefore, time is of the essence when dealing with these systems before their internal power reserves (i.e., batteries) bleed down.

The best you as a unit ASO can do is become familiar with the different types of recording devices installed in your unit's aircraft and how to deal with them before an accident occurs.

FDRs, CVRs, and VADRs

For aircraft equipped with a crash-survivable recording device (FDR, CVR, or VADR), all you need do is to notify the Army Safety Center during the initial notification message. Do not attempt to remove these devices from the aircraft; simply secure the wreckage from further damage.

Volatile-memory devices

For aircraft containing mission processors, ANVIS/HUD processors, engine monitoring systems, or other noncrashworthy volatile-memory devices, notify the USASC as soon as possible, providing as much information about the device as possible. However, never delay initial accident notification in order to gather information on recording devices. That information can be provided in a later message or fax. And remember, if the recording device has volatile memory, it becomes a race against time to return the device to its manufacturer for downloading before its internal power sources degrade.

Data-transfer systems

The OH-58D(I) uses a data-transfer cartridge (DTC) to load data into the mission processor. The DTC also acts as a noncrashworthy FDR that records up to 79 flight, engine, and system parameters. The Army Safety Center has the capability to download, process, and display this information and will do so not only for Centralized Accident Investigations but also for unit-level investigations.

If your unit has an accident that the Army Safety Center will investigate, do not remove the DTC. Simply secure the wreckage. If the investigation will be done at unit level and you want the Army Safety Center to handle the DTC data processing for you, carefully remove the DTC from the aircraft, package it securely, and contact the Army Safety Center for further instructions.

Video/audio tapes

Onboard video or audio recording devices can also be a valuable source of information. If an aircraft with such a device is involved in a mishap, protect the tape from further damage; do not remove the tape device cartridge from the wreckage. Simply secure the wreckage, and notify the Army Safety Center that a recording device was installed.

Other recording devices

If your unit's aircraft have test instrumentation, nonstandard recording equipment, or other recording devices that may have been installed to support a special program, you should follow the same general processes described above. If the recording device will be exposed to further damage if left in the wreckage, then take the appropriate steps to protect it. Do not remove the device. Simply secure the wreckage and notify the Army Safety Center that a recording device was installed in the aircraft. Again, do not delay the initial notification in order to gather information on recording devices. That information can be provided in a later message or fax.

POC: Mr. Gary Rasponi; Chief, Investigations Branch, USASC; DSN 558-2194 (334-255-2194); rasponig@safety-emh1.Army.mil

There I was . . .

. . . in the front seat of a Cobra with a No. 1 hydraulic system failure, halfway down a 4800-foot runway, doing 50 knots about 3 inches above the pavement. Just the normal emergency procedure for this particular situation, with one pesky little difference: We were flying sideways.

Gee, glad you asked.

Gary and I were going out to fly some SIP vs. IFE training (for me) and a few PARs (for him). We'd flown together for about 20 years and our crew briefing usually consisted of, "We're going out for a stan (or instrument) ride. You know the maneuvers we'll be doing. Got any questions? Okay, let's go do it!" Today, though, the briefing was a little different because Gary was now the honor graduate of our flight facility's second Aircrew Coordination Course. (Modesty *almost* prevents me from revealing that I was his trainer.)

After a by-the-book crew briefing, he added, "Let's prebrief two specific emergencies—first, an engine failure at altitude; second, a dual-system hydraulic failure." After he detailed each pilot's responsibilities for each emergency (again, by the book), he said, "If we do get a failure, I'll fly because I've got that good ol' three-to-one mechanical advantage in the back seat."

"Sounds good," I said, "and if you don't ask me for the emergency collective hydraulic pump when we're a mile out on final, I'll announce and then turn it on."

"Okay, let's go do it!"

We were 5 minutes into our flight when a noise like a blender full of gravel caused both of us to shrink down into our armored seats. I've long-since forgotten the rpm of a cavitating hydraulic pump, but it's a figure only Carl Sagan would comprehend. Two seconds later, the amok blender was joined by its friends, Messrs. Master Caution and #1 HYD PRESS lights. (For those of you unfamiliar with the idiosyncrasies of the AH-1F, a No. 1 system hydraulic failure means your antitorque controls are now about as movable as the division commander's desk.)

As briefed, Gary continued to fly while I read off the checklist. As briefed, he turned toward a suitable area for a "run-on landing at a speed of 50 KIAS or higher"—which just happened to be home station. As briefed, I called the tower, declared an emergency, and told the controller we'd be coming in for a run-on to the duty runway.

Suddenly, the grinding noise stopped, and Gary said he had normal pedal control back. While we mulled over this new development, the pump began to cavitate intermittently for several seconds. Aha! We were losing fluid, but we hadn't lost it all; the pump was operating intermittently (bear that in mind for later). The pump now resumed its annoying cavitation, and (again, as briefed) I provided some additional pressure to the appropriate pedal whenever Gary called for an assist in maintaining heading. We then performed our by-the-book before-landing check—as briefed.

Cut to final approach (and yes, I had announced, "We're at one mile. Emergency collective hydraulic pump coming on," and Gary had acknowledged—as briefed). "We've got a slight crosswind; help me out with a little left pedal to straighten out the nose."

"Okay, left pedal coming in; nose is straight down the centerline. Approach angle's good, airspeed's at sixty, and before-landing check still valid." We touched down at 60 knots in an impressive display of sparks, smoke, and textbook aircrew coordination. As we slid through 50 knots, we came to the intersecting runway, which has a slight crown, and became airborne—just as the hydraulic pump stopped cavitating.

Go back and reread the first paragraph. It's okay; I'll wait.

When the pump grabbed the last few ounces of fluid, several things happened simultaneously: the nose snapped left 90 degrees, we rolled right about 10 degrees, Gary uttered a scatological expletive, our airspeed decreased rapidly (due to the "barn door" effect), we began sinking back to the runway, and the pump resumed its manic cavitation.

We hadn't briefed this!

Since my aviation career objective (living through the next 5 seconds!) now appeared to be in serious jeopardy, I, too, did something we hadn't briefed. I planted both size thirteens on the right pedal and shoved—just as Gary hollered, "Right pedal!"

The nose s-l-o-w-l-y reoriented right, the right skid heel grabbed the runway (followed rapidly by the rest of the right skid), and we wobbled down the runway for several interesting seconds until the left skid decided to get with the program too. We ground to a halt next to the crash-rescue folks, who gave us a standing ovation for not plowing into them.

We performed a normal shutdown, but it took me three eternities to get two feet unstuck from an area that Bell had designed to accommodate only one.

All right, so we started out with the deck stacked in our favor: SIP/ASO in the back seat, IP/IFE in the front, with a combined flying-hour total sufficient for a trip to the moon and back at 90 knots—twice. The point is, we'd stacked the deck even more in our favor with our brief, and we trusted each other to comply with the brief and to react properly (and rapidly!) if something really ugly jumped out at us.

I've even taken to briefing specific duties for both single- and dual-system hydraulic failures.

—CW4 William S. Tuttle, New Jersey ARNG, DSN 445-9261 (609-530-4251)

New firefighting system authorized

Heat from fuel fires can become so intense that flight-line personnel cannot get close enough for the extinguishing agent to reach the fire. The Army recently authorized the use of compressed air foam system (CAFS) fire extinguishers as an alternative to the dry-powder flight-line fire extinguishers specified in AR 420-90: *Fire Protection* (25 Sep 92).

A small, mobile CAFS (NSN 4210-01-429-3863) is now approved as a substitute for the wheeled dry-powder extinguisher. The CAFS has a discharge range of 80 to 100 feet, which allows effective firefighting from a safe distance. In some models, the range can be extended by adding up to 300 feet of hose.

The CAFS provides a vapor-sealing blanket of foam designed to eliminate ignition or re-ignition of any flammable source. Some models have an environmentally friendly foam, which makes them ideal replacements for Halon 1211 fire extinguishers whose use destroys the ozone layer. Another feature of the new CAFS is that hands-on training can be conducted economically using ordinary dish-washing liquid. DA requires specialized CAFS training before using these extinguishers. Training requirements are outlined in OACSIM message 131237Z June 1997.

For regulatory guidance on use of the CAFS, contact Mr. Bruce Park, Director of Fire and Emergency Services, OACSIM, HQDA, at DSN 328-6174 (703-428-6174), parkbr@pentagon-acsim3.army.mil. For information on product selection, contact your installation fire chief.

POC: Mr. John Langhammer, USASC, DSN 558-2644 (334-255-2644), langhamh@safety-emh1.Army.mil

The Army Aviation Broken Wing Award recognizes aircrewmembers who demonstrate a high degree of professional skill while recovering an aircraft from an inflight failure or malfunction requiring an emergency landing. Requirements for the award are in AR 672-74: Army Accident Prevention Awards.

■ CW2 Frank Almeraz, Jr.

1-212th Aviation Regiment
Fort Rucker, AL

The student pilot was on the controls, flying at 100 feet agl and 80 knots over wooded terrain, when he and CW2 Almeraz, the IP, simultaneously saw a large buzzard-type bird fly up toward their OH-58C. CW2 Almeraz took the controls and began a left banking maneuver to avoid the bird. His effort, however, was unsuccessful, and the bird hit the red “push-pull” tube of the main rotor, causing it to deflect and become shortened by about 2 inches. The aircraft began to shudder and vibrate so violently that both pilots were tossed around in the cockpit. It was nearly impossible for CW2 Almeraz to keep his feet on the antitorque pedals, and his right lower leg sustained a 4-inch-long cut when it hit the center console. He attempted to continue the left turn to land to the only open field in the vicinity while instructing his student to contact flight following. The aircraft initially would not respond, and it continued on a course toward one of two large lakes in the area. Then, as the vibrations continued, the aircraft began a slow left turn and CW2 Almeraz was able to estimate the control input necessary to land to the grassy hillside. He grew concerned about dynamic rollover as he neared the field and realized the angle of slope. With no option available, he elected to terminate the approach with forward airspeed and touched down with about 5 feet of ground run. The aircraft sustained no further damage.

■ CW4 Marian Francis Clemens

West Virginia Army National Guard,
Parkersburg, WV

During climbout, the UH-1V yawed hard to the right. CW4 Clemens, the IE, was on the controls and initiated emergency procedures for engine overspeed while the PI made a Mayday call. The nearest available landing area would require a 180-degree turn to the left. Closer inspection revealed that a large set of power lines was located on the approach path, so the IE turned the aircraft sooner and about 60 degrees more to the left to avoid the wires. At about 500 feet agl, as CW4 Clemens maneuvered the aircraft for landing, the engine failed. He entered full autorotation and landed the aircraft, without damage, to a damp sod field that sloped uphill.

■ 1LT Michael P. Corcoran

A Company, 1-228th Aviation Regiment
Fort Kobbe, Panama

During cruise flight at 2000 feet agl over double-canopy jungle in mountainous terrain, the UH-60’s low rotor rpm warning light and audio came on. The crew confirmed that rotor rpm was decreasing below normal levels and realized they could not reach their intended destination 3 miles away. The only suitable landing area was a small swampy field to the left of the aircraft. 1LT Corcoran immediately entered a left turn with an autorotational descent to the field. During the autorotation, the main generators dropped off line due to insufficient rotor rpm, which caused loss of all cockpit indications. 1LT Corcoran maintained aircraft control throughout the autorotation and touched down in the small field with only minor damage to the aircraft.

The Black Hawk had experienced sudden and unrecoverable loss of rotor rpm, which is known as “dual-engine rollback.” 1LT Corcoran had less than 1 minute from onset of the emergency to diagnose the problem and land the aircraft. Any delay would have forced the autorotation into the jungle, increasing the probability of severe damage and injury.

■ CW4 Charles H. Emmons

Delaware Army National Guard
New Castle, DE

At 1500 feet and 90 knots over the mid-point of a large river, the UH-1H experienced a drop in engine and rotor rpm, accompanied by a left yaw. The only available landing area was a chemical plant that included numerous industrial structures. The area was also immediately adjacent to a large twin-span suspension bridge structure.

CW4 Emmons, the PC, took the controls, established a maximum-glide-distance autorotative descent, and turned toward the emergency landing area. Emergency procedures failed to restore engine power. On final approach, he had to maneuver the aircraft to avoid pipelines, power lines, and small trees that had not been visible when the area was initially selected. He landed the aircraft without damage on a small, unimproved road across uneven terrain.

Cause of the engine failure was determined to be failure of the N1 gearbox accessory drive turbine.

■ *CW2 John S. Tomkowski, III*

Company A, 1-212th Aviation Regiment, Fort Rucker, AL

CW3 Tomkowski and his two students were conducting NVG terrain flight navigation training in a UH-1H. While in level flight over trees at 50 feet AHO and 50 KIAS, the aircraft suddenly and rapidly yawed 20 to 30 degrees to the left. The yaw was accompanied by activation of the rpm warning light and audio. Engine rpm decayed to approximately 5800, and the engine could be heard winding down. Telling the student in the right seat to place the governor switch in the emergency position, CW3 Tomkowski was able to gain control of the engine rpm and continue powered flight while manually controlling the engine rpm with the throttle. He flew the aircraft about 800 meters under partial power conditions to the nearest open landing area. As he began a power-on approach, coordinating collective and throttle to maintain rotor rpm, he noticed that lowering the collective resulted in no significant increase in rpm. At about 10 feet above the ground with throttle full open, rotor and engine rpm began to bleed off when collective was increased to slow the rate of descent. At this point, CW2 Tomkowski completed the approach with an autorotational landing. The aircraft landed safely with approximately 20 feet of ground run and with no damage or injuries.

CW2 Tomkowski made two quick and critical decisions. The first was immediately getting the governor switch to emergency. At the altitude and airspeed when the emergency occurred, any delay would have resulted in the aircraft settling into the trees. The second critical point was recognizing that insufficient power was available to continue the approach with power. He was able to conserve enough rotor rpm to safely land the aircraft with no damage.

■ *CW3 Charles A. Robbins*

National Training Center Aviation Company (AA) Fort Irwin, CA

CW3 Robbins was the PC of a UH-1H flying at low level over extremely uneven desert terrain. The aircraft was at 100 feet agl and 90 knots when the crew felt a momentary yaw just as the rpm warning light came on. Immediately thereafter, the engine lost all power and the master caution and engine chip detector lights came on. CW3 Robbins identified the emergency and executed a successful low-level autorotation.

In the 6 seconds between the engine failing and the aircraft touching down, CW3 Robbins was able to maneuver the aircraft to avoid striking wires to the left of the aircraft while touching down with minimum ground run—about the length of the helicopter. The terrain in the ground path consisted of loose sand and dirt and was very uneven. During the slide to a stop, the front of the skids caught in a sand berm, causing the aircraft to rock forward. As the aircraft rocked back on the heels of the skids, the main rotor blade severed the tail boom forward of the 42-degree gearbox. Although this resulted in Class C damage, it prevented possible loss of life and destruction of the aircraft that could have resulted from the aircraft's rolling over.

The cause of the engine failure was later determined to be failure of the N2 spur gear.

■ *CW4 Ammon Webster, pilot in command*
■ *SSG Paul Chambers, crew chief*

West Virginia Army National Guard, Parkersburg, WV

On climbout during paradrop operations, the master caution and engine chip detector lights came on, followed by a severe yaw to the right and an increase in engine and rotor rpm. The aircraft was at 300 feet agl over a populated area. To cope with the emergency, CW4 Webster increased collective and reduced throttle to control rpm as he made a Mayday call. He then banked hard left to align the aircraft with the only available landing area: a football field with houses on two sides, a service station on the third, and a river on the other.

During the emergency, the jumpers were attempting to exit the aircraft. SSG Chambers repeatedly told them to assume the crash position and physically restrained them from jumping from the aircraft as CW4 Webster landed the UH-1H without damage or injury.

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class D

E series

■ After normal autorotation landing, rear crosstube broke on right side where it enters fuselage. Front crosstube bent when aircraft settled, and aircraft settled onto UHF antenna and tail stinger. Minor sheet metal damage resulted around right rear crosstube and UHF antenna.

AH64

Class A

A series

■ No. 1 engine flamed out during hover at 220 feet over riverbed. Aircraft descended and crashed in riverbed. Aircraft sustained significant structural and fuselage damage, and main rotor blades were destroyed. Neither crewmember was injured.

Class E

A series

■ Shaft-driven compressor failed during cruise flight. Aircraft was landed and shutdown without incident. Maintenance replaced shaft-driven compressor.

CH47

Class B

D series

■ As aircraft flew over heavily wooded area during slingload training, cracking sounds were heard and slingload (M119 howitzer) was lost. Postflight inspection revealed that hook was still closed. Suspect apex failure.

Class C

D series

■ Crew was conducting NVG blowing-snow landings. Rotor blades struck small trees during first landing, but crew was unaware of the strikes. During second landing, rotor blades again struck small trees. When PC applied power to reposition aircraft, crew felt moderate vibrations. Postflight inspection revealed rotor-blade damage.

Class E

D series

■ Aircraft with external load was approaching LZ during NVG RL progression training for enlisted flight crewmember. As crewmember reached for winch/hoist control grip, he inadvertently jettisoned load. Aircraft landed without further incident.

■ No. 1 engine caught fire during cruise flight. Crew shut down engine and discharged No. 1 engine fire bottle, which extinguished fire. Aircraft landed without further incident. Maintenance investigation continues.

■ During up-slope landing on sandy soil, forward landing gear settled into sand during thrust reduction. VOR and FM homing antennas were broken off.

■ After hooking up water buffalo slingload, front sling leg caught on fenders. FE was trying to free legs with shepherd's hook and by having aircraft move forward. Back sling leg became tight and lifted back of buffalo, causing the water to shift and flip buffalo onto end. Tongue raised up and scraped along belly of aircraft, eventually hitting lower rescue hatch door, causing two rivets to pop loose on door.

■ Just prior to takeoff, aircraft started to vibrate. Extreme vibrations were felt throughout the aircraft but mainly in forward transmission area. Crew performed emergency shutdown of both engines. Maintenance replaced forward transmission.

OH6

Class E

J series

■ Engine failed in cruise flight, and crew completed autorotation to open field without damage. Cause of engine failure not reported.

OH58

Class A

A series

■ Low-rpm audio and warning light came on in cruise flight at 500 feet agl and 90 knots. Pilot entered autorotation with turn to align aircraft into the wind. During descent, aircraft hit 5-foot fence post and crashed, severely injuring the pilot and killing the PC and passenger. Aircraft was consumed by postcrash fire.

Class C

D series

■ Following normal startup during overspeed check, engine flamed out. During restart attempt after 5-minute wait, tgt rose rapidly when throttle was opened. PC closed throttle and aborted start. Engine temperature monitor peaked at 1085° for 2 seconds. Cause under investigation.

Class D

D(I) series

■ Main rotor struck tree, cutting branches and throwing them into tail rotor during OGE hover. Main rotor had only minor repairable damage, but one tail rotor blade had a hole in its leading edge that could not be repaired.

Class E

A series

■ Pilot detected faint odor of fuel during flight. Aircraft landed without incident. Maintenance inspection found fuel fitting seeping.

C series

■ High frequency vibration was felt in pedals, cyclic, and floor during NOE flight. Generator was replaced.

■ Transmission oil hot light came on during flight. Transmission thermo switch was replaced.

■ Engine failed during hovering autorotation. Maintenance determined that excessive play in pilot's forward tongue-and-groove throttle connection (idle detent stop) caused throttle to position fuel control past idle position. Throttle connection was replaced.

D(I) series

■ Crew heard change in rotor noise during low-level formation flight. After landing, inspection revealed section of sheet metal had debonded from underside of main-rotor blade, 1 foot from tip. Blade was replaced.

■ Low-hydraulic-pressure caution message came on during hover taxi, and PC felt feedback in flight controls. Post-landing inspection revealed hydraulic fluid covering left side of aircraft. Hydraulic pressure line had chaffed against return line and ruptured. Both lines were replaced.

UH1

Class B

H series

■ Aircraft was in cruise flight at 2000 feet agl and 100 knots KIAS when crew heard loud bang. PC reduced power and executed a 180-degree turn to a hayfield. During approach, another loud bang was heard, followed by engine failure. PC executed autorotation to hayfield, where aircraft touched down on hilly terrain. Tail stinger hit ground, and aircraft rocked forward and became airborne again, touching down and coming to rest 8 feet forward of initial touchdown point. WSPS separated, main-rotor blades severed tail-rotor drive shaft, skids collapsed, and aircraft frame twisted. None of the nine personnel on board was injured.

Class C

H series

■ Maintenance contractor was relocating aircraft to another airfield. Aircraft tiedown chain had not been removed from skid, and during takeoff to hover, aircraft plummeted to ground. Main rotor blade contacted WSPS, resulting in 10-inch hole in one main rotor blade.

Class E

H series

■ During cruise flight, crew noticed fuel gauge continued to read 850 pounds. After precautionary landing and normal shutdown, aircraft was refueled. Fuel-quantity calculations confirmed failure of fuel gauge. Gauge was replaced and aircraft returned to flight.

■ Aircraft was in cruise flight when bird struck right windshield. Aircraft landed and shut down at field site without further incident. Windshield was replaced.

Class F

H series

■ While climbing through 9000 feet, aircraft experienced compressor stall as evidenced by loud engine reports, vibrations, and fluctuation in N1 and N2 egt. Immediate action steps were initiated, and aircraft was landed and shut down with no further incident. Caused by engine FOD.

UH60

Class A

L series

■ Aircraft was seen flying low and fast into a hard, right, banking turn prior to striking trees. Postcrash fire ensued. Eight fatalities.

Class E

A series

■ Aircraft settled during hot refueling. Settling allowed No. 1 tank to contact hose carrier, resulting in 1-inch puncture at midway point on underside of tank. Puncture did not penetrate ESSS tank.

■ No. 1 engine chip light came on during maintenance test flight. Crew returned to field and landed without incident. Maintenance found excessive chips on detector. Engine will be replaced.

■ During hover with cargo net, No. 1 engine torque went down to 60 percent, and No. 2 engine torque went to 101 percent. Crew diagnosed torque split and landed without incident. Inspection of No. 2 engine revealed that cannon plug on ECU was not completely seated.

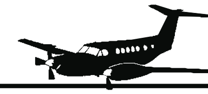
■ During hover, aircraft shuddered and whining noise was heard from No. 1 engine. Tgt was 850° to 860°C with No. 2 engine Nr and Np rising into yellow range, IP took controls and landed aircraft without incident. Caused by alternator failure.

V series

■ Master caution and engine chip lights came on just after takeoff. Maintenance found significant amount of brass filings and other particles. Engine was replaced.

■ Crew chief noticed fuel dripping onto tail rotor drive shaft cover during startup. Aircraft was shut down. Start fuel manifold was found to have a break, and it was replaced.

C12



Class E

D series

■ During cruise flight, right fuel gauge indicated 300 pounds less than actual (full) amount in right main tank. Mission was aborted, and aircraft returned to home base. Suspect faulty probe.

■ Aircraft started to vibrate and shudder after takeoff, and aircraft landed without incident. Maintenance found that internal wheel balance weight of nose tire had separated, causing vibration. Nose tire was replaced.

G series

■ Cabin filled with smoke during taxi, and crew performed emergency shutdown. Inspection revealed flap motor burned out in the up position. Maintenance replaced motor, relay, and transistors.

C23

Class E

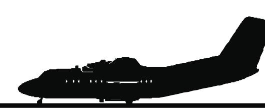
A series

■ During descent on instrument approach, left generator caution light came on. Aircraft landed without further incident. Maintenance replaced left starter generator.

B series

■ During cruise flight, aircraft yawed, No. 1 prop slowed to 770 rpm, and torque increased to 4700 pounds. Engine was shut down and aircraft landed without further incident. Prop governor was replaced.

O5



Class E

DHC-7

■ When landing gear was raised after takeoff, right main gear indicator light stayed green. Gear was lowered, visual inspection confirmed that gear was normal, and uneventful landing was made. Troubleshooting revealed faulty main landing gear proximity switch.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

UH-60-97-ASAM-14, 041645Z Aug 97, maintenance mandatory.
Bell-crank supports (P/N 70400-08158-101) manufactured by American General (cage code 1W160) have not been tested and, therefore, must be removed from service. Engineering estimates are that 100 hours of additional service is acceptable without incurring a significant risk due to this component. The purpose of this message is to require removal of subject part manufactured under contract DAAJO9-84-C-A333.

ATCOM contact: Mr. Dave Scott, DSN 788-8620 (205-842-8620), scott-dc@redstone.army.mil

UH-60-97-ASAM-15, 041707Z Aug 97, maintenance mandatory.
The lower pitch change link bearing, rod end (P/N 70101-08202-101), manufactured by Island Engineering (cage code 40137) has recently completed engineering testing. Results indicate that its fatigue strength is significantly below that of the original-equipment component and, therefore, must be removed from the aircraft. Engineering estimates are that 100 hours of additional service is acceptable without incurring a significant risk due to this component. The purpose of this message is to require removal of subject part.

ATCOM contact: Mr. Dave Scott, DSN 788-8620 (205-842-8620), scott-dc@redstone.army.mil

UH-60-97-ASAM-16, 041636Z Aug 97, maintenance mandatory.
The swashplate linkage, clevis connector (P/N 70400-08151-050) manufactured by Airborne Apparel (cage code 2A622) has not been tested and must be removed from service. Engineering estimates are that 100 hours of additional service is acceptable without incurring a significant risk due to this component. The purpose of this message is to require removal of subject part.

ATCOM contact: Mr. Dave Scott, DSN 788-8620 (205-842-8620), scott-dc@redstone.army.mil

NSC web page: http://www.nsc.org

Need new, interesting, thought-provoking, attention-getting topics for your safety meetings? If so, check out the National Safety Council's web page. They have all sorts of interesting things we can use. Note that I'm not getting paid by the NSC for this announcement! I just wanted to share another tool we can use in our risk-management toolbox.

—CW5 Scott Johnson, Aviation Branch Safety Office, Fort Rucker, AL, DSN 558-3000 (334-255-3000)

IN THIS ISSUE

WS • War Stories, CC • Crew Commo, SF • Shortfax

Class A Accidents *through July*

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3D QTR	April	1	2	3	2
	May	0	1	0	1
	June	1	3	6	1**
4TH QTR	July	0	1	0	8
	August	1		0	
	September	1		0	
	TOTAL	8	12	16	15

*Excludes 1 USAF pilot trainee fatality
**Excludes 1 Air National Guard passenger

U.S. ARMY SAFETY CENTER

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Some errors can blow the whole ballgame…

PLAY IT SAFE

Make it a preflight practice to walk around and *touch* anything that could fall off in flight.

Cowlings away!

As an Aviation System Manager at the Army Safety Center, I have a lot of accident reports cross my desk each week. My job, among other things, is to look for trends involving aircraft mishaps. In the last few months, I've noticed a number of mishaps involving aircraft parts separating during flight. This started me wondering, "What's happening out there?"

Are flight crews not securing cowlings properly or inadvertently leaving them open? Could there be a problem with maintenance procedures, or is there a materiel problem such as worn latches that allow cowlings or panels to come open during flight? As I pondered these questions, I recalled once seeing an AH-1G taking off with its ammo bay door open. As I watched, a flight jacket blew out and slowly fluttered to the ground. "Boy," I laughed to myself, "The guy who just lost his jacket is not going to be very happy when he gets where he's going and finds out he no longer has a flight jacket." (It was 5 degrees above zero.)

As I began to think back over my own career, I remembered that I had once left an engine cowling open myself. I was a brand-new WO1 fresh out of flight school and had just made PIC in the OH-58A.

I was supporting the Armor School at Fort Knox, KY. My mission that day was to fly an O-6 around a training area where new second-lieutenants were learning how to operate M-60 tanks over uneven terrain. It was a pretty simple day mission for a simple-minded OH-58 pilot.

After being in the air for 10 minutes, the O-6 wanted me to land—for the fourth time—so he could get out and conduct a one-way discussion with a tank crew who had just run over some pine trees that were off limits. As the O-6 walked away from the aircraft, he turned and gave me the old hand-across-the-neck signal. As I shut down the aircraft, I thought to myself, "So this is aviation—been out here half a day and logged 0.8 hours."

Not knowing how long we'd be there, I walked around the aircraft and opened the engine cowlings. An old OH-58 pilot had once told me that you could cool down the engine faster by opening both engine cowlings.

Of course, my passenger returned sooner than I had anticipated and was eager to get airborne. I did a quick walk-around, securing the engine cowling on the pilot's side, and proceeded to crank the aircraft. As we climbed through 500 feet, I got a radio call from the ground commander stating that our engine cowling was open.

I said, "Say again?", not believing what I had heard. To my dismay, he said it again: "Your engine cowling is open."

I had the distinct pleasure of telling the O-6 that we had to land immediately. After doing so and shutting down the aircraft, I sheepishly got out and walked around to the left side of the aircraft. There in front of me, just as I had left it, was an open engine cowling. Boy, was I embarrassed. But that wasn't the half of it. My O-6 passenger said, "This is the first precautionary landing I have ever been in, and it was for an open engine cowling." Although there was no damage to the aircraft, I cannot say the same about my pride.

But I digress.

I became curious as to how many other pilots had either left cowlings open, had cowling latches fail, or just plain had something come off the aircraft in flight. I decided to do a data pull of Class A-E mishaps for the past 3 years and see what I could find. Listed

FY 95

MH/UH-60A/L: 17 cases
- Cargo door/window departed aircraft
- Nose compartment door blew open
- Dzus fastener came off and hit aircraft

MH/CH-47D/E: 14 cases
- Work platform came open in flight
- Crew door/window fell off in flight
- Emergency escape panel missing after flight

AH-64A: 8 cases
- Transmission access panel came open in flight
- Engine cowling came open in flight
- Catwalk access panel came open in flight

C-12C/F/L and 0-5: 6 cases
- Engine cowling came open in flight
- Door came open in flight

AH-1E/F/S: 5 cases
- Dzus fastener fell off and hit aircraft
- Panel missing after flight
- Bag fell out of ammo bay during flight

OH-58A/C/D: 4 cases
- Armor side panel separated in flight
- Crew door came off in flight
- MMS upper shroud separated in flight

below is what turned up in terms of numbers and the top three causes reported for each aircraft each year.

Summary

Due to space limitations, I did not give you all the cases listed in the data base (more than 130), nor did I list all the types of aircraft involved. What I tried to do was give you a general overview of what's happening with regard to in-flight loss of components for the aircraft you fly.

It's impossible to say that every one of these cases was the result of human failure; there are going to be latch failures and such. And, besides, my intent is not to point fingers or assign blame. My intent is to make you aware of a problem that involves every type of aircraft the Army owns and operates.

Every member of the Army aviation team has an important part to play in reducing these mishaps.

Maintainers have to follow by-the-book maintenance procedures, ensure that cowlings are secured after maintenance is performed, and check latches and dzus fasteners not only for security but also for wear and tear.

Crews have the last look and the final say about the aircraft they are about to fly. A final walk around the aircraft is an important part of the preflight. It should be a hands-on walk around—that means touching anything that could come off during flight. It may sound like extra time and effort, but sitting in this seat looking at accident reports that come across my desk every day, I can tell you that there's only a fine line between a Class E mishap and a Class A accident. A cowling through a tail rotor can change your life forever.

—CW5 Bill Ramsey, Aviation Section, Army Safety Center, DSN 558-2785 (334-255-2785), ramseyw@safety-emh1.army.mil

FY 96

MH/CH-47D/E: 12 cases

- Bubble window separated in flight
- Clamshell door separated in flight
- Loading ramp/tongue or crew door fell off in flight (Note: CH-47-96-ASAM-09, 121316Z Sep 96, addressed lower latch pin failure allowing clamshell doors to come off in flight.)

MH/UH-60A/L: 8 cases

- APU door left aircraft in flight
- Cargo door window missing after flight
- Fairing cover came loose in flight

AH-64A: 8 cases

- Engine cowling fell off in flight
- Turtle-back door came open in flight
- Drive-shaft cover left open

C-12C/D/F, 0-5, C-26B: 6 cases

- Engine cowling opened in flight
- Doors opened in flight
- Avionics door separated in flight

UH-1H/V: 5 cases

- Dzus fasteners fell off and hit aircraft
- Cargo door separated in flight
- Tail-rotor cover separated in flight

OH-58A/C/D: 4 cases

- Door fell off during flight (one case resulted in Class A accident with 2 fatalities)
- MMS upper shroud departed aircraft during flight

FY 97 through 3rd quarter

AH-64A: 9 cases

- Engine cowling opened in flight
- TADDS shroud missing after flight
- Drive-shaft cover came open in flight

MH/CH-47D/E: 8 cases

- Escape hatch fell off in flight
- Crew door fell off in flight
- Ramp tongue separated in flight

MH/UH-60A/L: 4 cases

- Tail-rotor drive-shaft cover left open
- Nose compartment door came open
- APU access door missing after flight

Near miss

Friday was a holiday, so Jim and I planned to fly the long dual cross-country flight required for his civilian instrument rating. Jim had been my student in the private pilot course and had matured into an excellent pilot. It was with great pride and pleasure that I looked forward to these dual-instrument flights.

The skies were clear, with unlimited visibility. Under the hood, Jim was going to miss a beautiful day.

My mind drifted back to the previous Sunday, a day much like this one. Two pilots from our Redstone Arsenal military flying club were flying this very aircraft, also practicing instrument flight. They were 4000 feet above the Gadsden airport/VOR when the safety pilot looked down and saw two aircraft depart intersecting runways at the same time. As he watched, they met at 300 feet in the air. All four souls aboard lost their lives in that accident.

It seemed to me that the odds were high against being at the same place at the same time on a severe-clear day and not seeing each other. Knowing that most accidents result from a series of small incidents, I wondered what might have contributed to that one. I made a mental vow to keep my head and eyes outside the cockpit, especially around airports.

The first leg of our training flight was to Nashville, where we hoped to get the VOR 31 approach. We planned for a touch-and-go, followed by another IFR leg to Chattanooga. Just past Shelbyville we were handed off to Nashville Approach, who promptly announced that there wasn't going to be any touch-and-goes now, due to heavy traffic. We could either come on and land or they would be glad to offer us an approach to another airport. We opted for Smyrna and were given a vector for the ILS 32 approach.

As we eased over Murfreesboro airport, I was working hard at keeping my vow of maintaining a constant watch for other aircraft. As it turned out, none were pointed out, and none were seen.

Assigned a heading of 330° to join the localizer and track inbound, we were cleared for the approach. We were 3 miles from the outer marker when suddenly Approach reported, "Cessna Three Golf Quebec, there may be another aircraft very near you. Looks like I'm getting two radar echoes."

Well, if I was looking before, now I was really looking! "No," I reported back, "I don't see any traffic."

"Okay," said Approach, "It must be a double echo. Radar service is terminated. Change to advisory frequency is approved."

A quick punch of the buttons, and Jim broadcast that we were over the outer marker, ILS 32 inbound. In one heartbeat, we heard another voice report, "Over the outer marker, ILS 32 inbound."

Jim snatched off his view-limiting hood and pointed directly under the left main gear on his side. Less than 50 feet away was our "wingman," practicing ILS approaches just like we were. We carefully eased away and initiated a missed approach.

We reported our near miss to Approach and he said, "Okay, turn right heading 090, climb and maintain 5000, vectors on course to Chattanooga."

On reflection

What could I have done to avoid this near miss? We could have punched up the advisory frequency in the "both" position and monitored it sooner. In that way, if the other aircraft was broadcasting his position and intentions, we would have known where to look for him. I could have had Jim look out his window to help find the traffic instead of what I suspect many safety pilots and instructors do—the old "You fly, I'll look." Jim might have seen the aircraft at the first call from Approach. I might have offered to put my transponder in standby for a moment to see if Approach still got a transponder return.

The other guy was as legal as I was. I, too, have gone to uncontrolled fields to practice approaches without the hassle of ATC. However, if I ever do it again, you can bet I'll have Approach on the second radio and listen for anyone else out there flying the approach with me.

Although this incident happened to me as a civilian pilot flying a private airplane, a similar incident could happen to an Army aviator flying an official training mission. I suspect that it already has.

—Thomas A Chaffee, DAC, Redstone Arsenal, AL, DSN 788-6132 (205-842-6132)

Pull-out posters pages 5-8

OH-58D(I) ground operation

Be aware of the "caution" in TM 55-1520-248-10 that limits OH-58D(I) cyclic movements to 2 inches maximum displacement from center during ground operation. Stick movement any greater while the aircraft is on the ground with rotors turning can cause main rotor yoke, main cone set, or main rotor mast loads to exceed endurance limits used to calculate parts life. Hence, ground operation outside the 2-inch limit can shorten component life as well as increase the risk of rotor strike.

POC: Mr. Ron Boyce, Office of the PM-Kiowa Warrior, St. Louis, DSN 693-2932 (314-263-2932)

ALSE user conference coming up

Aviation life support equipment technicians and other aviation personnel will be attending an ALSE User Conference 4-6 November 1997 at Fort Rucker. Hosted by the Directorate of Combat Developments (DCD), the Conference will focus on protective equipment such as clothing and helmets, survival vests, body armor, the Combat Survivor/Evader Locator Program, the Aircrew Modular Survival and Cockpit Airbag Systems, and laser eye protection.

For more information, call or e-mail Mr. Bernie Roberson, DSN 558-9130/3154 (334-255-9130-3154), bernard_roberson@rucker-emh4.army.mil.

Free computer hardware

Looking to update computer technology in your unit but don't have much money to spend? Check out the Defense Automation Resources Management Program, which is part of the Defense Information Systems Agency. The program annually saves millions of dollars by transferring excess computer hardware within DOD and other agencies. The program prolongs the life of DOD computers and reduces procurement and operating costs for acquisition of new equipment.

The program office lists the equipment on its Information Technology Excess Catalog on the worldwide web at

http://www.disa.mil/cio/darmp/excess.html

Items include disk drives, printers, computers, monitors, scanners, and other equipment. The catalog lists every piece of equipment in detail and includes points of contact, phone numbers, and locations. Customers pay only shipping costs. Information about the program is available from the Defense Information Systems Agency, DSN 426-1904 (703-696-1904).

POC: CW5 Scott Johnson, Aviation Branch Safety Office, Fort Rucker, DSN 558-3000 (334-255-3000)

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class C

F series

■ During cockpit runup checks on maintenance test flight, CP (front seat) attempted to remove safeing pin on explosive canopy system. During this attempt, PI rotated handle and attempted to pull upward to release pin when he inadvertently activated the linear explosive system. Canopy exploded and functioned as designed.

■ Engine oil temperature went to 135°C during engine runup and systems check. Aircraft was shut down without further incident. Oil cooling and thermal systems to be inspected for malfunction; "hot engine" inspection pending.

Class E

F series

■ During hover taxi to runway, transmission oil bypass and master caution lights came on. Maintenance replaced transmission oil bypass switch.

AH64

Class C

A series

■ TADS cowling was lost in flight during gunnery operations. Cowling was destroyed.

■ Crew had been conducting aerial gunnery with intermittent landings. Postflight inspection revealed damage to one main-rotor and all four tail-rotor blades. There was no evidence of sudden stoppage, and crew reported no vibrations or unusual occurrences during flight.

■ During Table 10 gunnery training, round failed to extract in 30mm weapon system, resulting in detonation of subsequent round. Weapon was destroyed.

■ The morning after live-fire training, range control personnel discovered four HMMWVs destroyed by fire. Components of hellfire missile were found in vicinity. Incident is under investigation.

■ Postflight inspection after 4-hour day/NVG training flight revealed collapsed tail wheel strut and minor damage to stabilator. Suspect hard landing. Maintenance replaced tail wheel strut assembly.

Class D

A series

■ During postflight inspection, crew found damage to UHF and lower IFF antennas. UHF radio had failed after aircraft landed.

Class E

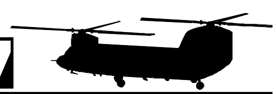
A series

■ Crew heard series of loud pops during cruise and determined that No. 2 engine was experiencing compressor stall. Crew initiated appropriate emergency procedure. Within 5 seconds of onset of emergency, engine failed. Crew secured engine and performed roll-on landing without further incident. Maintenance determined that engine failed due to FOD. Engine was replaced.

■ No. 2 engine would not start after refueling. Maintenance inspection revealed No. 2 engine air turbine starter shaft sheared. Starter was replaced.

■ During runup after refueling, PI noticed fluctuations (98 to 104 percent) in Np readings for both engines, followed by a shudder felt by both crewmembers. No increase in Nr or other gauges was noticed. Fluctuation followed by shudder repeated 11 times in 15 minutes. Inspection revealed that No. 1 engine control unit harness connector was almost completely backed off.

CH47



Class C

D series

■ Maintenance test pilot lowered thrust to "ground detent" position during maintenance test flight autorotation. After decreasing both engines to 60 percent using emergency trim switch and instructing PI to do likewise, MTP noted No. 2 engine N1 reading 60 percent. While attempting to regain N1, he conducted quick rotor rpm check. Upon rechecking cockpit readings, he noted PTIT reading steady at 1100°C. After lowering cover on PTIT trim, MTP announced "power recovery" and shut down No. 2 engine. Aircraft returned to home base without further incident.

■ During NVG infiltration training, aircraft touched down on upsloping terrain in secondary LZ. Due to sloping terrain, aft ramp was positioned 4 to 6 feet off ground to off-load troops. As crew attempted to center cyclic to arrest droop-stop pounding, aircraft moved aft and left, and right front wheels came off ground. Both crewmembers pulled collective to prevent aircraft from sliding further or tipping. Front wheels rose about 3 feet, resulting in aft ramp's rising 8 to 10 feet off ground. Soldier exiting aircraft sustained broken pelvis upon contact with ground.

Class E

D series

■ Crew was repositioning aircraft for mountain hoist operation while at 12,500 feet msl. When PI attempted to apply forward cyclic, he felt unusual mechanical stop in pitch axis and transferred controls to other pilot, who also felt the stop. Aircraft was repositioned, and, as forward speed increased, problem disappeared. Aircraft was landed without incident. Postflight inspection revealed that both jam indicators were popped on pivoting actuator in aft pylon. Maintenance could not duplicate. Aircraft scheduled to have all upper boost actuators replaced.

■ IP executed simulated engine failure during cruise flight at night by reducing No. 1 emergency engine trim switch. N1 gauge indicated decrease below 60 percent. Flight engineer reported that engine was on fire, and IP immediately performed emergency engine shutdown and discharged fire bottle on No. 1 engine. aircraft landed without further incident. Maintenance determined that fuel control caused the engine fire. Engine was replaced.

■ During simulated engine failure, normal engine beep trim system failed and would not control rotor rpm on either engine. ECL was returned to flight and rotor rpm was controlled using emergency engine trim. Maintenance replaced No. 1 engine N2 actuator.

OH58

Class C

D(I) series

■ When IP pressed analog test switch during engine-overspeed test, engine flamed out. During coastdown, IP noticed smoke coming from engine exhaust and performed engine shutdown, telling SP to monitor tgt. When IP left aircraft to investigate smoke and notify maintenance, SP noted tgt rising through 270°. When he engaged starter to motor engine, tgt rose rapidly to 1029° for 3 seconds.

Class E

A series

■ After takeoff and during climbout at 350 feet agl and 60 KIAS, PC heard thump from upper left pylon area. Aircraft returned to base and landed without incident. Incident is under investigation; supect bird strike.

C series

■ Grinding noise was heard in transmission area. CCAD analysis indicated overhaul/rebuild facility incorrectly assembled transmission.

■ Fuel boost and master caution lights came on during hover, and aircraft landed without incident. Maintenance replaced fuel pump cartridge.

■ During climbout, engine power dropped to 95 percent and did not recover. Aircraft was flown at 60 knots back to airfield. Aircraft is undergoing troubleshooting.

■ After normal preflight, runup, and takeoff, aircraft entered flight training area. While slowing to perform training maneuver at 20 feet agl, N2 decreased to 95 percent. Attempts to increase governor resulted in no increase in N2 (N1 was 101 percent). Maintenance inspection found that governor actuator switch had been wired backwards, causing a reverse function for normal input. Switch was rewired properly and aircraft returned to flight.

D(I) series

■ Postflight inspection following gunnery training revealed that three mirror panels from ANLQ-144 were missing. In-flight loss of equipment is being investigated.

■ On base to final approach at night under NVGs, aircraft experienced total hydraulics failure. Crew executed emergency procedures for hydraulics failure, but hydraulics would not return. IP executed run-on landing to airfield without incident. Maintenance replaced hydraulic pump to transmission oil pump shaft.

■ Left forward crosstube broke during termination of autorotation landing. Crosstube was replaced.

UH1

Class E

H series

■ During cruise flight at 600 feet agl and 80 knots, engine chip detector and master caution lights came on. PI executed immediate precautionary landing to nearest open field and shut down aircraft. Maintenance inspection revealed numerous sizable particles on plug. Engine replaced.

■ During cruise flight, d.c. generator caution light came on. Crew reset main generator and turned it back on. Light, however, remained on. Aircraft returned to airfield and landed without incident. Maintenance replaced main generator regulator.

UH60

Class C

A series

■ During landing to dirt road, aircraft entered brown-out conditions and rolled forward on touchdown. Main rotor blade tip caps hit trees; three tip caps were damaged.

Class D

A series

■ During landing to unimproved area, PC heard loud bang from rear of aircraft. Inspection revealed no damage. Aircraft was flown to home base without incident. Postflight inspection of tail wheel landing gear revealed damage to strut shock assembly.

Class E

A series

■ Minor damage to main rotor tip cap was found during postflight inspection after night unaided exfiltration in confined area.

L series

■ Bundle of pickets and concertina fell from slingload. Investigation revealed that nonstandard load did not maintain integrity due to failure of banding material. Loads were inspected, rigged, and certified IAW FM 5-450-3.

C12

Class C

C series

■ Aircraft was descending on instrument approach in IMC when it encountered icing. Crew reported residual ice although de-ice equipment was used appropriately. Crew then encountered VMC and configured aircraft for normal VMC landing. About 30 feet above runway, aircraft experienced airspeed decay and sink rate; power was applied without success. Aircraft descended vertically from 10 feet and landed hard.

F series

■ Suspecting lightning strike, crew conducted cruise check at 23,000 feet agl. Aircraft was diverted to home station. Postflight inspection revealed dime-sized exit hole in left outboard flap and burnt static wick on outboard tip of right wing. Suspect lightning entered through left prop.

R series

■ Aircraft was on instrument approach when lightning discharged nearby. Postflight inspection revealed damage to left wing tip and right horizontal stabilator.

Class F

N series

■ Sparks were seen coming from exhaust stacks of No. 2 engine during takeoff, and aircraft landed. Engine inspection found damage of at least $200,000 due to FOD ingestion. (Total damage costs cannot be determined until engine rebuild is completed.)

C26

Class C

B series

■ During GPU start, PI initiated start with "start test switch" due to residual egt indication. At about 15 percent engine speed, he depressed engine start button until egt increased. During normal egt increase, PC noted change in engine acceleration, at which time PI noted low GPU voltage reading. Check revealed that egt had increased to 800°C (maximum starting egt: 770°C). Engine was shut down without further incident.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation safety-action messages

C-12-97-ASAM-03, 221306Z Aug 97, maintenance mandatory.
A problem has been identified in all KLN-90B global positioning systems (GPS) that could affect course accuracy during GPS approaches at some airports.

The purpose of this message is to notify C-12 operators of a potential hazard to flight and restrict the use of the KLN-90B GPS from GPS instrument approaches until a permanent software correction is fielded.

ATCOM contact: Mr. Robert Brock, DSN 788-8632 (205-842-8632), brock-rd@redstone.army.mil

OH-58-97-ASAM-02, 251347Z Aug 97, maintenance mandatory.
A number of aircraft have experienced starting problems traced to a failure of the cutoff and start modulating valve in the fuel control. The failure may cause fuel restriction to the nozzle during the start sequence and result in a no-start or hot-start condition. (Under flight conditions, no fuel restriction exists if the failure occurs after the fuel control is in “fly” position.)

The purpose of this message is to impose a mandatory maintenance action on all OH-58D aircraft to correct the problem.

ATCOM contact: Mr. Robert Brock, DSN 788-8632 (205-842-8632), brock-rd@redstone.army.mil

UH-60-97-ASAM-17, 131502Z Aug 97, maintenance mandatory.
The UH-60 internal rescue hoist bracket assembly, aluminum structural plate, P/N 70800-02508-108 (cage code 78286) has been identified as cracking from the hole for the stud that holds the high-performance hoist to the forward end of the bracket. This cracking is caused by a pre-loading condition resulting from improper initial installation, subsequent incorrect installation of the hoist, and/or local manufacture, which precludes proper heat treatment or bend radius of the plate.

The purpose of this message is to require a visual inspection of all subject plates for cracking and to determine whether the plate has been locally manufactured. Also required is a visual inspection for cracks in the BL 34.50 beam. All internal rescue hoist bracket assemblies (P/N 70800-02508-046) are to be removed and reinstalled on a one-time basis using the procedure outlined in this ASAM.

ATCOM contact: Mr. Dave Scott, DSN 788-8620 (205-842-8620), scott-dc@redstone.army.mil

Maintenance-advisory message

AH-64A-97-MAM-16, 191949Z Aug 97.
Recently, an AH-64A M230 gun sustained substantial damage during firing. When the weapon system was downloaded after the incident, several unfired rounds of ammunition with punctured cartridge cases were found in the forward flex chute. While the incident is still under investigation, a possible scenario is that the cartridge-case punctures occurred during system uploading and the punctures contributed at least partially to the incident.

The purpose of this message is to advise users to closely monitor uploading of 30mm ammunition to detect potential cartridge damage caused by the loader before the ammo is fed into the system.

For assistance, contact your local TACOM logistics assistance representative.

Maintenance-information message

OH-58D-97-MIM-05, 261326Z Aug 97.
Recent tests have demonstrated that part number 3M 8545 (NSN 9390-01-445-9637), a polyurethane protective film, shows superior heat-resistant qualities to those of Estane, part number 406-015-009-101.

The purpose of this message is to outline application instructions for the 3M material.

ATCOM contact: Mr. Kevin Cahill, DSN 897-1389 (205-313-1389)

IN THIS ISSUE

WS • War Stories, CC • Crew Commo, SF • Shortfax

Class A Accidents

through August

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3D QTR	April	1	2	3	2
	May	0	1	0	1
	June	1	3	6	1**
4TH QTR	July	0	1	0	8
	August	1	0	0	0
	September	1		0	
	TOTAL	8	12	16	15

*Excludes 1 USAF pilot trainee fatality
**Excludes 1 Air National Guard passenger

U.S. ARMY SAFETY CENTER

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Burt S. Tackaberry
Brigadier General, USA
Commanding General

Flightfax

ARMY AVIATION
RISK-MANAGEMENT
INFORMATION

NOVEMBER 1997 ◆ VOL 26 ◆ NO 2

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In Army aviation, the difference between a Class A accident and a forced landing can often be measured in inches and seconds. The expertise of enlisted crewmembers lengthens those inches and increases those seconds.

You don't have to be a pilot to save an aircraft

The Army Aviation Broken Wing Award was created in 1967 to recognize exceptional skill in recovering from potentially catastrophic in-flight emergencies. Since that time, more than 2,000 crewmembers have received the award. That number represents an awful lot of accidents that didn't happen and an awful lot of Army aviation crewmembers whose actions saved lives and aircraft. But not all the recipients were pilots. Twelve enlisted crewmembers are included in this elite group.

The Broken Wing Award went for the first time to a nonrated crewmember in 1982. He was SFC Marvin W. Flatt, the flight engineer on a CH-47B. When the engines failed during approach to a confined area, SFC Flatt's immediate release of the external load prevented the aircraft from going down in trees.

Two years later, CH-54B flight engineer SSG Monroe W. Hogan received the Broken Wing Award for his actions during a dual engine failure on approach to an airport.

Less than 6 months later, SGT Paul A. Leonard was the crew chief on an NVG mission in a UH-60. When the slingload lodged itself into trees after the aircraft suddenly entered a fog bank, SGT Leonard immediately jettisoned the load, enabling the flight crew to regain control of the aircraft.

In 1986, flight engineer SGT Jonathan S. Gyuran and crew chief SP4 Russell H. Crocker were recognized for teamwork that prevented having to ditch a CH-47D in the ocean. The aircraft was 50 miles from land when oil began leaking rapidly from the aft transmission. Using a case of oil stored on board, the enlisted crewmembers managed to service the transmission with 18 quarts of oil in flight at just about the same rate it was losing oil. They did so despite being constantly sprayed with hot oil as it was pumped from the transmission.

In 1988, SP4 Artur A. Piotrowski became the sixth enlisted recipient of the Broken Wing Award. He was the crew chief on a CH-47D configured with two 600-gallon internal ferry fuel tanks. The aircraft had just refueled and was cruising at 2000 feet over mountainous terrain when fire broke out in the rear of the aircraft. SP4 Piotrowski's quick firefighting action prevented the fire from reaching the internal ferry fuel tanks.

A year later, SSG John Paul McConnell was the flight engineer of a CH-47D. Over mountainous terrain, the aft cabin suddenly filled with dense, dark, acrid smoke. SSG McConnell's actions and the skill of the pilot saved the aircraft and the lives of the crew and the 25 passengers.

PFC Robert D. Brown received the award in 1991 for his assistance in landing a UH-1H that experienced total hydraulics failure at 500 feet agl with seven people on board.

Later that same year, SGT James R. Frush received the Broken Wing Award for his actions after his AH-1F entered inadvertent IMC. The pilot's attention became fixated outside, resulting in the aircraft's descending at 2500 feet per minute in a nose-down, left-bank attitude. SGT Frush calmly talked the pilot through the procedures necessary to regain positive control of the aircraft and fly IMC until they were able to land safely at a nearby airfield.

SGT Donald R. Andreasen became the tenth enlisted recipient of the Broken Wing Award in 1994 for his assistance in landing an OH-58A whose engine failed over treacherous terrain.

Three years later, SGT James R. Seiders earned his Broken Wing Award for his actions during total hydraulics failure and cyclic hardover in a UH-1H.

SSG Paul Chambers is the most recent enlisted recipient of the Broken Wing Award. The crew chief of a UH-1H performing paradrop operations, he received the award for his actions during an in-flight emergency that put both the aircraft and the lives of several jumpers in jeopardy.

We salute these enlisted crewmembers whose life- and aircraft-saving actions have been recognized by the prestigious Army Aviation Broken Wing Award. We also salute all those crewmembers who haven't yet been tested by an in-flight emergency but who are trained and ready to use their exceptional skill to deal with whatever happens.

The Army Aviation Broken Wing Award recognizes aircrewmembers who demonstrate a high degree of professional skill while recovering an aircraft from an inflight failure or malfunction requiring an emergency landing. Requirements for the award are in AR 672-74: Army Accident Prevention Awards.

■ *CW2 Gary D. Clark, pilot in command*
■ *CW3 Ivan S. Murdock, copilot*

1/160th Special Aviation Operations Regiment (A)
Fort Campbell, KY

CW2 Clark was the PC and CW3 Murdock was on the controls of an MH-60K conducting mountain training. The NVG mission was to establish an aircraft FARP in a remote desert location. Due to environmental conditions (pressure altitude was +5000 feet and outside air temperature was 15°(C) and a load of 4000 pounds, they were operating in a high-gross-weight condition.

At 50 feet agl and 20 KIAS on takeoff after refueling at an airport, the crew heard a loud whining noise and noted an uncommanded right input in the cyclic. CW2 Clark immediately accessed the instrument page and ascertained that tgt was well above limits on both engines. CW3 Murdock immediately lowered the collective to maintain rotor speed and maneuvered the aircraft to the nearest suitable area, which was an abandoned dirt runway. He landed safely without visual reference due to brown-out conditions.

Inspection revealed that the No. 1 engine high-speed shaft balance stud had sheared, and complete shaft failure was imminent.

■ *CW2 Timothy F. Kools*

1st Battalion, 228th Aviation Regiment
Fort Kobbe, Panama

The CH-47D was on a training flight over the Panama Canal at 700 feet agl and 100 KIAS when it began to yaw 5 degrees, progressively increasing to 20 degrees left and right. CW2 Kools, the IP, immediately turned toward final approach to an airport a mile away. As he did so, the flight controls locked in the yaw left axis and left pitch axis, which caused forward airspeed to dissipate. He applied increased counterpressure to the flight controls without results. The flight controls would not respond and felt as though there was no hydraulic pressure in the system. The flight engineer reported that hydraulic pressure and temperature were normal and no caution capsules were illuminated.

After CW2 Kools struggled with the flight controls for about 30 seconds, they broke free and felt as though partial hydraulic pressure was restored. He immediately initiated an approach to the airport, which was straight ahead, but the controls locked again in the yaw and roll axis, causing aircraft control to be nearly impossible.

Pitch and thrust were available, and he continued the approach using only these flight controls although the aircraft continued to oscillate unrestrained. The flight controls freed up again just before ground contact and the landing was accomplished.

During normal shutdown, a slight vibration was felt in the flight controls, which increased rapidly to a violent vibration and blade flapping. The crew then conducted an emergency engine shutdown. Postflight inspection revealed an extended jam indicator on the aft swiveling dual boost actuator.

■ *CW2 Stanley M. Phillips*

247th Medical Detachment, NTC Support Battalion
Fort Irwin, CA

CW2 Phillips, the PC of a UH-60A, was conducting continuation training under NVGs with low illumination. The aircraft entered total brownout conditions during approach, and the PC initiated go-around procedures. At 40 feet agl during the crew's attempt to climb out of the dust cloud, the No. 1 engine experienced a severe compressor stall. CW2 Phillips immediately initiated a power reduction in an unsuccessful attempt to alleviate the condition. Simultaneously, the low rotor audio and caution light activated, and Np and Nr on both engines began decreasing.

CW2 Phillips continued descent and observed that the area directly in front of the aircraft had large ruts and a rock embankment. With Nr decreasing to the point that the main generators had dropped off line, he realized the only way to land safely was to pull the remaining collective and attempt to clear the embankment and land in a sandy wash-out area. The aircraft ballooned over the embankment and, with little to no control authority left, CW2 Phillips managed to guide the aircraft to touchdown without damage.

The No. 1 engine compressor stall was caused by erosion of the engine compressor. Subsequent inspection found that the inlet particle separator blower shaft from the accessory gearbox had sheared.

The No. 2 engine was unable to provide for the increased demand, and it too experienced a loss of power and a compressor stall.

■ CW5 James Noe

Maryland Army National Guard
Baltimore, MD

CW5 Noe was the pilot of a C-12C when, during takeoff roll, a deer ran across the runway in front of the aircraft. With the aircraft near the critical point of rotation, he knew he could not take off in time to avoid it. To reduce damage to the airplane, CW5 Noe pulled back on the yoke to raise the nose of the C-12, thus avoiding the deer with the nose and the right propeller. However, the deer did collide with the left landing gear and its carcass wrapped around the landing gear as the aircraft became airborne. With great skill, he maintained control of the now-damaged aircraft, flying left-side-low because of the weight of the deer on the left landing gear. When the deer carcass fell off, CW5 Noe gently lowered the left side of the aircraft onto the collapsed landing gear. This action prevented the aircraft from cartwheeling and eliminated any sheet-metal damage to the airframe. He skillfully steered the aircraft and kept it on the runway. The aircraft traveled for 2500 feet from the point of impact to termination. CW5 Noe's quick reaction prevented serious injury to the crew and minimized damage to the aircraft.

■ CW2 Russell L. Haslam

Aviation Brigade, 25th Infantry Division (Light)
Wheeler Army Airfield, HI

During an NVG flight with zero illumination, CW2 Haslam, who was in the front seat of an AH-1F, noted decreases in both engine and rotor rpm. Light and audio warnings activated at 94 percent. At 91 percent N2 and rotor, CW2 Haslam entered an autorotation and immediately requested and received a continuous callout of engine and rotor rpm from the IP in the back seat. Once established in steady state autorotation, engine N2 rpm recovered to 97 percent. To compensate for the zero-illumination condition, CW2 Haslam requested that both the IR and white searchlights be turned on to assist in locating a suitable landing area. During the deceleration phase of the autorotation, he saw power lines in the flight path and maneuvered the aircraft to a safe landing in a recently plowed sugarcane field.

■ CW3 Richard S. Handlon

2nd Battalion,
101st Aviation Regiment
Fort Campbell, KY

The mission was to conduct mission task training and evaluation in the AH-64A. CW3 Handlon, the IP, was in the front seat using the TADS FLIR, and the PI was flying the aircraft using the PNVS.

They had done several high- and low-g maneuvers, including diving flight, without any problems when the PI conducted a high recon to initiate an approach into a confined area. As he began the approach, he felt the aircraft shudder as if it were landing in a tailwind condition. He announced "go-around" and began to execute the maneuver to approach and land from the opposite direction.

At about 140 feet agl and 45 knots on the second approach, the PI felt a high-frequency vibration in the pedals. The pedals began uncommanded fore and aft movements of approximately 3 inches at about 60 cycles per minute. When the aircraft began yawing left and right, CW3 Handlon took the controls. Five seconds later, the aircraft began an uncommanded right spin.

CW3 Handlon immediately reduced collective pitch to attempt an autorotative landing. He activated the chop collar to stop the right spin and execute a controlled forced landing into dense 50-foot-tall trees. The spin slowed as the aircraft descended into the trees, and he increased collective in an attempt to keep the aircraft level. The tail section separated on contact with the trees, and the aircraft hit the ground in a slightly nose-down, level attitude.

The aircraft was destroyed and both crewmembers suffered serious injuries, but CW3 Handlon's actions prevented what surely could have been fatal injuries to both himself and the other pilot.

Auxiliary fuel tank operations

The extended range fuel system (ERFS) was developed for self-deployment; it was never intended for daily operations. However, the increased mission capability it provides has encouraged commanders to use the ERFS for daily operational missions.

Use of the ERFS as daily mission equipment carries an increased risk for flight crews. The ERFS operations outlined in the Interim Statement of Airworthiness Qualification (ISAQ) for the AH-64 are not comprehensive enough for daily use of the system. The UH-60 operator and maintenance manuals contain all relevant information, but they should be reviewed closely, particularly before operations with ERFS containing fuel. In addition, such operations should involve only mission-essential personnel.

The ERFS should not be used as a convenience item to avoid mission delays for day-to-day operations. The ERFS should be used only for METL-based training or operations requiring extended mission legs when fuel is not available. Further, missions using ERFS tanks containing fuel should be identified as moderate or high risk.

Risk-assessment factors

Aviation commanders at all levels should consider the following before approving flight operations requiring ERFS containing fuel.

- Lack of crashworthiness resulting in increased risk of postcrash fire and limited ballistic-tolerant capabilities of the ERFS tank.
- Degraded aircraft performance resulting from increased gross weight, center of gravity shifts both laterally and longitudinally, and reduced aircraft maneuverability.
- Configuration/installation procedures, including fuel samples for the ERFS, refueling and defueling procedures, preflight considerations for ERFS, and maintenance procedures.

Safety considerations

The U.S. Army Aviation Technical Test Center conducted a limited airworthiness and flight characteristics study of the AH-64A equipped with a single 230-gallon ERFS tank and found the following:

- During ground taxi, the rotor tip path plane can dip as low as 4 feet above the ground. All ground personnel should be briefed whenever conducting ERFS operations.
- Downslope over-rotation can occur when landing with the ERFS either upslope or downslope; however, it is especially pronounced when landing with the ERFS downslope. Whenever possible, the AH-64A should be landed with the ERFS upslope.
- The ERFS should be mounted on the right side of the AH-64A, as this has the least impact on aircraft flight characteristics.
- The AH-64A parking brake had to be manually held on all slope angles of more than 5 degrees. Aircrews should ensure that the aircraft is securely chocked before conducting shutdown.
- The CCU 44/B impulse cartridge for the external stores jettison system exhibited a 12-percent failure rate (3 failures in 25 attempts). All cartridges were within the authorized shelf life.

Flight briefings

All aircrew briefings should include the following items:

- ERFS fuel-transfer operations.
- Single-engine considerations with fuel in ERFS.
- Effects of auxiliary-fuel-tank location on egress procedures.
- Weapons employment considerations with or without modification work orders (MWOs) and engineering change proposals (ECPs) completed.

Operator and maintenance manuals

The AH-64 ISAQ and UH-60 and AH-64 operators and maintenance manuals must be thoroughly understood and complied with. Specifically—

- Normal load factors in excess of 2 G's are not authorized with ERFS tanks containing fuel. High-G maneuvers increase aircraft gross weight and power required, thereby decreasing the power-available margin.
- Maneuvering with only one tank installed requires caution. Asymmetrical loading due to external-fuel-tank installation can result in increased roll rates and slower recovery time.
- In order for the AH-64 to obtain a single auxiliary tank empty indication, a jumper wire must be installed on the pylon of the opposite side of the aircraft from where the auxiliary tank is installed.
- Jettison of fuel tanks is not authorized except in an emergency, and then only from airspeeds less than 100 KIAS for the AH-64 or in accordance with the UH-60 operators manual.
- AH-64 external fuel transfer is not authorized during internal fuel transfer or when operating below minimum single-engine airspeed.
- Fuel consumption checks will be completed before auxiliary fuel is transferred to the main tanks.
- Auxiliary fuel tanks will be visually inspected when pressurized to ensure there are no fuel leaks. If any leaking is observed, fuel transfer will cease.

—adapted from a letter from MG Daniel J. Petrosky, CG, USAAVNC and Fort Rucker, to aviation brigade, division, and regimental commanders

On saying what you mean

After completing an uneventful first leg of a VIP support mission, we were on final approach in a UH-60A into Yokota AFB to pick up our passenger for the return trip home. My copilot was on the controls as I instructed: "Give me a gradual roll-on to the parallel taxiway. When we touch down, I'll crank the 'P' [APU] and unlock your tail wheel."

On final, I noticed his airspeed was a little excessive; however, I trusted him to slow down at a safe point. When it became apparent that he did not intend to meet my required comfort zone for deceleration, I made mention of his high rate of speed. This didn't seem to faze my copilot. I again instructed him to slow down a little and prepare for landing, and he acknowledged my request. However, he still did not slow to my comfort zone.

We touched down at approximately 30 KIAS. I allowed this to continue because there were no obstacles on the taxiway. After completing normal after-landing tasks and positioning the aircraft for passenger pickup, I asked why we had touched down at such a high rate of speed. His response was a little more than I bargained for.

He reminded me that during our thorough pre-mission crew briefing, I had told everyone to "communicate positively and be explicit; say what you mean, and mean what you say."

On final, I had told my copilot to give me "a gradual roll-on landing." Now, Task 1029 in TC 1-212 specifies in standard #4, "Perform a smooth, controlled touchdown above ETL but below 60 knots groundspeed aligned with the landing direction ±5 degrees."

I had asked for a roll-on landing, and my very capable copilot did exactly what I said.

But, I really didn't mean what I said....

—CW4 Wayne Denmark, 78th Avn Bn (Prov), Camp Zama, Japan, denmarkw.78avn@zama-emh2.Army.mil

There I was at JRTC...

. . . in a UH-1H at 0100 hours on a combat search and rescue (CSAR) mission under NVG conditions. The night was clear, but it had been raining all day, and there was a small amount of ground fog developing. I was the unit's ASO as well as an NVG SP. I was in the left seat, and the PC for the flight was in the right seat; he was also an NVG SP. We had flown together for several years and trusted each other completely. In addition, we had been at JRTC for a week and had completed several CSAR missions.

We had thoroughly briefed the mission and possible scenarios that might occur. At about 300 feet agl over 75-foot pine trees, the low rotor rpm audio and light activated. I was on the controls and felt no indications of a possible engine malfunction, but I asked how the rpm was as I began a power-on decent to a small field in front of a field hospital to our front.

The crew chiefs in the back started calling the aircraft clear, as they were unaware that the audio had activated. They thought we were starting an approach at our pickup point. The PC was unable to call out that the rpm was okay over the crew chiefs, and I was unable to check the rpm as I was concentrated outside. As I still had no other indications of an engine malfunction, I continued the power-on approach past the 75-foot pine trees. At about 200 feet agl, the PC said the rpm looked okay, and I landed in the clearing and completed a normal shutdown.

Of course, the adrenaline was pumping as we exited the aircraft, and we were glad to be on the ground. We were glad that we had not overreacted and that we had covered possible engine malfunctions in our briefing. We were also glad we had landed safely without damaging anything.

Unfortunately, the observer-controller that made the location said that we had landed on a minefield and everyone had been killed.

Oh, well. We hadn't briefed that.

—CW3 John W. Hickman, Texas ARNG, San Antonio, TX, DSN 471-2919 (210-661-3631)

It ain't necessarily so

We learned a lot about hazardous attitudes in the Army's Aircrew Coordination Course. However, I discovered one on my own that we hadn't discussed in the course. It's subtly akin to the "Halo Effect," and it's potentially lethal. I'm sure the day will come when some high-speed clinical psychologist will give it a suitably psychobabble name, but for now I'll just call it "Tuttle's Theorem." It goes like this:

1. I belong to this unit, and I fly around this area a lot.

2. Aviator X also belongs to this unit, and he flies around this area a lot.

3. I know Y from having flown around this area a lot.

4. Hence, whence, thus, ergo, QED: Because I know Y, Aviator X must also know Y.

And now for Tuttle's Corollary: *It ain't necessarily so.*

As a full-time support aviator in the Jersey Guard, I operate in an area that includes Air Force bases, Coast Guard helipads, and a couple of Naval Air Warfare Centers in addition to the usual assortment of Army, National Guard, and civil hover-holes. I'm used to landing in areas with ground guides who maneuver aircraft for a living, and I'm comfortable with my knowledge of standard hand and arm signals. Since a goodly portion of my fellow aviators on the part-time side are either professional pilots or otherwise involved in civil aviation in the same area, we have a common mental aeronautical library.

So much for the bait. Now, the trap.

Our flight of four AH-1Fs had just arrived at our scheduled refueling stop on the way to Annual Training. We occupied most of the transient parking area, but a second flight of four was only a half-hour behind us. The AMC came up with a parking plan that wouldn't shut down the FBO, mesh rotor blades, or invert any of the starched wings having squatters' rights to the ramp. The idea was for us to ground guide the second flight between the FBO's hangar and the huddled masses of civilian aircraft. After getting the FBO's approval, the AMC phoned The Plan to the control tower.

We took our positions and eagerly awaited our opportunity to show the rapidly gathering crowd of gawkers "how it's done." I was the inside man—right in front of the FBO's office.

The Plan came together. Tower told Second Flight what to expect, and handed Lead over to our ground-guiding expertise. Lead approached our "outside man" and performed a flawless left pedal turn in response to his signals. Lead then proceeded—at an appropriately stately pace—past the two "passers" to yours truly—and stopped about one Cobra-length away from where he would have to park to make The Plan work.

You can see it coming, can't you?

I signaled Lead to "slide right." The slightly puzzled look I got from the front-seater should have raised the hair on the back of my neck, but I continued to give him the "slide right" signal (probably with the mindset that if you repeat yourself enough times, even a raccoon will finally understand you).

I was still trying ESP on Lead when he proved the fallacy of Tuttle's Theorem and validated Tuttle's Corollary. Instead of sliding right, he made a right pedal turn. A three-sixty. Faster than you can say "Bell."

One of my fellow aviators later said that the tail rotor passed about 3 feet over my head (" 'Course that was *after* you ducked!") and another said that he had never realized a human being could sprint while in a full crouch. Since Lead had landed by now (yep—still in the wrong spot), I did what I should have done when I spotted the "Huh?" look on the front-seater's face. I opened his canopy door and told him where he was supposed to park and how I was going to guide him there.

I had encountered a "slide right/left" every time I'd refueled at a military base, but the aviators in Lead had either never seen the signal or had forgotten what it meant. After discussing the situation, they'd decided I wanted them to pedal turn. So that's what they'd done.

Afterwards, both my buddies in Lead told me that, while they had been confused about "slide right," they had no trouble interpreting the double hand-signal I gave them from the safety of the FBO's doorway immediately following their pirouette. And yes, I did apologize to the FBO's secretary for almost becoming a wet red swath across the windows of her office. But I suspect that her eyes will still be about the size of saucers for quite some time.

—CW4 William S. Tuttle, New Jersey ARNG, DSN 445-9261 (609-530-4251)

A word to the wise. . .

***It's a good idea to periodically review standard hand and arm signals just to make sure everybody's speaking the same language. The standard signals are illustrated in appendix A, FM 1-104:* Tactics, Techniques, and Procedures for Forward Arming and Refueling Points.**

ANVIS maintenance

How do we start or maintain a good aviator's night vision imaging system (ANVIS) maintenance program?

Unit-level maintenance is the first and most critical level of a good ANVIS maintenance program. It is the foundation of the maintenance system and requires continuous emphasis by all commanders and supervisors. Commanders are responsible for providing resources, assigning responsibility, and training their soldiers to achieve the standards defined in paragraph 3-1a of AR 750-1.

The cornerstone of an ANVIS maintenance program is the preventive maintenance checks and services (PMCS) performed by the operator using the -10 operators manual. That means every pilot, copilot, crew chief, gunner, and flight engineer using the ANVIS must be properly trained on how to inspect the ANVIS.

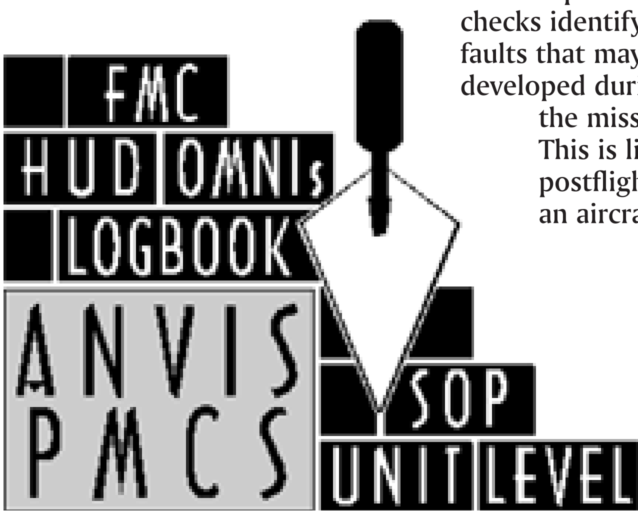
The before- and during-operations checks concentrate on assuring equipment is fully mission capable (FMC). That means ready to go to war and perform as advertised.

Faults detected during the before-operations checks that make the equipment not FMC or violate a safety directive must be corrected before the mission. This means if they are broken, do not use them; get another set.

Faults detected during the mission affecting FMC status must be considered during the mission. This means if you cannot fix the problem, modify or cancel the mission.

Faults detected before or during the mission not affecting FMC status may be corrected, if time permits, or recorded and reported for correction after the mission. But remember, if you do not document what is wrong with the goggles, then as far as the maintainer is concerned, there is nothing wrong with them.

After-operations checks identify faults that may have developed during the mission. This is like a postflight on an aircraft.



The unit-level maintainer is the next stone in this program. The maintainer is required to be trained in ANVIS maintenance, and this training must be documented by the qualified trainer. The maintainer must then be designated in writing by the commander as the unit ANVIS maintainer.

The unit ANVIS maintainer is required to maintain ANVIS in accordance with all technical manuals and written directives. This information could be compiled into a standard notebook binder. That binder should contain the following information:

- Maintainer's documentation of ANVIS maintenance training.
- Maintainer's designation by unit or activity commander.
- Maintainer's technical-inspector orders (to clear red-X and circle-red-X status and perform technical inspection on ANVIS and related equipment).
- Designated personnel authorized to perform distortion checks.
- Copy of unit NVG maintenance SOP.
- Copies of current NVG messages.
  - 101430Z Apr 97, ATCOM, GEN-97-ASAM-04
  - 191537Z Feb 97, USAAVNC
  - 130229Z Sep 96, ATCOM, GEN-MIM-96-05
  - 032330Z Jan 91, USAAVNC
- Listing of all rescinded NVG messages.
- Copy of SOP and Airspace NVG Checklist dated 15 Apr 97.
- Copy of ANVIS Maintenance Checklist dated 15 Apr 97.
- Current Technical Bulletins.
  - TB 1-1500-346-20, 26 Jan 96
  - TB 1-1500-348-30, 29 Dec 95
  - TB 1-1500-350-30, 26 Feb 96
- Copy of NVDB-UGM-1: *ANVIS Forms and Records Updated Guidance Manual*, 15 Apr 97.
- Required publications.
  - DA Pam 738-751
  - TM 11-5855-263-10
  - TM 11-5855-263-23&P
  - TM 11-5855-299-12&P

All this information is available through the Night Vision Devices Branch at Fort Rucker, DSN 558-9545 (334-255-9545).

Commanders are responsible to ensure that every set of ANVIS has a logbook and that the logbook is maintained in accordance with DA Pam 738-751 and all technical bulletins, technical manuals, and written directives.

The last stone of this maintenance program is aviation intermediate maintenance (AVIM). They provide support for the unit maintenance program in the areas of troubleshooting, repairs, and 180-day inspections.

—SFC Ken Wheatley, Night Vision Devices Branch, USAAVNC, DSN 558-9545 (334-255-9545)

Shortfax
Keeping you up to date

Attention AH-1 maintainers

Phase 2 of the AH-1 Aviation Maintenance Officer Course (AMOC) is now being conducted at the Western Army National Guard Aviation Training Site. If you have AH-1 related questions, contact CW4 Dale Whitmore, CW4 Gary Gebhart, or CW3 Jack Johnston at DSN 853-4573/4623 (520-682-4573/4623). The mailing address is Commander, Western AATS, Bldg L45-500, Silverbell AHP, Marana, AZ 85653-9598. The e-mail address is whitmored, gebhartc, or johnstonj@azng-mail.army.mil.

Hello? Hello?

With the automation of the phone system (no operators) here at Fort Rucker, we at the Safety Center are having a hard time returning calls to DSN numbers overseas. So if you need for someone here to call you, please leave a commercial number if possible. E-mail is also a good option.

—CW5 Bill Ramsey, Aviation Section, USASC, DSN 558-2785 (334-255-2785), ramseyw@safety-emh1.army.mil

ASE/EW course available

The proper use of aircraft survivability equipment (ASE) can greatly increase the survivability of aircraft on the modern-day battlefield. A 2-week course designed to train officers in all aspects of ASE employment procedures is taught at Fort Rucker. The ASE/Electronic Warfare Officer's Course (ASE/EWOC) is open to Army aviators who—

- Possess a SECRET security clearance.
- Have completed one utilization tour.
- Are ASET II proficient.
- Are identified to be placed in a unit EWO position.

Warrant officers who complete the course will be qualified for an additional skill identifier of H3. The course is also a prerequisite for the tactical operations officer track for warrant officers.

Twelve courses are scheduled for fiscal year 1998.

Class	Course dates
98-01	10-31 Oct 97
98-02	1-12 Dec 97
98-03	5-16 Jan 98
98-04	2-13 Feb 98
98-05	2-13 Mar 98
98-06	6-17 Apr 98
98-07	27 Apr-8 May 98
98-08	11-22 May 98
98-09	1-12 Jun 98
98-10	12-24 Jul 98
98-11	3-14 Aug 98
98-12	14-25 Sep 98

Officers wishing to attend the course should submit DA Form 4187 through their commander.

POCs: CW2(P) Jeff Ylitalo or Mr. Robert Wynkoop, ASE/EWOC, Fort Rucker, DSN 558-2023 (334-255-2023)

Static-discharge danger

Soldiers conducting static-sensitive operations need to be aware of possible static discharge from the extended cold weather clothing system (ECWCS). The parka (NSN 8415-01-228-1306 series) and trousers (NSN 8415-01-228-1336 series) are made of a synthetic laminated cloth commonly known as Gore-Tex™. Synthetic fabrics generally develop greater static charges and maintain these charges for a longer period than natural fibers such as cotton or wool.

Electrostatic discharge (ESD) during operations such as ammunition or missile handling, refueling, and maintenance or electronics may present an immediate operator hazard or a delayed adverse effect upon systems.

Units should identify operations where ESD can be a hazard and implement controls to reduce or eliminate these hazards. References that specify established procedures include, but are not limited to, the following:

- FM 10-68: *Aircraft Refueling*
- FM 10-69: *Petroleum Supply Point Equipment and Operations*
- FM 10-20: *Organizational Maintenance of Military Petroleum Pipelines, Tanks, and Related Equipment*
- FM 9-38: *Conventional Ammo Unit Operations*

Fortunately, no incidents have been attributed to ESD from field clothing, but the possibility is there. Units should ensure that controls such as grounding, bonding, and ventilation of fuel/air mixtures are part of their standing operating procedures for static-sensitive operations.

Technical POC is Mr. Neil E. Smedstadt, Army Natick Research, Development, and Engineering Center, DSN 256-4032 (508-233-4032). Safety POC is Mr. Paul G. Angelis, Army Soldier Systems Command, DSN 256-5208 (508-233-5208).

—adapted from *Explosives Safety Bulletin*

Changes at ATCOM

The aviation mission of the Aviation and Troop Command (ATCOM) has merged with the Missile Command to form the U.S. Army Aviation and Missile Command (AMCOM), which is located at Redstone Arsenal, AL. Please note that only the aviation mission of ATCOM was merged to form AMCOM.

CDRAMCOM message 220409Z Sep 97 lists the names, phone numbers, and e-mail addresses of points of contact in the Transportation Branch of the new command. CW5 Bill Ramsey at the Army Safety Center will also be glad to help you get through to the right folks at AMCOM. You can call him at DSN 558-2785 (334-255-2785) or e-mail him at ramseyw@safety-emh1.army.mil.

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class E

F series

■ Engine oil pressure light came on during low-level flight. Aircraft landed without incident, and maintenance replaced engine oil pressure switch.

■ Forward fuel boost pump light came on during cruise flight, followed by aft fuel boost pump light. During descent, segment lights extinguished, and aircraft landed without incident. Inspection revealed faulty one-way check valve in bypass manifold and forward boost pump. Bypass manifold and forward boost pump were replaced.

AH64

Class C

A series

■ Several caution lights came on in cruise flight, after which smoke entered cockpit. Crew executed manual emergency actions and landed without further incident. Subsequent maintenance inspection revealed extensive damage to electrical system. Investigation is in progress.

Class E

A series

■ Crew made precautionary landing after smelling smoke and feeling unusual airframe vibration during aerial gunnery at night. Inspection revealed No. 1 generator was bad and had been smoking. Generator was replaced.

■ During night gunnery training, aircraft experienced TADS and PNVS failure. PC established unaided flight and returned to base. Inspection revealed bad connector plug, which was replaced.

■ During before-takeoff check, primary hydraulic pressure was noted at 600 psi, and aircraft was shut down. Maintenance replaced primary hydraulic pressure transducer.

■ Oil bypass utility hydraulic caution light came on during taxi. Maintenance replaced utility hydraulic pressure filter.

■ Transmission chip caution light came on during hover taxi for takeoff, and flight was terminated. Inspection revealed broken connection at environmental splice in chip plug wire.

CH47

Class D

D series

■ During track and balance in cruise flight, No. 2 flight control hydraulic and No. 2 AFCS-off caution lights illuminated on master caution panel and No. 2 pump fault light illuminated on maintenance panel. Caused by sheared shaft on pump.

Class E

D series

■ After load was released during slingload training, center cargo hook required manual reset and aircraft was repositioned to land. During descent, aircraft struck another training block immersed in high vegetation. Aircraft was picked back up and landed safely.

■ During engine runup, crew noticed that forward rotor had unusual lateral oscillation that stopped when rotor speed reached 50 percent of rated rpm. This was attributed to the first start of the day and cool outside temperature. After runup and hover checks, aircraft was shut down due to weather. On postflight, crew discovered excessive wear on bushing assembly on outboard bearing rod end on shock absorber located on yellow blade/forward rotor. When retaining bolt was removed, pieces of bushing assembly fell out. A new shock absorber was installed and aircraft returned to flight.

■ Crew heard high-pitched whine coming from forward transmission area during flight. About 5 seconds later, master caution light came on with a No. 1 flight control hydraulic caution capsule and No. 1 AFCS. Aircraft landed and shut down in field, where complete loss of system pressure as well as fluid loss was experienced. Maintenance replaced pitch ILCA O-rings and transfer tube.

OH58

Class B

A series

■ Aircraft rolled over upon liftoff to a hover. Small postcrash fire was extinguished. There were no injuries. Incident is under investigation.

C series

■ Aircraft had departed refueling point and was en route to parking pad with crew under NVGs. While at forward 3- to 5-foot hover, IP experienced failure of his intercom system and instructed student to take controls. Confusion ensued as to who had the controls, and nose of aircraft rose and tail rotor hit ground. Main rotor blades also hit ground and entered cockpit. Student sustained laceration above right eye.

D(I) series

■ Crew heard loud bang in cruise flight, followed by engine failure. Crew executed emergency autorotation, and aircraft landed hard. Tail boom separated, and main rotor blades and tail rotor blades and gearbox were damaged. There were no injuries.

Class C

C series

■ While crossing a ridge line, aircraft experienced engine overtorque to 110 percent. During subsequent precautionary landing on the ridge, aircraft tail rotor contacted ground. Tail rotor assembly and gearbox separated. Aircraft was shut down without further incident.

Class E

C series

■ Tail rotor began oscillating in cruise flight at 70 knots. Shortly thereafter, low rotor rpm light and audio activated. Midway through autorotation, engine-out light activated. Aircraft landed without damage. Cause not reported.

D(I) series

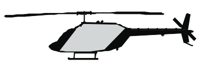
■ During cruise at 700 feet agl, high engine oil pressure message displayed with corresponding digital display. PC terminated mission and returned to airfield. On short final, low transmission pressure message displayed with corresponding digital display. Inspection revealed main seal on accessory gearbox was disintegrating, causing damage to freewheeling unit that allowed transmission oil to flow into engine.

■ IP noted lateral cyclic binding during hover taxi to parking. Inspection revealed binding or racheting was occurring about an inch from cyclic center. Maintenance adjusted cyclic servo actuator upper bolt and servo valve bolt.

■ During cruise flight at 600 feet agl, low oil pressure transmission warning message illuminated without corresponding instrument readings. PC declared emergency and landed. Caused by loose wire on transmission oil psi sending unit.

■ Transmission oil psi low caution illuminated three times while MPD indicated 55 to 60 psi, well within normal. Crew executed precautionary landing; maintenance replaced transmission oil psi switch.

TH67



Class D

A series

■ During simulated maximum performance takeoff at 15 feet agl, rpm warning light and audio activated. Student on controls immediately retarded throttle and entered autorotation. Aircraft sustained damage to isolation mount, spike striker plate, and transmission cowling on termination of autorotation.

UH60

Class A

L series

■ Chalk 3 in flight of three experienced brownout conditions while on approach to pickup zone during air assault training. Aircraft landed hard and rolled onto its left side. All main rotor blades, main transmission, drive train, tail rotor blades, and gearbox were destroyed. All occupants were treated for minor injuries.

Class C

L series

■ Crew smelled smoke while aircraft was positioned over refuel point but could not identify source. PC elected to reposition aircraft to taxiway for shutdown, during which crew noted smoke coming from No. 1 engine. Upon opening engine nacelle after cooling, it was noted that the V-clamp affixing the engine exhaust to the engine had separated. This allowed exhaust gases into cowling area, resulting in damage to several components. Incident is under investigation.

A series

■ Aircraft experienced brownout while at a hover during M-60 door gunnery training. Crew initiated a climb up and out of the dust cloud and over a stand of trees. As aircraft was subsequently being landed to clear and rod weapons, crew heard loud noise. CE reported that aircraft was still in the trees. PI increased collective, at which point PC took controls and landed without further incident. Initial inspection revealed all four main rotor blades sustained trailing-edge damage. One main rotor blade sustained further damage, and possible spindle damage is suspected.

Class E

A series

■ No. 1 engine failed during low power setting at termination of training flight, and normal restart was accomplished. No. 1 engine failed again during taxi to parking. Cause not reported.

■ Aircraft was landed on bush during NVG APART evaluation. Two days later, damage was found to searchlight mount and sheet metal surrounding searchlight.

■ No. 2 engine flamed out while aircraft was operating with both engines at flight idle and parking brake engaged. Maintenance replaced hydromechanical unit.

C12

Class C

C series

■ Upon touchdown from short-field landing, right main landing gear collapsed, allowing propeller to contact ground. Aircraft traveled 1600 feet down runway before stopping. All three blades of right propeller were destroyed, right engine experienced sudden stoppage, and inboard and outboard flaps and right aileron were damaged.

R series

■ Lightning struck aircraft, damaging left wing tip and right horizontal stabilizer.

Class E

C series

■ During close-traffic-pattern work, flaps traveled from full up to 40 percent during takeoff and again on downwind with flap handle in full-up position. Maintenance adjusted contacts in flap-handle striker plate and cam assemblies.

■ During taxi to active runway, brakes would not stop aircraft. Aircraft was stopped using reverse thrust. After shutdown, aircraft was towed back to maintenance. Caused by failure of hydraulic cylinders.

F series

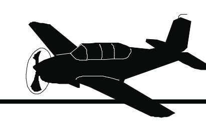
■ On rotation and initial climb, pilot's airspeed indicator went to 60 KIAS while copilot's indicator read 125. IP in rear seat assumed control and executed closed traffic pattern and landing. Maintenance found that static airline coupling was not fully secured and had separated during rotation.

G series

■ During initial climb after takeoff, landing gear handle warning light came on even though gear appeared to have retracted normally. As aircraft passed through 1000 feet, cabin door warning light also came on. Crew returned to airport and landed without incident. Inspection found that gear and door limit switches were out of adjustment.

■ Fuel control apparently failed on No. 1 engine, and engine N1 would not accelerate within parameters. While performing MOC runup for maintenance test flight, maintenance determined that oil-to-fuel heat exchanger was faulty.

T34



Class E

C series

■ As aircraft was accelerated to fast cruise after conducting slow flight maneuvers, pilot noted very strong smell of fuel. Following NATOPS procedures, pilot asked flight operations to coordinate look from another aircraft to determine if fuel was leaking. Visual look found no evidence of leak, and fuel gauges did not show loss of fuel, so pilot flew back to airfield and completed normal approach and landing. Maintenance cleaned fuel check valve on vent system.

■ Fire warning light came on after engine start. Crew shut down engine and exited aircraft. Maintenance inspection found no evidence of fire. Warning system was checked and connectors cleaned of moisture.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

CH-47-97-ASAM-10, 291548Z Sep 97, maintenance mandatory.
The AN/AVS-7 heads-up display provides operational symbology to pilots during ANVIS operations by overlaying the symbology on the image provided by the ANVIS. It was recently discovered that a component part power supply was changed by the vendor without approval, causing the AN/AVS-7 to be susceptible to some power line transients. The system will reset when certain power spikes are received, causing the display to blank for a 10- to 15-second interval while completing the power-up sequence. After that, the system will return to its normal start-up condition of full dim on the display and display page 1N.

The purpose of this message is to require a one-time inspection of all AN/AVS-7 systems to verify installation of the correct power supply component and to restrict flight operations with the AN/AVS-7 if an incorrect power supply component is installed.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (205-842-8632), brock-rd@redstone.army.mil

UH-1-97-ASAM-06, 292908Z Sep 97, maintenance mandatory.
ATCOM has received field reports citing failure of the self-sealing breakaway coupling connecting the oil line from the engine scavenge pump to the ODDS lubriclone filter. The pins in the connector are designed to shear in a crash sequence, but they are wearing away prematurely, resulting in pin failure. The internal valve closes and shuts off the oil flow. Pressure in the oil line increases, and the hose has failed under certain circumstances. Most of the wear on the pins can be attributed to normal aircraft vibration and side loading caused by the slight misalignment of the 90-degree coupling half at the lubriclone filter. Periodic inspection of these couplings is needed to prevent in-flight failure.

The purpose of this message is to require an inspection of the couplings, establish a recurring inspection to prevent future failures, and provide a temporary solution to the current supply shortage of 90-degree coupling halves.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (205-842-8632), brock-rd@redstone.army.mil

UH-60-97-ASAM-18, 082032Z Sep 97, maintenance mandatory.
Safety-of-flight message UH-60-97-1 was issued in December 1996 to remove certain reworked main rotor swashplate assemblies from use. To date, not all of the assemblies identified in this message have been turned in.

The purpose of this message is to require a visual check of serial numbers to identify suspect swashplate assemblies and to remove them from service.

AMCOM contact: Mr. Dave Scott, DSN 897-2068 (205-313-2068), scott-dc@redstone.army.mil

UH-60-97-ASAM-19, 291548Z Sep 97, maintenance mandatory.
See CH-47-ASAM-10 above.

UH-60-98-ASAM-1, 012125Z Oct 97, maintenance mandatory.
UH-60-97-ASAM-09 restricted main rotor shaft extensions (P/N 70351-08186-043) manufactured by the Purdy Corporation (cage code 15152) and Fenn Manufacturing Company (cage code 82001) to 2100 hours of service.

The purpose of this message is to eliminate this restriction and revise the service life of subject components to the original 14,000 hours.

AMCOM contact: Mr. Dave Scott, DSN 897-2068 (205-313-2068), scott-dc@redstone.army.mil

YOU CAN'T SOAR LIKE AN EAGLE . . . IF YOU THINK LIKE A TURKEY.
—HAPPY AND SAFE THANKSGIVING WISHES

IN THIS ISSUE

Class A Accidents

through September

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2D QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3D QTR	April	1	2	3	2
	May	0	1	0	1
	June	1	3	6	0**
4TH QTR	July	0	1	0	8
	August	1	0	0	0
	September	1	0	0	0
	TOTAL	8	12	16	14

*Excludes 1 USAF pilot trainee fatality
**Excludes 2 non-DOD fatalities

U.S. ARMY SAFETY CENTER

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Burt S. Tackaberry
Brigadier General, USA
Commanding General

Flightfax

ARMY AVIATION
RISK-MANAGEMENT
INFORMATION

DECEMBER 1997 ◆ VOL 26 ◆ NO 3

visit our web site • http://safety.army.mil

The Army has enjoyed a downward trend in accident rates over the last few years. While we continue to experience downward trends in most major categories of accidents, we closed out FY 97 with a slight increase in our Class A flight accident rate. However, our rate of just over 1 Class A accident per 100,000 flying hours is still the third best rate in the history of Army aviation.

That was not an accident;
that was not luck.
That was professionalism;
that was risk management;
that was a successful team effort.

BG Burt S. Tackaberry wears the dual hats of Director of Army Safety and Commander, U.S. Army Safety Center. This month he shares his thoughts on where we are in Army aviation safety.

As I continue to settle into my duties as the Director of Army Safety and Commander of the Army Safety Center, I want to share with you some of my observations. I also want to establish a dialogue with you concerning Army aviation operations and how we can do our job more safely.

Coming into this job, I could not see that the Safety Center did much for commanders out in the field. From that side of the street, it appears that we simply come out and investigate accidents. But the Safety Center does so much more. We work with various organizations—both inside and outside DOD—to make not only Army operations but also Army equipment as safe as possible. We are more than just aviation; we are ground operations, we are explosives, we are environmental, we are biological, we are chemical, we are everything and everywhere the Army is. But, because this is *Flightfax*, let me talk aviation.

The Safety Center works closely with the Army Aviation Center to identify hazards that are causing aviation accidents. This work is ongoing. In the meantime, here is my update on the current status of aviation safety, some accident cause factors and indicators that we believe are worth analyzing further, and some organizational and training issues we are currently reviewing.

The Safety Center recently looked at FY 92 through FY 96 Armywide accident data. One interesting indicator worth noting involved what we classify as "supervisory error." (NOTE: "Supervisory error" refers to the individual in charge in the cockpit; i.e., IP, IE, or PC.) We found that, in Class A through C aviation accidents, supervisory errors increased gradually from 5 percent of all cause factors in FY 92 to 15 percent in FY 96. In these supervisory-error accidents, IP experience averaged almost 1200 hours in FY 92, compared to just over 750 hours in FY 96. PC experience averaged 1327 hours in FY 92, compared to 452 hours in FY 96.

What does this mean? It could indicate an overall decline in Army aviator experience over the past few years, or it may simply show that aviators at this experience level are doing more of the flying.

To identify effective controls, the Aviation Center and the Safety Center are looking at several organizational and training issues. I would like to share my thoughts on a few of them.

"We are in some hard times. There are two things we can do this fiscal year. We can hope that we don't kill 14 aviators and have 12 Class A accidents like we did last year, or we can take action to make sure that we don't. But one thing is for certain: hope is not enough to save us this year. As a team, as professionals, using risk management as a tool, we can make a difference and make this a safe year."

Issue: Currency vs. proficiency

The two are not synonymous. Individual aviators are not getting as many flight hours as they did in the past, and, in many areas, proficiency equates to hours. For example, can we continue to expect people to maintain proficiency by flying just 1 hour of goggle time every 45 days? In these tough times, with our aircraft becoming more complex, it is time to revisit this issue.

Issue: Leader experience

I look at young lieutenants; they have a much harder life today than I did. They spend a year as a flight platoon leader, and then they go to a staff job. After that, they come back to Fort Rucker to the Aviation Officer Advance Course and then back to the field. They spend a year—if they're lucky, 18 months—as a company commander. A few years later, they are a battalion commander.

We are seeing battalion commanders with less experience in the cockpit, but we expect them to be able to recognize risks that could lead to a dangerous situation. That is why risk management is so important. The ability to use the risk-management process effectively enables even the most inexperienced leader to go to his or her next level of leadership and lay out hazards, risks, and the controls needed to ensure mission accomplishment in the safest manner possible.

Issue: Aviator experience

The warrant officer experience level in line units has changed. I flew with CW3s and 4s all my life. The restructure of units' MTO&E has eliminated some senior warrant officer positions. Now, CW3s and 4s are few at company level.

Issue: Crew coordination

We are evaluating the success of our crew-coordination program and its fielding, sustainment, and evaluation process. We know it is a great tool, but it needs to be updated and sustained. We did a good job in getting it out. In a lot of ways, our crew-coordination program is one of the best safety tools we have. But it has two major problems. It is not a living document, and it is not standardized.

Our crew coordination program must be a living document so we can pinpoint crew-coordination tasks that are surfacing in accidents on a regular basis and focus on those. If it were standardized, everybody would learn the same thing the first time and, as we PCS to other units, the standard remains the same.

Issue: Spatial disorientation

While spatial disorientation has always been a hazard for flight crews, its characteristics have changed. In addition to classic illusions such as leans and coriolis effect, today's missions have created new sources of spatial disorientation. The most critical of these are inadvertent drift and unrecognized gradual descent while at a hover.

In an effort to develop controls for the spatial-disorientation hazard, the Safety Center hosted a spatial disorientation working group last summer. The group developed and recommended control-measure proposals in four major categories: education, training, research, and equipment.

As our missions continue to become more complex and aircrew workloads increase, we can expect that exposure to spatial-disorientation hazards will also increase.

Issue: Digital source collector

Historically, 80 percent of all aviation accidents, both military and civilian, have been related to human performance. Therefore, the human factor has to be the area of major concentration for future accident reduction. This is something the digital source collector has potential to reduce. The DSC is an asset that can provide commanders a training and maintenance resource to ensure "command presence" on all flights. In addition, I believe that aircraft with a flight data recorder or gun-camera capability should always be flown with the devices recording.

Summary

In conjunction with the Aviation Center, the Safety Center will continue to analyze accident data and review these and other issues we believe may be affecting aviation safety. As we identify more specific accident-causing hazards and develop control strategies, we will provide you with this accident-prevention information.

But this is not a one-way street; the lines of communication are open. We need your input regarding your areas of concentration. We also are ready to assist if you identify specific areas in which we may help you with your accident-prevention strategies.

In closing, let me say to each and every member of the Army aviation team—military and civilian, officer and enlisted, crewmember and mechanic: Your professionalism is second to none; your dedication is impressive, your commitment is without question, and your outstanding performance makes what is an inherently dangerous profession safer.

—BG Burt S. Tackaberry, Director of Army Safety and Commander, U.S. Army Safety Center, Fort Rucker, AL, DSN 558-2029 (334-255-2029), tackabeb@safety-emh1.Army.mil

"Statistics show that half of all battalion commanders, two-thirds of all brigade commanders, and every garrison commander will have a fatality during their command."

A word to commanders

Aviation commanders, you have an *extremely* difficult job. It is a much harder job than when I had it, faster than when I was in your position. You are operating at high tempo with limited resources, and you are doing a magnificent job. I hope you will tell me what the Army Safety Center can do to help.

I want to stack the odds as much as I can in the favor of aviators. I want to ensure that the equipment we are giving you is the best equipment, that the procedures we are teaching are the safest procedures, and that the missions we are asking you to perform are as free of unnecessary risk as we can possibly make them. I know you want the same things.

Contact us. Tell us what you are doing. We can show you the statistics; we can tell you, based on the numbers, the most likely scenario for an accident, whether it is hitting a tree or overtorquing an engine. Then, in your mission briefs, you can share that information with your flight crews. Later, when they are out in an Apache and find themselves at a hover in an attack position, they will be aware of the events and situations that are most likely to get them in trouble. If they know what to expect, they can talk about it, prepare for it, know ahead of time what to do to prevent it.

I would love to get a dialogue going. What do you want? Please do not hesitate to let us know what your problems are. If you have a safety issue out there, Commander, I will carry the message for you to the highest levels.

Army Safety Center Aviation POCs—DSN 558-xxxx (334-255-xxxx)

Accident investigations/systems
LTC Versal Spalding 9552

Army National Guard liaison
LTC Tom Shea 9579

Army Reserve liaison
LTC Dave Clark 2376

Attack helicopters
CW5 Mike Moorehead 3703

Aviation life-support equipment
CW5 Dan Medina 9847

Cargo helicopters
CW4 Keith Freitag 3262
MSG Ruben Burgos 3650

Digital source collector
Mr. Gary Rasponi 2194

Engineering
Mr. Gary Rasponi 2194

Flightfax
Ms. Sally Yohn 2676

Fixed wing aircraft
CW4 Wes Hedman 9855

Human factors
Mr. Dwight Lindsey 2046

Legal
LTC Linda Jelonek (SJA) 2924
Ms. Vicki Hendrix (FOIA) 2373

Media & Marketing
Mr. John Hooks 3014

Medical
COL Ed Murdock 2763

Night vision devices
CW5 Bob Brooks 1253

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CW3 "Stew" Milligan. 9857

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Statistics
Mr. Bud Gill 1243

Training
CW5 Meade Roberts 2443
CW4 Paul Mahoney 2445

Turbine engines
MSG Kenneth King 9852

Utility helicopters
MAJ Herb Burgess 9853
CW5 Bob Brooks 1253
MSG Kenneth King 9852
CW5 Dan Medina 9847

Web site
Mr. Jason Harlow 2101
http://safety.army.mil

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The Army Aviation Broken Wing Award recognizes aircrewmembers who demonstrate a high degree of professional skill while recovering an aircraft from an inflight failure or malfunction requiring an emergency landing. Requirements for the award are in AR 672-74: Army Accident Prevention Awards.

■ *CW3 Steven F. Flankey*

1/160th Special Operations Regiment (A)
Fort Campbell, KY

On the final leg of a cross-country flight, CW3 Flankey was pilot in command of an MH-6J. The aircraft was at 500 feet agl and 105 knots when it experienced complete engine failure. The sun had set 35 minutes before, and lunar illumination was zero. The forced landing area chosen was a very dark field with the only visual references being scattered trees that were not identifiable even with NVGs until the aircraft was passing through 100 feet agl. The soft-surfaced field also contained a series of irrigation ditches and erosion-control levies throughout. The entire area was 75 by 120 meters, of which only a small portion was usable for a safe landing. Density altitude was 1100 feet, and there was an 8- to 10-knot crosswind. The aircraft was very near the 3200-pound maximum allowable gross weight limit for safe autorotation.

The initial indications were a left yaw and a change in engine noise. The copilot, who was on the controls at the time, initiated immediate action steps and lowered collective to maintain rotor rpm. At this speed, the MH-6J tends to tuck its nose violently if the engine fails, which it did. Even before the collective was completely lowered, and with the nose already tucked significantly, the crew conducted an emergency transfer of the controls in accordance with the crew brief.

Realizing that the landing surface was soft, possibly wet, CW3 Flankey decided to execute a minimum-ground-run landing. He applied initial pitch at about 10 feet, and then leveled the aircraft at 3 feet and allowed it to touch down. Because of the soft surface, he kept the aircraft light on the skids until it came to a complete stop.

Shortfax
Keeping you up to date

Height-velocity-avoid region

The dual-engine UH-60 brought a safety margin to utility-helicopter operations that wasn't possible with single-engine aircraft. However, as mission demands expand and new equipment is added, Black Hawks frequently operate at higher gross weights than in the past.

UH-60 crews should be aware that operating in height-velocity-avoid regions can be hazardous to them, too, if one engine becomes inoperative.

Avoid regions vary based on gross weight and atmospheric conditions. Pilots should review the information in the operator's manual on the height-velocity-avoid regions for single-engine failure and avoid flying in these danger zones as much as possible.

POC: Mr. Michael Lupo, Utility Helicopter PM Office, Aviation and Missile Command, DSN 645-0076 (205-955-0076), lupo-mv@redstone.army.mil

Audiovisual library now on web

The Defense Automated Visual Information System (DAVIS) is now on the worldwide web. This joint-service library contains more than 26,000 audiovisual productions (films and videotapes) produced and purchased by DOD components to support training, operations, and other requirements.

The DAVIS web site (http://www.redstone.army.mil/davis) is unrestricted and features an easy-to-use full-text search engine that can quickly find and produce detailed descriptions of audiovisual productions in the Defense inventory. The site can then be used to electronically order productions.

Historically, DAVIS was available only to visual-information specialists. That is no longer the case. Everyone is now encouraged to use it, from training NCOs to others responsible for professional development.

POC: Mr. Richard C. Latson, Defense Visual Information Directorate, DSN 328-0640 (703-428-0640), rclatso@hq.afis.osd.mil

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class A

F series

■ Aircraft began spinning while making right decelerating turn at 25 to 30 feet agl and 70 KIAS during zone recon. Aircraft hit ground, rolled, and came to rest inverted. Tail boom and guns separated. Both crewmembers sustained minor injuries.

Class E

F series

■ During downwind for landing, aircraft made uncommanded 20-degree right yaw. Pilot felt chatter/feedback in antitorque pedals and landed aircraft. Cause not reported.

■ While unmasking behind hill, aircraft started uncontrolled right turn due to wind. As PC increased airspeed to reposition aircraft, front seat called "Tree." PC then increased collective to clear tree, resulting in an overtorque. Aircraft started right turn into the hill, and N2 and rotor rpm began bleeding off. PC found a place to land as N2 rotor continued to bleed off. Aircraft landed hard with zero forward airspeed.

AH64

Class A

A series

■ Shaft-driven compressor light came on at hover during battle drill training. Crew landed aircraft, performed emergency shutdown, and egressed without injury. SDC caught fire, and flames consumed aircraft.

■ Aircraft was struck by lightning while parked and moored on airfield. Initial estimate of damage is $2 million.

Class C

A series

■ As student was performing ECU lockout of No. 1 engine, No. 2 engine experienced overspeed and was shut down by overspeed protection device. IP took controls and executed autorotation to dry lake bed. Aircraft settled into soil softened by recent rains, stopping abruptly and rocking forward. Extent of damage: right pylon, tail wheel strut, possible damage to 30mm turret, and skin damage to underside of tail boom.

■ Damage to all main-rotor blades was discovered during postflight inspection. Suspect blade strike. Incident is under investigation.

Class E

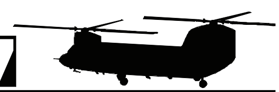
A series

■ During approach to refueling pad, crew detected fumes in crew station and felt vibrations in airframe. Crew expedited their approach and performed emergency shutdown. Maintenance determined that turbine in ECU seized.

■ During engine runup, crew noted drop in ECU airflow. About 30 seconds later, the SDC caution warning light came on. Crew shut down aircraft without incident. Maintenance inspection revealed faulty shaft-driven-compressor filter.

■ Smoke began to fill both crew stations during approach at night, but there were no caution/warning lights. PC shut down ECU and made emergency landing. Caused by failure of shaft-driven compressor.

CH47



Class B

D series

■ Slingload was inadvertently released at 35 feet agl during approach to field site. Crew noted slight jolt and illumination of master caution light and landed about 50 meters from the load without further incident. The aircraft was not damaged; however, the slingloaded M198 howitzer was damaged beyond repair.

■ Right rear landing gear strut failed when aircraft was set down on 15-degree slope. When PC repositioned aircraft and landed a second time, failed strut damaged fuselage.

Class C

D series

■ Lower drag link of left aft landing gear broke during left cross-slope landing. Aircraft fuselage hit the ground, sustaining damage.

■ While hovering during exfiltration, aircraft drifted rearward, and PI applied forward cyclic and increased thrust. As a result of aircraft movement with ramp partially submerged, ramp door separated from aircraft. Crew aborted mission and landed at nearby airport without incident. Ramp was subsequently recovered without damage and will be reinstalled.

Class E

D series

■ No. 2 flight control hydraulic pump fault light on maintenance panel came on in cruise flight. This was followed by rise in No. 2 flight control hydraulic pressure to 4000 psi and hydraulic oil temperature to 120°. Aircraft landed without further incident. Caused by failure of No. 2 flight control hydraulic pump.

■ With aircraft on ground during slope operations, flight engineer noticed increase in No. 2 flight hydraulic temperature along with a low roaring noise coming from aft transmission area. As he reported this to pilots, No. 2 flight hydraulic pump fault light illuminated on the maintenance panel just as No. 2 flight control pressure light illuminated on master caution panel. Aircraft was immediately shut down. Maintenance replaced No. 2 hydraulic flight boost pump.

OH58

Class B

D(I) series

■ While in cruise flight, crew heard loud bang, followed by engine failure. Crew executed emergency autorotation. Aircraft landed hard, sustaining damage to tail boom, main and tail rotor blades, and tail rotor gearbox.

Class C

D(I) series

■ During GCA approach, transmission oil pressure light came on. Engine operation continued for 10 to 15 minutes before shutdown. Postflight inspection revealed red substance of unknown origin around drive shaft, and transmission oil line was broken and covered in oil. Transmission was replaced.

■ Aircraft experienced transmission overtorque during maintenance test flight. Aircraft landed without incident.

■ Aircraft became uncontrollable about 5 seconds after positive transfer of controls from PC to PI. Aircraft was in nose-high attitude and left bank when PC regained control. Quick check of engine monitor page indicated that both high engine and high mast torque limits had been exceeded. Aircraft was landed without further incident.

■ Engine temperature peaked at 1003°during engine start, resulting in hot start. Aircraft was shut down without incident.

D series

■ After completing simulated engine failure at hover, pilot began increasing throttle to 100 percent engine rpm. At 95 percent rpm, a "FADEC FAIL" message displayed on multifunction display. Authority digital electronic control still indicated it was in automatic mode. IP reduced throttle to idle with no corresponding reduction in engine rpm. IP then switched to FADEC manual mode, and engine rpm reduced to idle. Crew completed normal shutdown. No limits were exceeded. Maintenance repaired wire at ECU cannon plug pin 4 (interface harness) that transmits signal between ECU and hydromechanical unit.

TH67

Class D

A series

■ Bird strike in cruise flight damaged left and right windscreens and pilot's window.

UH1

Class E

H series

■ After landing in LZ, off-loading passengers reported fluid leaking from bottom of aircraft. CE confirmed leak, and PC performed emergency shutdown. During shutdown, aircraft experienced complete loss of hydraulics due to crack in hydraulic line under B nut. Maintenance replaced line.

■ During cruise at 2000 feet and 90 knots, pilot noted engine oil temperature increase above redline, and aircraft landed at nearby airport. Engine anti-ice and oil thermal bypass valves were replaced.

V series

■ During localizer no-precision approach in IMC, N2 needle dropped to zero. Flight was continued to VMC, and aircraft was landed on grass adjacent to runway. No other engine or instrument problems or indications were observed. Cause not reported.

UH60

Class B

A series

■ Aircraft struck power lines at 400 feet agl during medevac training. Aircraft came to rest upright.

Class C

K series

■ Crew noted "thump" during hot refueling in preparation for maintenance test flight. PI noted fuel seepage from No. 5 auxiliary fuel cell while checking the cargo compartment. Crew terminated refuel operations and parked aircraft without further incident. During inspection, internal auxiliary fuel system unisex valve was discovered in closed position, resulting in overpressurization damage to Nos. 5 and 6 auxiliary fuel cells during refueling. Internal tanks had recently been re-installed following phase maintenance.

A series

■ Unbeknownst to crew, right-hand oil cooler access door separated during taxi for takeoff. Aircraft was flown for 1.5 hours without incident. Postflight inspection revealed that door had contacted main rotor system, tail rotor gearbox cover, and tail rotor blades. Door was found on airfield.

■ APU panel came off in flight. Postflight inspection revealed damage to one main rotor blade.

Class D

A series

■ Crew smelled something hot while repositioning aircraft after maintenance on No. 1 engine. Postflight revealed that V-band on No. 1 engine had come loose. No. 1 engine cowling and PAS and LDS sheaths melted, and engine cowling latch retainer was damaged.

Class E

A series

■ During instrument flight evaluation, IE noticed center windscreen start to crack. OAT was 0°C and windshield heat was on. By the time aircraft landed, center windscreen had cracked its full length.

C12

Class E

C series

■ During postflight, metal separation was discovered on left lower wing section. Maintenance repaired wing and aircraft was released for flight.

■ Stall warning horn stopped sounding during slow flight training. As IP started to troubleshoot problem, crew detected smell of smoke in cockpit. IP terminated maneuver and landed aircraft at nearest airport without incident. Maintenance replaced faulty speaker for the stall warning system.

D series

■ During runup for test flight, No. 1 engine stopped responding to power lever inputs. Caused by failure of fuel control unit.

F series

■ No. 1 fire pull handle illuminated during cruise flight. PC initiated emergency procedure, but light remained on although no visible indication of fire was observed. Aircraft returned to base without incident, where maintenance determined that No. 3 fire detection sensor was improperly positioned. Sensor was resting against engine bleed air valve, causing false indications.

■ As full power was applied during takeoff roll, No. 2 prop failed to produce 2000 rpm. Crew aborted takeoff and taxied aircraft back to parking without incident. Maintenance inspection confirmed inoperable prop gauge; it had stuck at 1670 rpm. Prop tach gauge was replaced.

O5

Class E

DHC-7

■ During postflight inspection, small dent was found in leading edge of right wing, outboard of No. 4 engine. Indention suggested bird strike.

■ No. 1 hydraulic pressure indicated less than normal after Nos. 1 and 2 engine start. Troubleshooting revealed faulty pressure transmitter.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-64-98-ASAM-01, 201556Z Oct 97, maintenance mandatory.
T700-GE-701 yellow and blue engine harnesses have been redesigned to make them moisture/fault resistant. The purpose of this message is to provide inspection criteria and guidance for identifying and replacing all Phase 0, I, and II design harnesses with the moisture-resistant Phase III harnesses.

AMCOM contact: Mr. Howard Chilton, DSN 746-7271 (205-876-7271), chilton-hl@redstone.army.mil

CH-47-98-ASAM-01, 151327Z Oct 97, maintenance mandatory.
A CH-47D in cruise flight recently entered an uncommanded nose-down left roll that failed to respond to corrective inputs. The crew reported that the aircraft completed a 360-degree roll. Other flight-control incidents have also been reported and investigated with no conclusive findings. These reports include uncommanded inputs and control lockup.

The purpose of this message is to gather information about other incidents of uncommanded control inputs or lockup within the H-47 community. This ASAM will remain in effect until rescinded or superseded.

AMCOM contact: Mr. Dave Scott, DSN 897-2068 (205-313-2068), scott-dc@redstone.army.mil

CH-47-98-ASAM-02, 231737Z Oct 97, maintenance mandatory.
CH-47-96-ASAM-01 was issued to require inspection and removal of certain aft landing gear drag links that were susceptible to stress corrosion cracking. That ASAM required that the drag links be replaced by 6 November 1997.

The purpose of this message is to extend that date to 30 April 1999. A system safety risk assessment has been written to identify the additional risk associated with this extension.

AMCOM contact: Mr. Dave Scott, DSN 897-2068 (205-313-2068), scott-dc@redstone.army.mil

UH-1-98-ASAM-01, 201509Z Oct 97, maintenance mandatory.
Since the oil debris detection system (ODDS) was fielded, several problems have surfaced with installation, operation, and manual references. The purpose of this message is to correct deficiencies associated with ODDS installation and provide maintenance information and requirements.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (205-842-8632), brock-rd@redstone.army.mil

UH-60-98-ASAM-02, 071542Z Oct 97, maintenance mandatory.
Push rods (P/Ns 70400-08155-050 and -051) manufactured by Versatile Machining, Inc. (cage code 6S522) have not been tested and must be removed from service. Engineering estimates that 100 hours of additional service is acceptable without incurring a significant risk due to this component.

The purpose of this message is to require both removal from service and stock and disposal of all subject push rods.

AMCOM contact: Mr. Dave Scott, DSN 897-2068 (205-313-2068), scott-dc@redstone.army.mil

UH-60-98-ASAM-03, 302108Z Oct 97, maintenance mandatory.
The swashplate link (P/N 70400-08110-054) manufactured by TEK (cage code 65780) recently completed engineering testing. Results indicate that the part does not conform to process specifications of the original manufactured component.

The purpose of this message is to direct removal of subject swashplate links no later than 30 June 1999.

AMCOM contact: Mr. Dave Scott, DSN 897-2068 (205-313-2068), scott-dc@redstone.army.mil

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Class A Accidents *through October*

		Class A Flight Accidents 97	Class A Flight Accidents 98	Army Military Fatalities 97	Army Military Fatalities 98
1ST QTR	October	0	2	0	0
	November	0		0	
	December	1		0	
2D QTR	January	2		2	
	February	0		0	
	March	2		1	
3D QTR	April	2		2	
	May	1		1	
	June	3		0	
4TH QTR	July	1		8	
	August	0		0	
	September	0		0	
	TOTAL	12	2	14	0

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