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ARMY AVIATION
RISK-MANAGEMENT
INFORMATION

SEPTEMBER 1998 ◆ VOL 26 ◆ NO 12 http://safety.army.mil

Food for thought. In our continuing effort to prevent soldier deaths in POV accidents, the Army Safety Center has produced "The Road Show," a short video that can be used in your unit to generate discussion of the major causes of and control measures for highway accidents. Visit our web site at http://safety.army.mil for ordering instructions as well as a downloadable facilitator's guide and additional briefing ideas. Working together, we can save soldiers' lives.

—BG Burt S. Tackaberry
Commanding General
U.S. Army Safety Center

Fiscal year 1998 has not been a great year for Army aviation as a whole, and the UH-60 has not been spared. In fact, we saw a sharp rise in UH-60 Class A-C accidents during the first 10 months of FY98, and UH-60s accounted for 6 of the Army's 14 Class A helicopter accidents during that period.

QUESTION:

Is there cause for alarm?
Let's look at the trends to find out.

Spotlight: UH-60 safety performance review

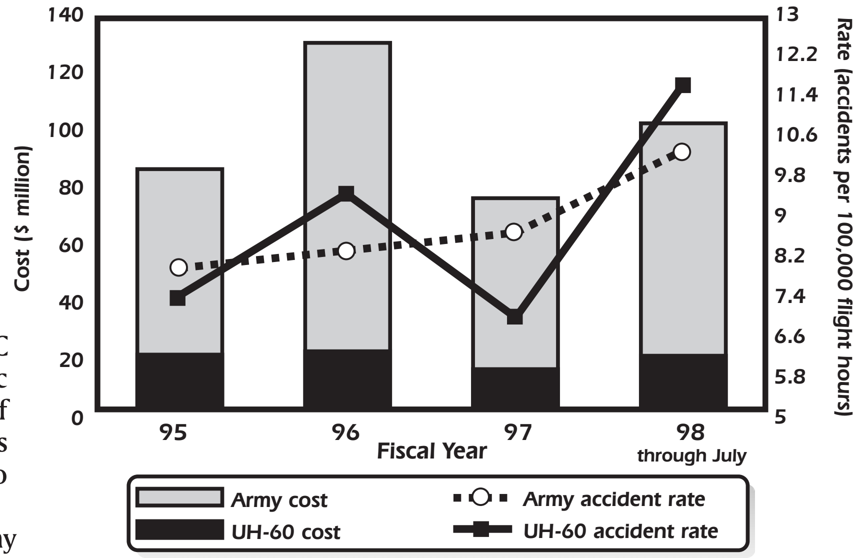

Figure 1. Rate and cost comparison of Army and UH-60 Class A-C accidents

Army trends

The overall Army aviation Class A–C accident rate is on a pretty dramatic upward trend (figure 1). Through July of this fiscal year, that rate is 10.23 accidents per 100,000 flying hours, compared to FY97's year-end rate of 8.60.

Why is this happening? There are many possible contributors. Among them are reductions in flight hours, experience (measured in terms of pilot-in-command (PC) time), and manpower.

A trend that all aviators probably know too well is that PC time, which equates to experience, is coming down. In 1992, for example, PC time in Class A-B accidents averaged 1327 hours. Five years later, in 1997, it was less than half that—536 hours. It's a pretty safe assumption that this severe reduction in our experience base has, to at least some degree, adversely affected our accident rate.

One type of accident seems to lead the pack every year: Collisions of all types, especially tree strikes, account for a large percentage of Class A-C accidents. This trend, which has persisted for more than 4 years, is common to nearly all Army helicopters, and the Black Hawk is no exception.

UH-60 trends

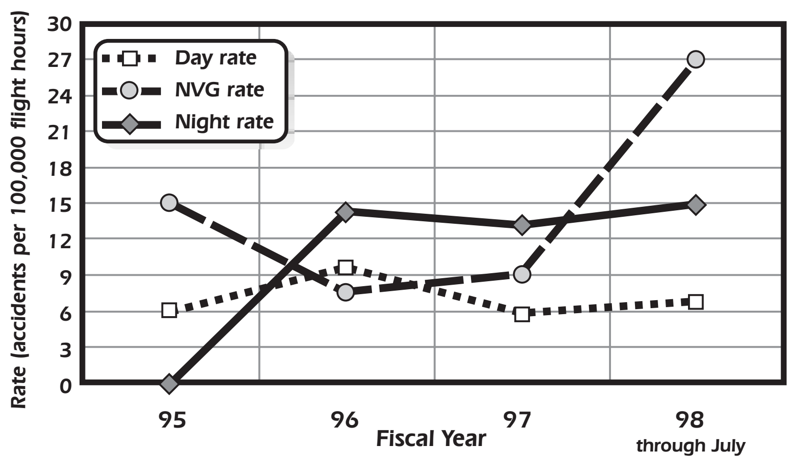

Figure 2. Comparison of UH-60 Class A-C accidents by mode of flight

Only a cursory glance at figure 1 makes it clear that UH-60s are not having a good year. So, back to the original question: **"Is there cause for alarm?"** The answer is no, not "alarm," but there is certainly cause for concern.

We should all understand that factors outside the Black Hawk community seem to have a wide impact. This is evidenced by the fact that not a whole lot of difference exists between the Army's Class A-C rate for all aircraft (10.23) and the UH-60 rate (11.60). Therefore, to reduce Black Hawk accidents, we may have to look at mostly aviation-wide controls. The Black Hawk community, though, is not absolved of responsibility. Although Army UH-60 rates are not severely out of synch with Army aviation as a whole, there are some trends that need immediate attention in the community.

When we look at Class A-C Black Hawk accidents by mode of flight (figure 2), we see a spike that could be defined as "alarming": The NVG accident rate rose almost 300 percent during the first 10 months of FY98. However, we should take this with a grain of salt; we had only 10 NVG Class A-C accidents in 37,100 NVG hours. This is a small sample on which to base a trend.

Day rates also rose. These rises were accompanied by a rise—albeit only slight—in the percentage of accidents that happen on single-ship missions. What emerges is a trend that suggests that, in the Black Hawk community, single-ship, NVG missions are the most likely missions to end in a Class A-C accident.

—CPT Stace W. Garrett, Aviation Systems & Investigation Division, DSN 558-2781 (334-255-2781), garretts@safety-emh1.army.mil

Smiths Industries Voice and Data Recorder

The Smiths Industries Voice and Data Recorder (VADR) was the first crash-survivable solid-state flight data recorder ever placed on an Army aircraft. It's also the digital source collector currently installed on the special ops version of the Black Hawk, the MH-60K. In addition, the VADR is used on the MH-47E helicopter and the RAH-66 flying prototypes and is widely employed by the Air Force, Coast Guard, Navy, and Marine Corps. The Army is currently evaluating VADR installation on A and L series UH-60s at Fort Rucker as part of a 19-aircraft demonstration effort that involves not only the UH-60 but also the CH-47D, AH-64A, and OH-58D.

Description

The VADR weighs 6.7 pounds and measures 5 x 3.4 x 9.6 inches. It records flight data from either the military standard 1553 data bus (OH-58D and AH-64A) or from the AN/AVS-7 ANVIS/HUD (UH-60A/L and CH-47D).

Capabilities

The VADR can record 25 hours of continuous flight data and up to 2 hours of continuous cockpit audio. Powered by the aircraft's +28 VDC essential power bus, the VADR records information any time the aircraft is powered, whether from internal or external sources. The VADR can withstand impact forces of more than 3400 G's as well as a 1-hour, 1100°C postcrash fire.

Downloading

Downloading and processing data is quick and simple. Maintenance personnel can connect a laptop computer to the VADR's download port (part of the installation kit) and download up to 13 hours of flight data in less than 3 minutes. The data is then transferred to a ground-station or desktop computer for analysis.

Software

The VADR is unique among flight data recorders now aboard Army aircraft in that, unlike the others, the VADR can be reprogrammed by users at unit level. For example, if a new flight parameter is added to the list of those already being recorded by the VADR, the Army simply ships new software upload disks to user units. Unit personnel then load the new program into each VADR right at the aircraft. This eliminates the need to ship recorders back to vendors for reprogramming.

Maintenance & storage

The VADR requires maintenance only when it is to be stored. Even then, the only requirement is placement of a plastic dust cap over the J1 connector to prevent damage or contamination.

Operational checks

Before use, flight crews should—

- Visually inspect the J1 connector on the side of the box for cracks or dents that could affect the recording capability of the unit.
- Visually inspect the wiring harness that connects to the VADR through the J1 connector for pinched or severed wires that would affect the recording capability of the unit.

—Mr. Joseph Creekmore, Research Analysis and Maintenance, Inc., prime contractor on DSC Demonstration Program for U.S. Army Safety Center, DSN 558-2259 (334-255-2259), creekmoj@safety-emh1.army.mil

UH-60 individual training: DES observations

The goal of every aviation unit is to train to a level of readiness that will enable it to perform its wartime mission. Flying hours are a precious resource, and every minute must be used to its maximum to ensure readiness. Recent assessments have revealed several areas that units should focus on to improve overall aviation training and readiness.

Commander's task list (CTL)

The CTL is used to inform crewmembers of their authorized flight duties and stations and their flying hour, task, and evaluation requirements. In many cases, units create generic CTLs and apply them to every assigned aviator.

The commander should tailor the CTL to each individual based on the crewmember's experience, abilities, and proficiency. For example, a commander may require a FAC 1 aviator who is a recent graduate of the UH-60 qualification course to fly more than 48 hours semiannually to gain proficiency. The number of iterations required for each task should also reflect the crewmember's proficiency. When an aviator fails a flight evaluation and a "U" is entered on the DA Form 7122-R: *Crew Training Record*, the CTL should reflect an increase in the number of iterations for the task the aviator performed unsatisfactorily.

In addition, not every crewmember needs to perform every mission task. For example, if a unit has a mission to perform water-bucket operations, the commander should carefully select the aviators he or she feels are qualified to perform the mission, and add that task to their CTL. Not every aviator needs to be water-bucket qualified.

Crewmember training records

Reviews of individual aircrew training folders reveal that few crewmembers are receiving unsatisfactory evaluations. DES has too often found units with only the rare "unsatisfactory" on unit aviators' training records. In one case, DES found not a single "U" in any of the unit's aircrew training folders. However, unit IPs gave a total of 11 "unsatisfactories" when they were being evaluated by DES SPs.

Unsatisfactory evaluations often turn into "training flights" to avoid a blemish on the record. In some cases, the IP will tell the crewmember that he or she is weak in certain areas but pass the crewmember on the evaluation. As a result, the standards are lowered because crewmembers learn they can remain weak and still pass annual or no-notice evaluations.

IPs may be reluctant to place a "U" on the DA Form 7122-R because it is a permanent record. However, the 7122-R is not an OER. No-notice and annual evaluations must be conducted to ATM standards, and the 7122-R must reflect the true results of the evaluation. Accurately graded evaluations will improve individual performance and keep standards constant.

No-notice program

The no-notice program is an extremely important tool for commanders to ensure crewmembers are maintaining standards. The unit SOP should define the no-notice program, and no-notice evaluations should include both rated and nonrated crewmembers. DES has suggested that no-notice performance be monitored at division and brigade level as a gauge to assist in the management of aviator training.

Nonrated crewmember training

Some nonrated crewmembers are progressing to RL1 without meeting the minimum flying-hour requirement of 5.5 hours. In other cases, units do an excellent job of training during RL progression but do not sustain the academic training once the RL progression is complete.

DES recommends that units use every available training opportunity to conduct nonrated crewmember academic training. During goggle inspection prior to an NVG flight, crews should discuss night illusions. In addition, crews can discuss various academic subjects during flight, including emergency procedures and aeromedical factors. Sergeants' time can also be used for academic training.

Another key to a successful nonrated crewmember training program is involvement of senior NCOs from company level through brigade.

Formal simulator program

The UH-60 flight simulator is an excellent training device. Units should create a formal simulator training program that includes both instrument and tactical scenarios. Crews should be given a scenario to plan and execute, and units should receive feedback from simulator operators on crew performance.

Tactical flight scenarios should focus on aircraft survivability equipment, emergency procedures, terrain flight planning, navigation, and inadvertent IMC recovery procedures. Instrument flight scenarios should focus on instrument planning and procedures, radio-aided navigation, emergency procedures, and use of the command instrument system.

The simulator is also an ideal device to train and evaluate aircrew coordination. Aircrew coordination training (ACT) does not end with course completion;

it is a vital part of the overall aircrew training program. ACT should be emphasized during readiness level progression and evaluated during APARTs.

There is a jump seat in the simulator that is ideal for platoon leaders and company commanders to observe their crews. That jump seat is also a great observation post for new aviators to observe what "right" looks like.

Bottom line is that the simulator is an essential part of a unit's training program and must have the commander's attention to ensure that it is used to its maximum.

Summary

Maintaining individual and crew proficiency requires constant attention. It also requires—

- A commander's task list that tells each aviator what his or her requirements are and what skills are expected.
- Crewmember training records that accurately reflect aviators' proficiency.
- A tough no-notice program to tell the commander where each aviator is throughout the year.
- A well-monitored simulator program to ensure that those tasks that cannot be accomplished in the aircraft can be executed to standard should the real situation arise.
- A nonrated crewmember program that ensures that crew chiefs are a fully functioning part of the aircrew.

None of this is easy, but it can be done—and it can be done well. There are units that have been almost perfect in their execution of the ATP, there are units that are doing well above average, and there are units that have challenges.

Take full advantage of every flying hour to maximize training. In today's times of reduced resources, every hour is more than precious.

—CPT Steve Millward; Directorate of Evaluation and Standardization, U.S. Army Aviation Center, Fort Rucker, AL; DSN 558-9229 (334-255-9229); steven_millward@rucker-emh4.army.mil

Current Black Hawk issues

Power management & "wrong engine"

Power management has been steadily creeping up as a cause of UH-60 accidents in the Army. And any accident in which power management is a factor is usually catastrophic. In the span of only about a year, two Black Hawk accidents have been attributed to power-management errors. Both ended in multiple deaths and destroyed aircraft.

Here are a couple of real concerns that Black Hawk pilots need to think about:

- How many times have you consulted figure 5-9 in TM 1-1520-237-10 to know when blade stall can occur?
- When was the last time you practiced (in the simulator) recovery from blade stall?
- Have you practiced (in the simulator) getting into and recovering from power-management-critical areas?

Another important question is this: How many aviators have touched or moved the wrong power-control lever during an emergency—simulated or real? This question was asked to many aviators a couple of years ago in a survey that came as a result of an accident in which the pilot shut down the No. 1 engine in response to a No. 2 engine fire. Recently, a group of Army Aviation Center and Army Safety Center personnel gathered to assess the current risk and develop controls to mitigate it. The group identified that the hazard of a forced landing due to moving the wrong PCL in an emergency situation was high. The controls include a myriad of design and training possibilities. But what can be done at unit level right now? Much of what is discussed in the risk-management example on page 6 could also apply here.

Dual engine rollback

This is a condition that is isolated to the Black Hawk community in T-700 and T-701C engines. It involves simultaneous decrease of both Np down to, normally, 95 to 96 percent, but sometimes down to 88 to 92 percent. The condition persists for only seconds before it returns to normal. Since 1990, we have had 17 incidents, with only one repeat aircraft. None of these incidents, however, resulted in damaging accidents.

Tiger teams from AMCOM have investigated numerous times, but no definitive cause has been identified. Information is needed. If you experience this condition, do not hesitate to report it to AMCOM or the Army Safety Center.

ALQ-144 strikes

We in the Black Hawk community seem to be forgetting that the ALQ-144 can be hit in certain conditions like aft cyclic and rough landings. During the first 10 months of FY98 alone, we had five ALQ-144 blade strikes that cost the Army nearly half a million dollars. Remind yourself often that the "disco light" is back there and that ATM procedures are designed to help avoid costly errors.

—CPT Stace W. Garrett, Aviation Systems & Investigation Division, DSN 558-2781 (334-255-2781), garretts@safety-emh1.army.mil

UH-60 operations: A lesson in risk management

Analyzing accident trends gives us an overview of Black Hawk safety performance. What we are truly interested in is not simply identifying the problems, but rather, first eliminating those hazards that can be *eliminated* and then *controlling* the rest. That's where risk management comes in.

FM 100-14: *Risk Management* was published in April 1998 to give commanders and other leaders a five-step process for managing the risks that are inherent in Army operations. Let's look at how the process works in Black Hawk operations.

The first step is to **identify the hazards**. Obviously, you need good information, and you have three ways to get it:

- Use your own unit's experience (experience goes a long way in identifying hazards).
- Log on to the Army Safety Center's Risk Management Information System to look at Armywide hazards. Contact your ASO for access.
- Request information through your safety chain.

All of these methods will help you identify the hazards inherent in the specific missions your unit performs.

Table 1 provides information on Armywide Class A-C UH-60 accidents for the period FY94 through the first 10 months of FY98. From this information, we can draw conclusions about the top hazards affecting the Black Hawk community.

For the purpose of this article, let's look strictly at the number-one Black Hawk accident event Armywide—collisions—and apply the five-step risk-management process to it in order to suggest control options for your unit.

Step 1: Identify the hazards

We've identified collisions as a hazard, given that they comprise 47 percent of all UH-60 Class A-C accidents for a 5-year period. What can be done to mitigate this hazard?

Step 2: Assess the hazards

FM 100-14 gives guidelines for assessing the severity and probability of a hazard; those guidelines appear here as tables 2 and 3.

In our example, the probability of a collision is about 4.7 Class A-C collisions per 100,000 flight hours. That correlates to the definition in table 2 under the term "Seldom (D)" for a single item, "Not expected to occur during a specific mission or operation." Therefore:

HAZARD PROBABILITY = D

We can assess hazard severity from either of two perspectives: the most *likely* severity or the most *dangerous* severity. The most *likely* severity correlates with the definition of "Marginal (III)" in table 3, since most collision accidents are Class C with no loss of life or injury. On the other hand, if we look at the most *dangerous* severity, we must classify it as "Catastrophic (I)" because a collision has proven fatal in the past. Therefore:

HAZARD SEVERITY = I or III

Quite a disparity, isn't it? The bottom line is that the assessment of hazard severity is your call based on your intuitive analysis, experience, and judgment. The option you choose is up to you, but the process remains the same.

For our purposes here, let's risk manage from the perspective of "most dangerous," the I-D, which, according to table 4, equates to high risk. Keep in mind that this assessment is for illustration purposes only; it is by no means an "official" assessment for this hazard.

continued on page 8

Table 1. UH-60 Class A-C accidents, Oct 93 – Jul 98

Top 3 Accident Events	Percent of All A-C	Top 3 System Inadequacies*	Top 3 Task Errors**
1. Collisions (tree, bird, object, ground, water, etc.)	*47%*	*1. Overconfidence 2. Inadequate supervision 3. Inadequate experience*	*1. Inadequate crew coordination 2. Improper scanning 3. Improper estimation or control input*
*2. Flight-related operations****	*10%*	*1. Insufficient information 2. Inadequate SOP 3. Inadequate training*	*1. Inadequate crew coordination 2. Failed to follow instructions 3. Failed to follow SOPs*
3. Hard landings	*5%*	*1. Inadequate SOP 2. Adverse environmental conditions 3. Inadequate supervision*	*1. Inadequate hazard detection 2. Inadequate scan 3. N/A*

* Refers to inadequacies in the system of performing the mission.
** Refers to an error on the part of an individual or crew.
*** Refers to accidents that do not cause damage to aircraft or crew but that occur during aircraft operations (rappel, hoist, etc.).

Table 2. Hazard probability

FREQUENT (A) Occurs very often, continuously experienced	
Single item	*Occurs very often in service life. Expected to occur several times over duration of a specific mission or operation. Always occurs.*
Fleet or inventory of items	*Occurs continuously during a specific mission or operation, or over a service life.*
Individual soldier	*Occurs very often in career. Expected to occur several times during mission or operation. Always occurs.*
All soldiers exposed	*Occurs continuously during a specific mission or operation.*
LIKELY (B) Occurs several times	
Single item	*Occurs several times in service life. Expected to occur during a specific mission or operation.*
Fleet or inventory of items	*Occurs at a high rate, but experienced intermittently (regular intervals, generally often).*
Individual soldier	*Occurs several times in career. Expected to occur during a specific mission or operation.*
All soldiers exposed	*Occurs at a high rate, but experienced intermittently.*
OCCASIONAL (C) Occurs sporadically	
Single item	*Occurs some time in service life. May occur about as often as not during a specific mission or operation.*
Fleet or inventory of items	*Occurs several times in service life.*
Individual soldier	*Occurs some time in career. May occur during a specific mission or operation, but not often.*
All soldiers exposed	*Occurs sporadically (irregularly, sparsely, or sometimes).*
SELDOM (D) Remotely possible; could occur at some time	
Single item	*Occurs in service life, but only remotely possible. Not expected to occur during a specific mission or operation.*
Fleet or inventory of items	*Occurs as isolated incidents. Possible to occur some time in service life, but rarely. Usually does not occur.*
Individual soldier	*Occurs as isolated incident during a career. Remotely possible, but not expected to occur during a specific mission or operation.*
All soldiers exposed	*Occurs rarely within exposed population as isolated incident.*
UNLIKELY (E) Can assume will not occur, but not impossible	
Single item	*Occurrence not impossible, but can assume will almost never occur in service life. Can assume will not occur during a specific mission or operation.*
Fleet or inventory of items	*Occurs very rarely (almost never or improbable). Incidents may occur over service life.*
Individual soldier	*Occurrence not impossible, but may assume will not occur in career or during a specific mission or operation.*
All soldiers exposed	*Occurs very rarely, but not impossible.*

Table 3. Hazard severity

CATASTROPHIC (I)	*Loss of ability to accomplish mission, or mission failure.* *Death or permanent total disability (accident risk).* *Loss of major or mission-critical system or equipment.* *Major property (facility) damage.* *Severe environmental damage.* *Mission-critical security failure.* *Unacceptable collateral damage.*
CRITICAL (II)	*Significantly (severely) degraded mission capability or unit readiness.* *Permanent partial disability.* *Temporary total disability exceeding 3 months' time (accident risk).* *Extensive (major) damage to equipment or systems.* *Significant damage to property or the environment.* *Security failure.* *Significant collateral damage.*
MARGINAL (III)	*Degraded mission capability or unit readiness.* *Minor damage to equipment or systems, property, or the environment.* *Lost day due to injury or illness not exceeding 3 months (accident risk).* *Minor damage to property or the environment.*
NEGLIGIBLE (IV)	*Little or no adverse impact on mission capability.* *First aid or minor medical treatment (accident risk).* *Slight equipment or system damage, but fully functional and serviceable.* *Little or no property or environmental damage.*

Step 3: Develop controls and make risk decisions

The task of developing controls for the collision hazard might be overwhelming without further definition of the hazard. We need to have an idea why the hazard is resulting in accidents. Another reason to better define the hazard is so we can prioritize our controls; i.e., which control will make us the most money?

Eliminating the collision hazard would require that we either (1) quit flying or (2) quit flying near any object. Neither is feasible. So, because we cannot eliminate the hazard, we must develop controls to mitigate the hazard.

Table 1 lists the top three system inadequacies and task errors associated with each hazard. These are going to help us define the controls that will attack the root of the problem. The controls suggested here will be geared toward what can be done at unit level, not what "the Army" needs to do.

As we consider the top three system inadequacies and task errors that result in collisions, we can sum them up into categories of controls such as improved aircraft training and crew-coordination training. Above and beyond what we are already doing, the following controls to mitigate the hazard of collisions are possibilities you might consider implementing. Let's evaluate the impact of the three options.

■ **Control option 1: Enhanced simulator program.** A structured simulator program that mandates flights that mirror real missions would increase aviators' positive habits in the conduct of those missions. This option might entail full and complete mission planning on every flight, METL-related mission scenarios, and mandated maneuver execution. In addition, a pilot acting as an observer that debriefs the pilots would enhance everyone's abilities. In the case of collisions, all of the prevalent system inadequacies and task errors could be addressed in the simulator, thereby mitigating the risk of collisions. However, such a program would have to be managed to be effective.

■ **Control option 2: Aircrew coordination sustainment program.** All Army aviators are qualified in aircrew coordination, but we have no standardized sustainment program. An official program at unit level conducted during simulator training periods, APARTs, and no-notice rides by independent observers (PI, PC, IP) would keep our aircrew-coordination skills fresh and viable. An observer with a simple checklist on a mission would give the commander an idea of the state of aircrew coordination in the unit. And, since crew-coordination errors are the leading task error for collisions, it makes sense that this control could mitigate the hazard.

■ **Control option 3: Improved crew-selection process.** Proficiency versus currency is at the heart of this control option. To mitigate the hazard of collisions, practiced and proficient aviators should conduct missions. This option would require that we define "proficiency" as it relates to our specific METL.

After developing controls, we must make decisions about which one or ones we will implement. This selection and prioritizing of controls will be based on resources available and residual risk left after the control is in place.

Step 4: Implement controls

Once we've made our risk-control decisions, it's time to implement the controls. We must ensure that they are integrated into SOPs, written and verbal orders, mission briefings, and staff estimates. The critical check for this step is to ensure that controls are converted into clear, simple execution orders that are understood by everyone involved. The risk-management work sheet at figure A-2 in FM 100-14 will help in this process.

Step 5: Supervise and evaluate

We must supervise mission rehearsals and execution to ensure that controls are implemented and remain effective. Once the mission is completed, we evaluate how well the controls worked and change them as necessary.

Summary

The five-step risk-management process can be used to manage hazards at any level. Although the example here dealt with an Armywide hazard, you may have identified other hazards that are more prevalent in your unit. Use the process to develop controls to mitigate them, and implement the ones you can at your level. Those you can't, refer to your higher headquarters.

That's risk management.

—CPT Stace W. Garrett, Aviation Systems & Investigation Division, DSN 558-2781 (334-255-2781), garretts@safety-emh1.army.mil

Table 4. Risk assessment matrix

SEVERITY		PROBABILITY				
		Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic	I	E	E	H	H	M
Critical	II	E	H	H	M	L
Marginal	III	H	M	M	L	L
Negligible	IV	M	L	L	L	L

E – Extremely high risk H – High risk M – Moderate risk L – Low risk

An exercise in risk management

Below are three accident scenarios. Conduct a quick risk assessment by identifying the hazards of each mission and developing controls. Answer the following questions for each scenario and then check your answers at the end.

- *What hazards that affected the outcome should have been identified before the mission?*
- *What controls could have effectively mitigated the identified hazards?*

Scenario 1

On a day recon of an NVG route, a flight of two UH-60s enters a valley through the mountains. Visibility is good, and the two aircrews see high-tension wires crossing the valley from ridgeline to ridgeline. To cross the wires, the crews choose the lowest point in the wires. While crossing at 50 to 75 feet above the main wires, Chalk 1 strikes the second of two small static wires that cross above the main wires. The aircraft loses its tail rotor and spins into the trees below, injuring six occupants and destroying the aircraft.

Scenario 2

On a single–ship, day, photo recon mission, an ESSS-equipped Black Hawk with full ERFS tanks makes a turn in excess of 60 degrees bank and 90+ degrees of direction at 100 feet AHO. The aircraft loses altitude, dips down into the trees, and sustains a blade strike. The aircraft continues down in a level attitude to a hard landing on a road. The ERFS tanks separate from the aircraft, rupture, and explode, killing eight occupants and destroying the aircraft.

Scenario 3

A platoon leader and crew chief are preparing the aircraft to MOC a newly installed fuel filter on the No. 2 engine. They are using no communication equipment. Three blade tiedowns and all four aircraft tiedowns are attached. The platoon leader, wearing no protective equipment, climbs in and straps himself in the right seat. As he starts the No. 2 engine against the gust-lock, the crew chief on the cowling says to "bump it up." When the pilot increases the PCL to about 96 percent, the gust-lock breaks, and the blades begin to turn. Because the blades are tied down, one bends and breaks, causing a severe out-of-balance condition that shakes the aircraft apart. Both pilot and crew chief are killed, and the aircraft is destroyed.

—CPT Stace W. Garrett, Aviation Systems & Investigation Division, DSN 558-2781 (334-255-2781), garretts@safety-emh1.army.mil

Answers

Scenario 1

- **Hazard:** Crossing wires in low-level flight
- **Control:** Cross wires in accordance with ATM
- **Hazard:** Loss of situation awareness; failing to perceive hazards (inability to detect small wire)
- **Control:** Altitude restriction (above all wires in area)

Scenario 2

- **Hazard:** Operating noncrashworthy ERFS
- **Control:** Risk manage use of ERFS (is the mission worth the risk?)
- **Hazard:** Improper power management leading to loss of situation awareness; failing to project effects of action
- **Control:** Power-management training; simulator scenarios of critical power-management situations

Scenario 3

- **Hazard:** Operating engines against gust-lock while aircraft is tied down
- **Control:** MOC training program for non-MTPs designated to conduct MOCs that require engine start
- **Hazard:** Loss of proper communication capability in coordinated-effort tasks
- **Control:** Require that MOCs be treated as "intent to fly" (use ALSE, prepare aircraft, and maintain crew communications)
- **Hazard:** Loss of situation awareness; failing to project effects of action, resulting in exceedance of aircraft limitations
- **Control:** Emphasize ATM and –10 training (monthly tests?)

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class C

F series

■ On landing following left anti-torque maneuver, front and rear crosstubes separated just above skid cuffs. Aircraft belly contacted ground, damaging fuselage, transmission, main drive shaft, WSPS, VHF and UHF antennas, and crosstube assemblies.

Class D

F series

■ Aircrew was performing simulated engine failure at a hover when aircraft hit ground hard and bounced back into air. IP took controls and recovered by advancing power and stabilized aircraft at hover. Postflight inspection found skids spread and lower WSPS tip broken.

Class E

F series

■ Master caution and transmission chip lights came on during cruise flight. Postflight inspection revealed that quantity and size of magnetic plug exceeded limits for ODDS-equipped aircraft. Transmission and mast were replaced.

■ After several days of rain, runup hydraulic check found pilot cyclic stiff in right quadrant. Maintenance cleaned cyclic support and adjusted friction.

AH64

Class C

A series

■ Aircraft was undergoing maintenance checks for engine replacement. After 5-minute hover following normal engine start and runup, aircraft was landed for troubleshooting of low cockpit pressure indications. Inspection revealed no oil in either engine nose gearbox. Residual oil in sight glass read normal prior to engine runup.

Class D

A series

■ VHF and UHF antennas were found broken during postflight inspection after nose-down slope training.

Class E

A series

■ APU fire pull handle illuminated at 500 feet agl and 110 knots. Crew pulled fire handle and made emergency landing. Inspection revealed moisture in electrical connector to fire pull handle.

■ No. 2 nose gearbox caution light came on during cruise flight. Gearbox was replaced.

■ Aircraft was on ground with engines running when ground personnel smelled strong odor and then saw ashes dropping from engine nacelle. Crew immediately shut down and exited aircraft. Inspection revealed that No. 1 engine exhaust nozzle V-band clamp had failed and scorched some anti-chaffing tape.

■ Pilot felt uncommanded yaw inputs along with slight pedal vibration during flight. During shutdown, a high frequency noise was heard. Postflight inspection revealed that No. 7 drive shaft was excessively scored.

CH47

Class C

D series

■ Center clevis hook released while aircraft was at 75-foot hover following takeoff. Slingloaded HMMWV fell to ground, sustaining extensive damage.

■ Fire emanated from No. 2 engine cone during shutdown after flight that included simulated engine failure. Upon seeing engine temperature exceed 940°C, crew initiated emergency procedures to complete shutdown. Investigation is under way.

■ Crew experienced No. 2 engine PTIT overtemp during engine shutdown.

Class E

D series

■ During ground taxi for takeoff, latch indicator for left combining transmission tripped. Flight engineer tried unsuccessfully to reset the latch. Aircraft was then returned to parking IAW instructions in a message about combining transmission cooling fan shaft failures. When maintenance removed cooling fan drive shaft, lower spline adapters were found to have numerous cracks and broken pieces. There was also unusual wear on cooling fan drive shaft. QDR and parts were submitted for analysis.

■ Just before liftoff to hover, SP in troop commander's seat heard change in aircraft noise and felt high-frequency vibration from vicinity of forward transmission. Aircraft was immediately shut down and towed to parking. Drive shaft assembly was replaced.

OH58

Class C

D(I) series

■ With 28-knot tailwind during hover, pilot inadvertently depressed SCAS-release switch, which disengaged stability and control augmentation system, increasing pilot workload. Pilot over-controlled, causing tail skid to strike ground. Tail skid scraped laterally along concrete ramp for 6 inches before contacting a tar expansion joint, causing overstress failure of vertical stabilizer.

■ Crew was performing simulated engine failure at altitude. Main rotors drooped during recovery with power, and aircraft landed hard, damaging main landing gear.

Class D

D(I) series

■ Postflight inspection found aft crosstube excessively spread. IP reported that training day had been uneventful, and at no time did he suspect damage.

D(R) series

■ After sending digital message during OGE hover, PI looked up and saw a few small pieces of a tree limb fly by aircraft. No abnormal vibration or noise was noted. He flew to nearby clearing and landed. Inspection found damage to both tail-rotor blades, which were replaced.

Class E

A series

■ During formation flight at 800 feet agl and 100 KIAS, crew felt lateral vibration, accompanied by thrashing sound from rotor system. Crew notified flight lead and turned toward airport less than 4 miles away. As aircraft turned, vibrations increased, and crew made precautionary landing without incident. Postflight inspection revealed damage to rotor-blade tip that had debonded aft of tip cap, which had remained in place.

D series

■ After normal approach for landing, aircraft began to vibrate and rock side to side when skids touched down. As collective was lowered, rocking motion progressed to whirling motion that became more violent as collective was lowered. Whirling motion stopped when pilot raised collective and returned to a hover. Crew repositioned aircraft and landed without further incident. When maintenance test pilot duplicated event, vibrations stopped when SAS was disengaged. Suspect new software, which had been installed just before the incident, affected yaw SCAS channel; previous software version was reinstalled, and aircraft was released for flight.

UH1

Class C

H series

■ Half-inch wrench used for tail-rotor adjustment was left on vertical fin. Post-phase test flight was accomplished without incident, but damage to tail rotor was discovered during postflight inspection.

Class D

H series

■ During termination phase of run-on landing, forward crosstube failed at left attaching point, followed immediately by failure at right attaching point. As aircraft settled, lower wire cutter was forced up into belly, damaging sheet metal and breaking copilot's chin bubble.

Class E

H series

■ Crew noted stiffness in tail-rotor pedals during downwind segment of traffic pattern. Maintenance determined that stiffness was caused by paint overspray on tail-rotor control chain.

■ Crew began smelling fuel odor after 15 minutes of fuel transfer from left internal auxiliary tank during straight and level flight. When odor persisted even after windows were opened, aircraft was landed and fuel was seen draining from vent line under aircraft. After shutdown, crew plugged vent line with rags until maintenance arrived.

V series

■ Aircraft responded to civil aircraft crash in remote area and transported two injured personnel to hospital. After returning to home base, postflight inspection revealed irreparable damage to one main-rotor blade. Suspect FOD from flying debris in unimproved landing area.

■ After approach to 5-foot hover near accident site, crew decided to reposition tail rotor away from accident scene. After moving tail about 90 degrees to the right, crew felt unusual vibration, and PC took controls and landed. Postflight revealed 6-inch cut on one blade; tail rotor had hit tree branch.

UH60

Class C

A series

■ Main-rotor blades contacted tree during NOE terrain flight. Aircraft was returned to home base without incident. One blade required replacement; remainder sustained tip-cap damage.

L series

■ Collapsed tail strut was discovered during hot refueling following landing to dusty LZ at night.

Class D

A series

■ Prior to takeoff, two crewmembers checked and locked cowling, and PC checked all latches and found them secure. On takeoff, No. 1 engine cowling came open and tore off aircraft. Crew landed and ground taxied to parking without incident.

L series

■ During drug-interdiction support mission at night under NVGs, aircraft was at 100 feet tracking suspect boat. As aircraft descended parallel to boat to make positive identification, vessel slowed down and pilot lost visual contact. Boat turned toward aircraft and struck fuselage under left cabin door. Aircraft returned to home base and landed without incident. Postflight inspection revealed sheet-metal damage to fuselage and tail yoke.

Class E

A series

■ When PI applied aft cyclic while entering tight confined area, main-rotor tip contacted pine needles. Controllability check showed all responses normal, and mission was continued. Postflight inspection revealed broken tip cap.

■ Crew smelled burning odor just before landing. Upon entering FARP, they saw smoke coming from nose compartment and performed emergency engine shutdown. Caused by overheated wiper motor.

■ IP felt uncommanded cyclic roll during cruise flight. While verifying that PI did not bump controls, IP again felt cyclic roll left followed by aircraft shudder. Assuming a flight control malfunction, IP made precautionary landing. Maintenance replaced SAS computer.

■ Master caution light illuminated on downwind, and, upon touchdown, strong electrical odor was detected and battery fault light came on. Upon entering parking after ground taxi from runway, ground personnel reported that right main landing gear was on fire. Emergency shutdown was performed and fire was extinguished. Cause of fire not reported.

L series

■ While aircraft was slowing from 60 KIAS during approach to confined area, bottom of tail boom contacted tree branch. Vegetation caught in tail wheel section and bent actuator and damaged left rear APR-39 antenna.

C12

Class B

F series

■ Aircraft was struck by lightning after encountering IMC an hour after departure. Crew continued to their intended refuel point, where a cursory check revealed damage only to left aileron and right inboard flap. Subsequent inspection at home station revealed right propeller damage as well.

Class C

C series

■ Aircraft was struck by lightning while in cruise flight in IMC. Lightning entered left propeller, penetrated left inboard de-ice boot, and exited through trailing edge of left wing outboard flap. Postflight inspection also revealed damage to left and right horizontal stabilizers.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785). Note: Information published in this section is based on *preliminary* mishap reports submitted by units and is subject to change.

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action message

AH-64-98-ASAM-06, 201811Z Jul 98, maintenance mandatory

Chaffed wires have been found on some aircraft that experienced uncommanded flight-control inputs. Although not confirmed, these wires are suspected to have contributed to the problem.

The purpose of this message is to require inspection, rerouting, and repair of certain wires identified in the message.

AMCOM contact: Mr. Howard Chilton, DSN 897-2068 (256-313-2068), chilton-hl@redstone.army.mil

Safety-of-flight message

CH-47-98-SOF-02, 161231Z Jul 98, technical

In the recent past, three Chinook combining transmission cooling fan drive shafts have sheared. All three were the new shafts (P/N 145D5319-7) installed as part of MWO 1-1520-240-50-67. Failure of these shafts was contained by the "stovepipe" retaining shield, which prevented any collateral damage. However, because the cooling fan was no longer operating, temperature of the combining transmission and both engine transmissions exceeded limitations. These high-temperature conditions required replacement of all the transmissions that exceeded 140°C.

Investigation of the cause of the three fan-shaft failures is on going. The purpose of this message is to implement flight restrictions, additional preflight-inspection procedures, and a recurring inspection every 4 flight hours of the combining transmission cooling fan drive shaft in Chinook aircraft having MWO 1-1520-240-50-67 applied. The flight restrictions and inspections will continue until the cause of the combining transmission cooling fan drive shaft failures have been determined and corrective actions have been implemented.

AMCOM contact: Mr. Teng Ooi, DSN 897-2094 (256-313-2094), ooi-tk@redstone.army.mil

Maintenance-information message

GEN-98-MIM-02, 251625Z Jun 98

The purpose of this message is to notify users that DOD-L-85734 lubricant can be used as a direct replacement for MIL-L-23699 in all Army helicopter transmissions and gearboxes. The new lubricant contains an extreme-pressure additive that provides better wear protection and higher load-carrying capacity than the MIL-L-23699. When MIL-L-23699 is used in transmissions or gearboxes, it may elevate iron-particle readings in AOAP samples. This is due to corrosion-inhibiting/dispersing additives, which act as a solvent to clean residual oil debris from gearboxes or transmissions.

Although the two lubricants are compatible, they should not be mixed in service. MIL-L-23699 should be drained before refilling with DOD-L-85734. Flushing is not required unless debris is detected on the chip detector or oil filter.

Note that DOD-L-85734 should not be used in any helicopter turbine engine because turbine engines operate at higher temperatures than transmissions and gearboxes and may cause premature elastomeric seal deterioration.

AMCOM contact: Mr. Art Ather, DSN 897-1402 (205-313-1402), ather-im@exchange1.redstone.army.mil

POV-fatality update through July

Speed ⊙
Fatigue ⊙
No seatbelt ⊙

No new causes, just new victims

FY98	FY97
100	71

IN THIS ISSUE

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

Class A Accidents through July

		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	1	0	0
	December	1	2	0	2
2D QTR	January	2	1	2	0
	February	0	1	0	0
	March	2	1	1	0
3D QTR	April	2	0	2	0
	May	1	1	1	0
	June	3	2	0	4
4TH QTR	July	1	1	8	0
	August	0		0	
	September	0		0	
	TOTAL	12	12	14	6

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Burt S. Tackaberry
Brigadier General, USA
Commanding General