Number 45 January 2015

Flightfax®

Online newsletter of Army aircraft mishap prevention information

This edition of Flightfax continues the five-year airframe safety reviews with a look at fixed wing aircraft. Awareness of the types of mishaps occurring in our aviation fleet is key in addressing risk assessments and countermeasures, regardless of aircraft type.

Also found in this issue: DES covers emerging concepts for training of emergency procedures, safety lessons learned in maintaining the UH-72 Lakota, a mishap review addressing unforecast weather and proper mooring, and a blast from the past covering why it is important to use our checklists properly.

Happy New Year and thank you for your efforts in the aviation safety arena. The Army Chief of Staff's safety objective for aviation is to remain under a rate of 1.0 mishaps per 100K flight hours. Through mid-January we are just slightly above the mark at 1.10, and will continue to improve with your focus on good risk decisions. Until next month, fly safe and manage your risk levels!

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Fixed-wing Five Year Accident Trend Review

During the last five fiscal years (FY10 – 14), there were six recorded fixed-wing Class A mishaps resulting in six fatalities. Four mishaps occurred during the day with two at night. Two were in OEF and one in OIF. Additionally, there were three Class B and 29 Class C mishaps. A review of the mishaps reveals the following:

Three (50%) of the six Class A mishaps were caused by human error. Two (33%) had materiel failure as causal and two were unknown/not yet reported. Class B's consisted of two materiel failures and one unknown/not yet reported. Of the 29 reported Class C mishaps, 12 (41%) were human error, four materiel failures (14%), 11 (38%) environmental cause factors (lightning, hail, bird, etc.) and two unknown/not yet reported.

Leading accident events (Class A)

Human error.

(1) While on a night visual approach into the airfield, the aircraft flew within 1.5 NM of a cargo jet and entered into its wake turbulence. The aircraft departed controlled flight, entered the incipient stage of a right-hand spin, and crashed into the ground at a high velocity and high angle of impact. The three crew members were fatally injured and the aircraft was destroyed by post-crash fire.

(2) While conducting a daytime pilot-in-command evaluation, the aircrew landed the aircraft without the landing gear extended. The aircraft sustained extensive damage to the lower fuselage and aircraft mission equipment. Neither crew member was injured.

(3) Aircraft landed hard with an excessive vertical rate of descent from altitude. This excessive rate of descent and hard landing caused the airplane to bounce off the landing surface and impact the ground a second, and then a third time before coming to a stop.

Materiel failure. There were two materiel failure mishaps resulting in three fatalities.

(1) Crew reported loss of engine power during go-around for engine-out training. Aircraft descended to ground impact and Class A damage is reported.

(2) While returning from a recon mission at night, the aircraft departed controlled flight and initiated a near-vertical descent from 25,000 feet MSL and impacted terrain resulting in fatal injuries to all three crewmembers and a destroyed aircraft. Materiel failure suspected.

Additional.

- Aircraft crashed on take-off during single-pilot training and contacted the tree line, sustaining significant damage. Aircraft has been deemed not economically repairable and had been turned over to DRMO for disposition.

FW Flight Mishap Rate FY10 – 14

The flight mishap rate for fixed-wing aircraft was 1.09 Class A mishaps per 100,000 hours flown. The rotary-wing aircraft mishap rate for the same time period was 1.57. For comparison, the previous five year period (FY05 – 09) had a FW rate of 0.37 and a RW rate of 2.17.

Fixed-wing CLASS A – C Mishaps																
FY	Class A (6)						Class B (3)					Class C (29)				
	C-12	UV-20	C-26	UC35	EO-5	Fatal	C-12	UV-20	C-26	UC35	EO-5	C-12	C-37	C-26	UC35	EO-5
2010	3					3	1			1		5				1
2011												5		1		
2012					1							7			1	
2013		1										4		1		1
2014	1					3				1			1	1	1	
Total	4	1			1	6	1			2		21	1	3	2	2

By the Book Maintenance and the UH-72

CW5 JOSEPH T. WITMER
28th CAB ASO

With the addition of the UH-72 to the National Guard fleet we are getting accustomed to the differences between the traditional Army way of doing maintenance, and the civilian style. The Army uses technical manuals or TMs, while civilians use aircraft maintenance manuals or AMMs. Like other new aircraft we are exposed to, we are finding all the little glitches involved with the design of the airframe and power systems. We are also discovering the flow of the different manuals can lead to confusion with the maintainers.

As the aviation safety officer for a facility, I get to work with the crew members and maintenance personnel. Since I'm not a test pilot, I've been spending a great deal of time learning how the maintenance programs with an FAA certified aircraft differ from how the rest of our facility operates. We're also learning how to read these new AMMs. You would think one manual is the same as others, but that would be far from the fact. One seemingly simple maintenance practice led to a near miss with one of our UH-72A 'Lakotas.' As we dug into the near miss, I wanted to share with others what we found.

So there I am, coffee in hand walking through the hangar first thing in the morning when I am asked to come look at the intermediate gearbox of the UH-72A that had the filler cap come off in flight the night prior. As I inspected the filler cap, it was clear that I was back in learning mode. The cap is completely different from the UH-60, CH-47 and AH-64 caps I am used to seeing. Being a UH-60 instructor pilot and safety officer I took some time to ask questions about how the gear box is serviced and how often. Unlike the UH-60, the UH-72 does not require regular servicing AND there is a special requirement not required with other Army aircraft that caught me off guard. The little O-ring at the end of the filler cap is required to be replaced every time the cap is removed for service.

The UH-72 unit instructor pilot and safety officer, CW2 Carey Blake, did a great job researching the requirements and ensuring the maintenance personnel were retrained on this requirement. We reviewed the maintenance manual (AMM 65-32-00, 3-2) and there it was clear as day, step-by-step instructions on the service that requires the removal of the O-ring and installation of a new one. Normally, this would end my investigation as a near-miss report and retraining complete. However, I wanted to know WHY this simple, clearly required, step was missed. Was it a simple individual failure or was there something deeper at work? I spoke with our other maintainers and called other units that have the UH-72A in their fleet to ask if they were aware of this requirement to change an O-ring every time the cap was removed. I was surprised that some units, like ours, were not aware of the requirement.

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So how could this be missed? The steps are clearly in the maintenance manual. The O-ring is readily available and maintenance personnel are fully certified AMPs. I routinely walk around the hangar and see the maintenance manuals out when the maintainers are working on the aircraft. Maintainers for multiple aircraft were questioned about replacing O-rings. The general consensus was to inspect for damage and, if none, place back in service.

We always preach "by the book maintenance" in aviation. Here is a prime example of why that is so important. I would like to say this was an isolated incident involving one maintainer at one AASF, however, that would be far from the truth. After several calls and discussions, it turns out we are not alone with this one issue. I can only imagine how many other issues we will discover as we get used to the new airframe and new manuals. The transition from typical Army technical manuals to civilian-style aircraft maintenance manuals will also be something we need to get used to.

Manned Aircraft Class A – C Mishap Table as of 15 Jan 15

	Month	FY 14					FY 15			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	0	0	2	0		0	1	3	0
	November	3	0	5	0		2	0	2	2
	December	1	0	3	0		1	1	1	0
2nd Qtr	January	2	2	4	4				1	
	February	1	0	3	0					
	March	0	3	0	0					
3rd Qtr	April	1	1	5	0					
	May	3	1	2	2					
	June	2	0	6	0					
4th Qtr	July	2	0	5	0					
	August	0	0	0	0					
	September		1	2						
	Total for Year	15	8	37	6	Year to Date	3	2	7	2

Class A Flight Accident rate per 100,000 Flight Hours

5 Yr Avg: 1.31	3 Yr Avg: 1.25	FY 14: 1.42	Current FY: 1.10

Emergency Procedure Training and Execution

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As a H60A/L/M standardization instructor for the Directorate of Evaluation and Standardization (DES), I have had the fortunate opportunity to be involved in the revision of emergency procedures in the H60 flight manuals and recent revisions of the aircrew training manuals. Many are now aware of the Aviation branch chief's "defragging the hard drive" campaign. Due to this initiative, I believe the time is right for taking an honest look at how we train and execute emergency procedures in the Army's aircraft operator's manuals and aircrew training manuals (ATMs). It is important to remember the initiative is not about relieving aviators of the requirement to have knowledge and understanding of aircraft systems, but to rethink, reorganize, and ensure our training and procedures are as effective and efficient as possible. One thing is for certain, as we review our strategy we must take into account history of failure and reliability of today's systems when determining immediate action steps in the aircraft flight manuals and selecting emergency procedure tasks for the aircraft ATMs. The use of simulation as the primary emergency training device must be used to the maximum extent that the device capability allows, saving costly flying hours and allowing more effective training and evaluation of aircrews during emergencies. There is no doubt that emergency procedure training is an essential part of the Aircrew Training Program and a cornerstone to an effective safety program; therefore we must continue to evolve our process to be effective and as safe as possible.

The most important single consideration is helicopter control. All procedures are subordinate to this requirement.

In my career as an Army aviator, I have seen many positive improvements made to the way we train and execute emergency procedures. When I was assigned to Germany in 1995, my unit lost an aircraft in the Mediterranean Sea, killing all five crewmembers onboard. The aircraft was lead in a formation of two UH-60s flying NVG's on an overwater mission approximately three hundred feet over water at an airspeed of 130-140 KIAS when an engine failed. The aircraft was operating above single engine airspeed maximum and the aircrew did not decelerate, the rotor drooped and the aircraft hit the water at 120 Gs. Unfortunately, the aircraft was above maximum single engine airspeed and the rotor drooped very quickly. The point of this example is, for a reason we will never know, the pilots failed to control and continue to fly the helicopter when it was capable of single-engine flight. The accident influenced how I view emergency procedure training and enforced what I believe to be the most important rule during an emergency – the most important single consideration is helicopter control or simply known as "aviators must continue to aviate" during emergencies. Unfortunately, there are too many where pilots failed to control the aircraft when it was within the aircraft capability to continue to fly. Fortunately, we have made some improvements in the flight manuals and in our doctrine to convey this point – but we have still much room for improvement. Integrating aircrew coordination training into all ATM tasks has greatly improved the way we think and perform during emergencies. Improvements in technology , such as the fielding of the GE-701D engine in the AH-64 and H-60 have expanded our power margins and single-engine

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capabilities to a much greater extent than ever before - resulting in a reduced need for quick reaction time. This has made our aircrew safer by allowing pilots more time to identify the malfunction, perform the correct procedures and, most importantly, continue to fly the helicopter.

Aircrew Training Manual Task 1070 Standard #1 - Identify the malfunction and perform the appropriate immediate action procedures.

All of the aircraft ATMs and aircraft flight manuals emphasize the criticality of identifying the malfunction and ensuring the correct procedure is followed. This point cannot be understated. Many times as instructors we create a false sense of urgency during the training and evaluation of emergency procedures as we train inside a limited traffic pattern or attempt to get in all the progression or evaluation tasks. The fact is, there is no artificial time limit for describing emergency procedures, only a subjective call by the instructor on performing the immediate action steps.

Immediate-action steps for engine malfunctions for the pilot on the controls must always incorporate maintaining rotor RPM and controlling the helicopter within single-engine limits. Once the aircraft control requirement is met, the aircrew must ensure the correct procedure is followed by utilizing the checklist. My experience has been that during training or evaluations many aircrews perform the entire procedure from memory. The emphasis must be on getting the procedure right (which is the first standard) and not performing steps quickly or recalling the entire procedure from memory. The H-60 ATM crew briefing and the performance planning card (PPC) both include an emergency airspeed for the pilots to fly during emergencies. The airspeed is selected to ensure the aircraft is capable of flying within the single-engine limits. If followed during every emergency, it ensures the aircraft will fly within the single-engine limits of the helicopter. During an engine malfunction, failure to rush to put an engine into lockout during a partial-engine failure becomes null, since the aircraft is within single-engine limits and the rotor will not decrease.

The point is although there have been improvements in the ATM and ability to get accurate performance data and mandatory briefing of performance items, our training must be updated to reflect performance upgrades. Since most Army aircraft do not fly single-pilot, I believe regurgitating steps from memory during an annual evaluation while on the flight controls is an outdated concept and not an effective measure of a pilot's ability to react effectively during an emergency. The evaluation must include the team concept and utilize the entire crew to identify the malfunction, analyze the situation and perform the proper procedures and I believe we need to incorporate and enforce this in training.

Utilization of simulation and conducting effective emergency procedure training is an area we need to improve. The flight simulators are the best way to train and evaluate crew interaction during emergencies. It is essential to ensure we continue to perform the flight maneuvering required for certain tasks like autorotation, and flight with degraded AFCS until they can be fully replicated in the simulator, but the fact is that simulators allow the evaluator more variety and latitude when conducting emergency procedure training and evaluations with zero risk to the aircraft or aircrew. The current methods of training assume more risk than necessary when we disable systems or fly the aircraft in degraded condition to replicate an emergency, even though historically there is a small or nonexistent rate of failure. The latest revision of the H-60 ATM includes allowing engine (DEC/ECU/DECU) lockout to be trained and evaluated in the simulator and task 1070 prohibits disabling of systems other than those specified in the task in order to reduce risk while training emergency tasks.

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Many emergency procedures tasks teach pilots valuable skills in handling the aircraft, but I believe the way we train must be reviewed to ensure we are getting the most effective and safest training possible. For example, flight with degraded AFCS, and autorotation in the H-60 are not accurately replicated in the simulator (2B38, 2B60) and must continue to be trained and evaluated in the aircraft. Ultimately, the aircraft simulator should be the primary training and evaluation device if the capability of the simulator allows. Every aircraft ATM must be updated to ensure maximum value is gained from these devices. All tasks taught in the actual aircraft must be required in the aircraft because there is historical data that supports the requirement or the flight maneuvering part of the task must be taught in the aircraft due to a simulator limitation.

MG Lundy's campaign to "defrag the hard drive" gives us great opportunity to update and improve the way we train, execute and incorporate emergency procedure training into our ATMs and flight manuals. An effective review must update procedures in order to take advantage of the safety margin and redundancy some of the aircraft systems that our aircraft provide. Simulation must be utilized as a primary training device to the maximum extent possible in order to reduce risk during emergency procedure training and evaluations. As aviation professionals, it is up to all pilots to ensure the emergency procedures contained in the aircraft flight manuals and the training of emergency procedures mandated by our ATMs is as effective and safe as possible.

UAS Class A – C Mishap Table									as of 15 Jan 15
	FY 14					FY 15			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	6		3	9	W/GE				
MQ-5	1	1		2	Hunter	1		`1	2
RQ-7		12	11	23	Shadow		1		1
RQ-11			1	1	Raven				
RQ-20			1	1	Puma				
YMQ-18									
SUAV					SUAV				
UAS	7	13	16	36	UAS	1	1	1	3
Aerostat	3	2	3	8	Aerostat	0	0	0	0
Total for Year	10	15	19	44	Year to Date	1	1	1	3

When a Soldier dies in an accident - every supervisor and contemporary who ever spoke to him or her had an opportunity to influence their judgment, so a little bit of all of us goes in with every troop we lose. - Author Unknown

Several variations of the above statement have been floating around for years. Instead of Soldier or troop it might say pilot or aircrew member to give it an aviation flair - that sort of thing. Pretty sure we've all seen something similar. It's a good message. One that should make you stop and think - how could I, as a contemporary, supervisor, or peer, have been able to prevent that mishap?

It was summer during a JRTC rotation. The assault battalion was the aviation task force element in support of an infantry brigade. Although a brigade staffer (ASO), I was attached to my designated flight company for the rotation. Having been a SP in the unit before moving to the brigade position, I maintained a habitual relationship with the company and supported their operations frequently. On this rotation I was teamed with a new aviator recently progressed through the RL chain. He seemed relatively mature, on the younger side (aren't they all?) and eager learn. His flight skills were on par with his experience level.

We'd been in the box a couple days and the flying OPTEMPO was high with numerous support missions being conducted on a 24-hour cycle. Our morning mission was multiple single-ship insertions of scout teams into various remote sites on the reservation. Having just completed putting a team into a confined area surrounded by fairly tall trees, the PI initiated an altitude over airspeed takeoff to clear the tree line. As we crested, an OPFOR aircraft filled our windscreen passing from our right to left. He was as surprised to see us as we were him. Our gunner monitored the opponent trying to circle back to our position as we transitioned into a high speed low altitude profile utilizing the existing cover. As the PI flew I monitored the instruments and noted he had pulled the power into the upper transient torque limits. I gently guarded the collective, giving it an adjustment into the normal operating range with the comment of "watch your power." We escaped to fly again.

Following the mission we discussed the incident and he acknowledged he had no clue he was pulling that much torque and had got caught up in the urgency of the moment. I reinforced the need to monitor the instruments and some of the ramifications of operating near power margins – overtorques, TGT limiting, decreasing rotor, etc. Enough said - point made – no harm no foul.

So why did this seemingly minor incident stay in my memory cells? Fast forward a year. The same pilot is part of a crew flying a low level mission in the training area. While attempting to make a high speed hard right turn on the flight route, the aircraft bleeds rotor and descends into the trees resulting in a totally destroyed aircraft and fatal injuries to all crewmembers and passengers.

Did I crash that aircraft? Of course not. Did I have an opportunity to influence the judgment of one of the pilots flying that aircraft? Absolutely. Would it have made a difference a year prior if I had sat down with that new aviator and discussed more in-depth the effects of TGT limiting and increased power requirements in turns? I can't possibly know with certainty but it surely would not have hurt and maybe would have been decisive in preventing the mishap. *Never stop learning - never stop teaching.*

Jon Dickinson, Aviation Directorate

Accident findings: From the archives for your review

Finding 1 (Present and contributing: Human error – Individual Failure) During a day, visual flight rules contour flight at approximately 25 feet above the highest obstacle and 100 knots airspeed, the aircraft pilot in command (PC) and the pilot (PI) did not adequately consider and accommodate for the added power needed to maintain obstacle clearance in a 90-degree heading change, 60+ bank-angle turn. The power needed to maintain altitude was not available, and the aircraft descended and crashed through the 60 to 65 foot tall trees. The aircraft was destroyed in the crash and the post-crash fire. All aircraft occupants were fatally injured.

The PC and the PI were fatally injured in the accident and the aircraft was not equipped with a flight data/cockpit recorder. Therefore, the specific cause for their actions could not be determined. It is suspected that a lack of flight discipline may have influenced their actions. Both the PC and the PI had flown the route many times and were familiar with the required heading change, the corridor flight restrictions, the maximum bank angle restrictions, and the aircraft power requirements. The observed, low, fast, steep, banking turn exceeded the allowable flight parameters which was not required for the route or the mission and could have been avoided. A lack of flight discipline was also identified during witness interviews of both rated and nonrated crewmembers who had recently flown similar missions with the PC. Low, fast turns in excess of 60-degree bank angles were noted with the PC, indicative of a lack of flight discipline.

Finding 2 (Present and contributing to the severity of injuries): The aircraft was being operated with two 230-gallon extended range fuel system (ERFS) tanks mounted on the external stores support system (ESSS). As the aircraft with the full, partially crashworthy, external fuel tanks descended through the trees, the external fuel tanks ruptured and separated from the aircraft. The fuel ignited and the flames engulfed the aircraft, causing fatalities in an otherwise survivable crash.

Service personnel come blessed, or cursed, with the same lavish helping of human nature as other mortals, including pilots. They react the same way to fatigue, pressure, anxiety, extremes of discomfort, and dim-witted self-satisfaction. The best of them can and do make mistakes. All top-flight mechanics know this. Like mature pilots, they are keenly aware that their capabilities and experience have their limits and that they have to maintain a constant, all-points lookout against the creeping complacency and overconfidence which can turn them into zombies before they know what has hit them.
BFTP this issue.

Mishap Review: Microburst damages

A microburst weather event developed which overturned one AH-64D, leaned two others onto their right rocket pods, and damaged a third as well as one UH-60M.

Summary

A severe and unexpected thunderstorm impacted an airfield, produced a microburst, and damaged four AH-64D, one UH-60M and a cargo van. One of the AH-64Ds was turned over on its side. The damaged aircraft were not moored and had untied blades due to on-going flight operations. The total cost of the incident was over $4.3 million.

Timeline

1650 Aircraft return from training mission. No refuel due to lightning in the area
1723 Weather warning (WW) issued for lightning within 5 nm
1725 Last training aircraft recovers to airfield
1759 WW issued for severe thunderstorms winds $\geq$ 50 kts, ½ inch hail valid till 1830 hours
1800 Unit ops notified of WW, battalion ops not notified
1810 Winds: 170/27 Gusts to 33
1819 Winds: 180/42 Gusts to 57
1820 Multiple aircraft overturned
1821 Winds: 170/43 Gusts to 63
1836 Winds: 120/15 Gusts to 23

Commentary

Isolated severe winds as a result of the thunderstorm was the primary environmental cause factor for the incident. Also noted was that after the aircraft returned from their missions, they were not moored and rotor blades not tied down prior to the severe weather. The aircraft were scheduled for follow-on flights in the evening. There was no established SOP for mooring and tie-down procedures or for notifying key personnel/sections for dissemination of weather warnings.

The fast-moving system overloaded the weather center. There were forecast products available but not used that could have helped forecast the microburst.

Check and double check

29 Nov 79 Flightfax

In a hurry to take off, pilot did not require removal of rear seat backrest cushion assembly. Cushion blew out of OH-58, which was flying with all doors removed, and hit tail rotor blades. Blades separated from tall rotor, aircraft crashed, and pilot was killed.

You are fooling nobody, including yourself, when you skip or do an inadequate job on a preflight check because of too much pressure, not enough time, fatigue, or a self-induced idea that the checklist isn't all that important in the first place. Mishap experience shows that some Army pilots obviously believe that checklists are not worth the time and patience they require in the face of some really important task which should have been finished yesterday at the very latest. Unfortunately, the checklist is one of the first things to go out the window when time and patience run short. In a depressing number of cases, when the checklist goes out the window so do the pilot and his crew, sooner or later.

Failure to make an adequate preflight or use the checklist correctly was listed as a cause factor in 484 mishaps for the period FY 77 through FY 79. Seven resulted in accidents and 42 in incidents, with 6 people killed and 10 injured. However, over different terrain and under different circumstances, these could easily have turned out to be major accidents. More than once you have probably heard somebody say he has the checklist so thoroughly engraved on his mind he could recite it backwards and forwards. To be sure, if you stick around Army aviation for a while, you will become familiar with the checklist, maybe even thoroughly familiar. So familiar, in fact, that you can become complacent and fall into that ho-hum attitude which can do you in. And that's when you overlook a checklist item at just the wrong moment. No use suddenly remembering it after you are aloft and your turbine starts giving off not-so-funny noises.

Checklist was not followed, and right passenger seatbelt was left outside aircraft. Seatbelt banged against fuselage during entire flight, causing $5,000 damage.

Loose nut on accumulator end of air tube assembly resulting from improper torque caused power loss. Aircraft was landed on paved road, with major damage to cross tubes. Luckily, there was a landing area available.

Carelessness, or complacency (and is there any difference, really?), concerning the checklist probably stems from the fact that relatively few checks, no matter how detailed and careful, turn up anything seriously wrong. So why bother when the odds are with you? Why go to your dentist twice

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a year? Complacency isn't the only item on the list of potent checklist troublemakers. There are people who not only know everything they need to know but know it better than most. Operating on the usually sound theory that no matter how good something is it can be made better, people in the grip of this kind of self-hypnosis have been known to take pencil and shears to the prescribed checklist, performing drastic surgery. They will tell you proudly that their home-grown versions not only save time but get things done just as well. The person who allows complacency or know-it-allness to lead him into procedures the book would never condone is asking for what he is sure to get. Your aircraft is no better than the person who flies and maintains it and if it is being asked to perform with an oily rag lodged somewhere in its craw, something a thorough check would have turned up, it can't be blamed if it falls out of the sky. Service personnel come blessed, or cursed, with the same lavish helping of human nature as other mortals, including pilots. They react the same way to fatigue, pressure, anxiety, extremes of discomfort, and dim-witted self-satisfaction. The best of them can and do make mistakes. All top-flight mechanics know this. Like mature pilots they are keenly aware that their capabilities and experience have their limits and that they have to maintain a constant, all-points lookout against the creeping complacency and overconfidence which can turn them into zombies before they know what has hit them. Like homemade preflight checklists, homemade maintenance procedures just won't do. Sticking to the book is the only answer. Every unit commander has a responsibility to see that all personnel follow the checklist from top to bottom all the time! And the only way to do this is to do it with book in hand.

Check and double check

It is a matter of positive thinking. No mature, normally confident person who knows his job likes to have it dinned into him night and day that he must perform in a certain way and only that way. But we are all human. And accidents do keep on happening in which failure to follow the checklist is a factor. How often have you heard (or said yourself when you were in a hurry to get back home): "The aircraft's okay. Let's give it a quick onceover." Or have been handed a "revised" checklist with the famous last words: "Never mind what they told you at school. We do things differently out here." Do you always insist on an oral call-out when you are following the checklist? When a fuel line has been taken off and put back in place, do you always check for leaks around the connections? If you are interrupted during a check, do you take up where you left off, giving human nature a gap wide enough to drive a truck through, or do you start all over again?

All this is a matter of individual responsibility, particularly when the unit's aircraft are operating over a wide area out in the field. The safety officer and the unit commander share the common human inability to be in more than two or three places at the same instant. A large part of the time, aircraft crews and even mechanics are on their own to a considerable extent; and, in fact, indications are that most of them are doing a good job most of the time. But what we want is all of the people all of the time. Check and double check•

I used to be a lifeguard but some blue kid got me fired.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in December 2014.

Utility helicopters

UH-60

-M Series. Crew was conducting a roll-on landing to the runway when all 4MRB made contact with the tail boom. Aircraft was landed w/o further incident; Damage reported: all 4MRB and scoring of the tail rotor drive shaft. (Class C)

-A Series. Crew experienced an un-commanded yaw and "severe" vibration following climb-out to altitude and initiated an emergency landing. Post landing inspection revealed damage to one main rotor blade/ potential de-bonding/ separation of the trailing edge and tip cap. (Class B)

Fixed wing aircraft

C-12

-Crew experienced a bird-strike on the starboard wing during an instrument approach to the runway. Aircraft was landed w/o further incident. Damage reported at the class C level. (Class C)

C27J

-Aircrew was conducting a training flight when the aircraft made contact with a USAF C-130 at 1,500 FT MSL. Both crews were able to land their aircraft and both sustained class A damage.

Unmanned Aircraft Systems

MQ-5B

-UA struck the arresting gear drum during landing to the airstrip. The main landing gear subsequently separated, potentially resulting in total loss damage. (Class A)

When one barber shaves another, who talks?

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Online newsletter of Army aircraft mishap prevention information published by the U.S. Army Combat Readiness Center, Fort Rucker, AL 36322-5363. DSN 558-2660. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Flightfax is approved for public release; distribution is unlimited.

Number 46 February 2015

Flightfax®

Online newsletter of Army aircraft mishap prevention information

Solid maintenance forms the foundation of an effective aviation training program. When the maintenance system operates effectively, we are able to safely generate the needed operational tempo to train the unit's pilots. However, if the maintenance program struggles, an increased level of risk is introduced as organizations perform their flight training. In the cockpit, human error mishaps increase as the complexity of the aviation environment increases. Maintenance errors follow the same pattern. As operational tempo increases, the pressures of repairing the aircraft will correspondingly increase, and unit commanders must make good risk management decisions on how to best balance their unit training programs and unit maintenance operations.

Material failure is loosely defined as a component that did not operate as intended or designed, and caused, allowed, or contributed to the malfunction. When an accident board investigates material failure, the basic question that must be answered is whether the malfunction was caused by a design defect or whether the failure was caused by an improper maintenance practice. Straight out of DA PAM 385-40, which describes the methods to conduct accident investigations, the first two steps when investigating a material failure are to "examine records and unit operating procedures", and "the materiel factors investigation must interface with human factors investigation to search for [Soldier] mistakes that may have resulted in the materiel failure." In other words, did the unit's maintenance program cause the mishap?

Unit commanders have the very challenging task of balancing the competing requirements of aviation flight training, aircraft maintenance, and external unit taskings. But this is not a new problem, just one that we have not seen for the past decade. One way to think about this is to approach maintenance operations with the same rigor as a flight operation. Have we clearly identified the maintenance mission tasks we are to perform? Have we conducted a risk assessment and mitigated all of our maintenance risks to the lowest level (who is our "maintenance MBO" that expertly looks at our risks and recommends controls), and have we performed our "crew selection" to assign the right Soldiers and leaders to the maintenance mission that are properly trained and qualified in these tasks. Like I said, not a new problem as this procedure sounds strikingly similar to our existing maintenance of P4T3 (problem, people, parts, plan, tools, time, and training). All we need now is to properly assess our maintenance risk and approve these actions at the right level of command and we will be on track for a solid maintenance program.

Until next month, fly safe and manage your risk levels!

COL Mike Higginbotham
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Materiel Related Five Year Accident Review

During the last five fiscal years (FY10 – 14), there were 16 recorded materiel failure Class A flight or flight-related mishaps resulting in 14 fatalities. Additionally, there were five Class B and 36 Class C mishaps. Eight (50%) of the sixteen material failure Class A mishaps resulted in fatalities.

Leading accident events (Class A) Materiel Failure.

OH-58D/H-6

(1) The OH-58D was in cruise flight when a FADEC failure occurred. As the crew attempted a precautionary landing, the aircraft crashed and both crew members sustained fatal injuries.

(2) The H-6 experienced a Full Authority Digital Electronic Control failure. As the crew was attempting a precautionary landing, the aircraft crashed and both crew members sustained fatal injuries.

(3) The OH-58D experienced a suspected a materiel failure resulting in a limited power situation in which the crew was unable to sustain flight. The aircraft descended into trees destroying the aircraft, fatally injuring one pilot and seriously injuring the other.

(4) The OH-58D splined steel trunnion in the tail rotor assembly failed in flight. The aircraft sustained a loss of tail rotor thrust. The aircraft developed a rapid and uncontrollable right yaw and a vertical descent of approximately 4,000 feet/minute, impacting the ground. The aircraft fuselage was damaged and both crew members sustained fatal injuries.

(5) The OH-58D's electronic control unit (ECU) failed in flight. The rotor RPM rapidly decayed, resulting in a low rotor RPM condition, a rapid descent, and catastrophic impact with the ground. One crew member was fatally injured, one crew member was critically injured, and the aircraft was destroyed.

(6) At a hover, the OH-58D right flight-control hydraulic servo malfunctioned and jammed and would not allow the pilot to apply aft cyclic. The aircraft nose-low attitude could not be corrected (changed) and the aircraft impacted the terrain causing severe damage to the aircraft and one minor injury.

(7) During a general maintenance test flight, the OH-58D's fuel boost fail caution light illuminated, followed by low fuel pressure warning. The low rotor audio was activated, followed by an engine failure indicated by an engine out warning. The maintenance test pilot (MTP) descended in a power off autorotation and impacted the ground.

(8) While conducting a route security/reconnaissance mission at 90 knots and 150 feet above ground level, the aircraft experienced an in-flight engine failure. The crew was forced to execute a low-level autorotation to a level, plowed field. The aircraft was destroyed and the two crew members sustained injuries.

H-60

H-60M. The tail rotor pitch change shaft failed. This failure separated the linkage of the tail rotor pitch change shaft and the tail rotor servo, allowing the tail rotors to seek a neutral pitch and to be unresponsive to the pilot’s flight control inputs. The aircraft entered an uncontrollable yaw with increasing rate. The aircraft impacted the ground destroying the aircraft. Two crew members were seriously injured and one crew member was fatally injured.

CH-47F

While conducting CH-47F sling load operation, the sling load separated from the aircraft and impacted the ground. It was determined the 11K reach pendant failed.

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AH-64

(1) The crew of an AH-64D noticed a burning smell in the cockpit followed by CHIPS MAIN TRANSMISSION caution warning indications. On final approach to the landing area, the collective position did not correlate to the torque output of the engines. The aircraft impacted the ground in a level-roll attitude, approximately thirteen degrees nose up, and with approximately nine Gs of force. The aircraft sustained major structural damage and the co-pilot gunner in the front seat received significant facial fractures. Over-torqueing of the main rotor hub nut retention ring at the factory created improper pre-loading of the bearings and led to a catastrophic bearing failure and over-heating of the static mast.

(2) During level cruise flight under night vision systems/goggles (NVS/NVG), the AH-64E No. 2 generator malfunctioned due to an internal generator bearing failure. The generator developed a short resulting in smoke in the back cockpit, severe vibrations in the crew member's tail rotor pedals, and complete loss of A/C power to the aircraft No. 2 AC panel. The crew suspected an aircraft fire, anticipated a tail rotor malfunction, and began an immediate descent for landing. During the landing, the aircraft's main rotor blades contacted the ground, causing extensive damage to the aircraft.

(3) The AH-64D's lateral-servo actuator malfunctioned. This resulted in the lateral-servo actuator back driving the flight controls through the mechanical control input that was connected to the servo. The cyclic moved uncommanded to the left, rolling the aircraft approximately 60 degrees and causing an impact with the ground. The aircraft was destroyed, with no significant injuries to the crew.

(4) AH-64D suffered a catastrophic failure of the main rotor system. The aircraft crash resulting in two fatalities.

(5) During the termination phase (less than five feel AGL and less than six knots groundspeed) of a VMC approach in the NVS mode with the front-seat PI on the controls, the Flight Management Computer (FMC) commanded the backup control system (BUCS) ON in the roll channel and disabled roll channel stability and command augmentation system (SCAS). Full BUCS ROLL channel authority washed-in less than one second after BUCS was commanded ON, resulting in increased aircraft roll response and decreased control input dampening. The crew was unable to stabilize the aircraft attitude, resulting in roll attitude changes of 40 degrees to the right, 44 degrees to the left, and 78 degrees to the right in less than 3.5 seconds resulting in contact with the ground. The aircraft came to rest on its right side.

C-12

The C-12C departed controlled flight and crashed. A suspected materiel failure of unknown origin caused the aircraft to initiate a near-vertical descent from 25, 000 feet and impact a ridgeline. All three crew members were fatally injured and the aircraft was destroyed.

Flight Mishap Rate FY10 – 14

Total FY 2010 -2014 manned flight and flight-related mishaps

Hours flown: 5.8 million

CLASS A (80) Cause factor

Human Error :	61 (76%)	Rate/100K: 1.05
Materiel Failure:	16 (20%)	Rate/100K: 0.28
Environmental:	0	
Unknown:	3 (4%)	Rate/100K: 0.05
Overall	80	Rate/100K: 1.38

CLASS A - C (442) Cause factor

HE:	334 (76%)	Rate: 5.75
M:	57 (13%)	Rate: 0.98
E:	20 (4%)	Rate: 0.34
U:	31 (7%)	Rate: 0.53
	442	Rate: 7.60

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Materiel Failure CLASS A – C Mishaps																
FY	Class A (16)						Class B (5)					Class C (36)				
	AH-64	H-47	H-60	OH	FW	Fatal	AH-64	H-47	H-60	OH	FW	AH-64	H-47	H-60	OH	FW
2010	1	1	0	1	1	5	1	0	0	0	2	1	1	3	2	1
2011	1	0	0	4	0	3	1	0	0	1	0	4	1	4	7	0
2012	0	0	0	2	0	2	0	0	0	0	0	2	0	2	1	1
2013	1	0	0	1	0	3	0	0	0	0	0	0	1	1	2	1
2014	2	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0
Total	5	1	1	8	1	14	2	0	0	1	2	8	3	10	12	3

No matter what goes wrong, there's always someone who knew it would

ALSE Video now available

A new product to assist flight crews with Aviation Life Support Equipment (ALSE) training has been added to the Aviation Directorate, USACRC website. It can be found at the following link:

https://safety.army.mil/ON-DUTY/Aviation.aspx

Click on Aviation Life Support Equipment

If you have ideas for future aviation products that you would like to see included with the products we already have, send us an email and we will review for possible production. Fly Safe!

AVIATION MAINTENANCE STANDARDIZATION

CW5 Frank Turinsky
Directorate of Evaluation and Standardization
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AH-64D/E Maintenance Test Pilot Evaluator

During all Directorate of Evaluation and Standardization (DES) unit assessments, maintenance management and Maintenance Test Flight (MTF) standardization are assessed and results out-briefed to the appropriate levels of command. Additionally, DES Maintenance Test Pilot Evaluators (ME) provide mentorship and insight to unit Maintenance Test Pilots (MTP) in order to leave the unit with valuable tools to manage the commander's maintenance programs. Whereas the FORSCOM Aviation Resource Management Survey (ARMS) provides a well-rounded, generic assessment of unit resource management, DES MEs administer a more airframe-specific assessment of unit readiness and maintenance standardization. These assessments are based on, but not limited to, the following references: AR 95-1, AR 700-138, DA Pam 738-751, TC 3-04.7, TM 1-1500-328-23, Aircrew Training Manual (ATM), MTF manual, and appropriate IETM. The purpose of this article is to provide insight on noted trends across the Army aviation enterprise where it pertains to aviation maintenance standardization and to provide solutions to these trends.

PREPARATION FOR TRIAL

In the unfortunate event of an aircraft accident investigation, some of the maintenance-specific items a unit can expect to be inspected include: aircraft historical records, MTF sheets, and ULLS-A(E) maintenance and flight records. I refer to this record keeping as "preparation for trial," because we never know the day or the hour that our practices might be inspected for adherence to all applicable publications. Every maintenance action performed, MTF sheet filed, historical record entry made, and flight logged might just be the last opportunity to tell the airworthiness story. When considering maintenance documentation in this way, the importance of day-to-day maintenance management and historical record upkeep becomes obvious. How well has your unit prepared for that trial we hope never comes?

MAINTENANCE TEST FLIGHT SHEETS

The MTF sheet is signed proof that the aircraft has met the airworthiness standards of the appropriate MTF manual, but it's only as good as the data that is recorded on it. Task 4000 of each ATM describes the actions an MTP will take prior to performing a MTF, and should be the starting point for any MTF. Once the MTP inspects the aircraft logbook, he/she references TM 1-1500-328-23 and the appropriate IETM, determining whether to perform a General Test Flight (GTF) or Limited Test Flight (LTF) based on the maintenance performed. They then reference the appropriate MTF manual and review the maneuvers to be performed. Upon successful completion of the MTF, the MTP signs the MTF sheet and it becomes part of the aircraft historical records maintained in Quality Control (QC) to serve as proof of airworthiness. Lastly, the MTP completes all aircraft logbook and historical record entries IAW DA Pam 738-751.

A GTF is a detailed flight to test the airworthiness of the entire aircraft and prove all systems/components are functioning as prescribed in applicable aircraft maintenance manuals. It includes every maneuver in the MTF manual performed cover-to-cover to the standards of the appropriate ATM; however, one of the most common trends among assessed units is that GTFs are not being annotated as being completed. In other cases, the MTF sheet shows that a maneuver was

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performed incorrectly or the aircraft did not perform within allowable tolerances. Examples of this in the AH-64 include: Auto-rotational RPM check, maximum power check, TGT limiter/contingency power check, and emergency hydraulics check. In more severe cases, flight critical maneuvers and engine performance checks have not been performed at all and the aircraft has been released for flight.

An LTF evaluates the operation of specific items or systems. Only the applicable maneuvers or portions of the MTF manual required to verify satisfactory functioning of the item or system need to be completed. It is performed IAW TM 1-1500-328-23, appropriate MTF manual, and ATM when the completed maintenance does not warrant a GTF. Although MTF manuals prescribe the minimum checks that will be performed on every MTF (specified by double asterisks), the MTP must decide which additional LTF maneuvers will validate airworthiness based on maintenance performed. However, many MTPs are not performing MTF maneuvers that apply to the maintenance that was performed. Examples include: stabilator actuator replacement with no stabilator checks performed and flight control servo replacement with no hover maneuvering checks performed.

ENGINE PERFORMANCE CHECKS

The Engine Torque Factors (ETF) and Aircraft Torque Factor (ATF) required for accurate performance planning are derived from data noted by the MTP during the maximum power check. Once this data is taken and calculations made, it is transcribed onto the DA Form 2408-19-2 in the aircraft historical records for that particular engine as well as the engine HIT check log. In the AH-64 series aircraft, the ETFs are also entered into the aircraft ENG/ ETF page, and included in Performance Page (PERF) calculations. This creates four areas where an inspector can check to see if engine performance has been properly calculated and annotated: MTF sheet, DA Form 2408-19-2, HIT log, and aircraft ENG/ ETF page (if applicable). When these values differ, historical records are in error, true engine performance values are unclear, and the probability of crews inaccurately calculating aircraft performance planning increases.

USE OF TECHNICAL MANUALS AND DOCUMENTATION

DES MEs witness maintenance actions and note whether approved maintenance manuals are on hand while performing maintenance, often they are not. This occurrence has been noted throughout the range of maintenance tasks, from Preventative Maintenance Daily (PMD) inspections through tasks as intrusive as a main transmission replacement. The institutional knowledge that a seasoned maintainer possesses is a valuable asset, but is never a viable substitute for by-the-book practices. Additionally, many maintainers have lost familiarity of the 204-series manuals, most evident in incorrect application of safety wire and cotter pins. Although the MDS-specific IETM provides detailed maintenance task descriptions, maintainers are reminded that the 204-series technical manuals not only still apply to all aviation maintenance tasks, but are the foundation of sound aviation maintenance.

The most efficient maintenance program is only as good as its documentation; documentation that accurately describes aircraft status, fault, and corrective actions taken. Some aircrews are reluctant to make aircraft deficiency entries or rely on the crew chiefs to make these entries for them. By not committing to making an aircraft fault entry, aviators are allowing faults to continue on the aircraft, or encouraging undocumented maintenance. Additionally, it has been noted that maintainers' corrective action entries do not reflect proper actions or man- hours IAW IETM. Keep in mind that DA Form 2408-13-1 entries tell the story of what fault was encountered and action

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taken to correct the fault; detailed, by-the-book entries prevent ambiguity in determining faults and corrective actions performed.

Unfamiliarity with AR 95-1, AR 700-138, and DA Pam 738-751 leads to units assigning a status symbol that incorrectly reflects the seriousness of a fault. At best, this results in a low supply priority and longer repair part wait times; at its worst, it results in crews flying aircraft with "Red X" deficiencies that aren't entered as such. Continuous training of airworthiness standards contained in AR 95-1, AR 700-138, and applicable IETM prevents erroneous status reporting.

STANDING OPERATING PROCEDURES (SOP)

Unit maintenance SOPs are written by maintenance managers and signed by the commander. However, junior Soldiers who perform the bulk of the maintenance actions rarely know what their unit SOPs say, much less comply with them. During ARMS, units are inspected and expected to have SOPs that address particular maintenance areas, but is your unit following the SOP signed by the commander? It's common for maintainers at all levels to be unfamiliar with the SOPs they're bound to abide by.

MSPU and IVHMS

The Modernized Signal Processing Unit (MSPU) and the Integrated Vehicle Health Management System (IVHMS) are invaluable in monitoring component health, vibration levels, and increasing Time Before Overhaul (TBO) intervals. Many units are reaping the benefit of reduced track and balance times afforded by these systems without paying due diligence to required recurring download requirements IAW applicable AWRs. This trend is discovered when Directorate MEs check the latest MSPU download and find aircraft that have been operating on vibration exceedances that require maintenance action. The trend is caused when maintainers download the data on time, but are unaware of the limitations stipulated in the applicable AWR and Condition Based Maintenance (CBM) manual. Additionally, increased TBO intervals occur when units report vibration trends to Huntsville for analysis, however, these increased intervals are slower in coming when units fail to report this data. These systems are great systems, but benefits are only realized when used to the system's full potential.

WHY THE TRENDS AND WHAT'S THE FIX?

The Directorate doesn't have access to any special references or publications that the unit doesn't have access to. Maintenance assessments are based on the above references and all pertinent Airworthiness Releases (AWR), Aviation Safety Action Messages (ASAM), Aviation Maintenance Action Messages (AMAM), and Safety of Flight Messages (SOF). So, why are these trends so common? In some cases it's that one maintainer is trying to perform too many roles while others fail to perform the role they're assigned; some units claim they're too busy to always do business by the book; in others, the experience level just isn't there. In all cases, it's lack of accountability.

The unit maintenance program belongs to the commander. It is supervised by the executive officer (XO), managed by the production control (PC) section, and enforced by the quality control (QC) section, MTPs, and platoon sergeants. The unit's ME, or AMO if assigned, is the standardization officer for all aviation maintenance actions who synchronizes capabilities, resources, and training opportunities into an efficient maintenance program that maintains forward momentum. Holding maintainers accountable in their assigned roles is key in reversing these trends and maintaining an airworthy fleet.

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The PCOIC must be a trusted, quality-minded technical expert who understands the commander's intent and makes sound decisions accordingly. Likewise, the QCOIC must be a technical expert who understands the operational need for combat power generation. Historical records that are routinely inspected by the QCOIC and Technical Inspectors (TI) IAW applicable publications are normally well maintained and inspection-ready. MTPs must be unrelenting in the pursuit of airworthiness, paying equal attention to MTF maneuvers, maintenance documentation, and correct historical record entries while continuing to learn their craft.

The value of engaged platoon sergeants and TIs who maintain a presence on the hangar floor and flightline cannot be underestimated. TIs should possess unquestionable professional credentials and unrelenting adherence to Army-level maintenance publications as well as local SOPs. Soldiers who routinely perform undocumented maintenance or maintenance without required manuals are a product of habitual maintenance without supervision, mentorship, and continued training. Engaged TIs, whether they're NCOs or MTPs, reduce the probability of incorrect maintenance practices.

THE DEFENSE RESTS

The end state of all aviation maintenance tasks is mission accomplishment in airworthy aircraft. Army aviation maintenance programs are proven to be true to meet this end state by training maintenance Soldiers, MTPs, technical inspectors, and commanders to perform assigned duties. However, graduating aviation programs of instruction is just the beginning of the learning process. Involved, decisive leadership must encourage the continual education of the enterprise while demanding accountability in attaining prescribed standards. Encourage learning in your formations, trust your maintenance managers, but demand proper maintenance practices. In the end your unit will be prepared for the trial we hope never comes.

UAS Class A – C Mishap Table									as of 28 Feb 14
	FY 14					FY 15			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	6		3	9	W/GE				
MQ-5	1	1		2	Hunter	1		`1	2
RQ-7		12	11	23	Shadow		1	1	2
RQ-11			1	1	Raven				
RQ-20			1	1	Puma				
YMQ-18									
SUAV					SUAV				
UAS	7	13	16	36	UAS	1	1	2	4
Aerostat	3	2	3	8	Aerostat	0	0	0	0
Total for Year	10	15	19	44	Year to Date	1	1	2	4

Mishap Review: AH-64D EP Training

While conducting night, emergency procedures training, the NP speed of both engines increased to the overspeed protection setting resulting in a dual engine shutdown. The aircraft lost rotor RPM and crashed. Both pilots were fatally injured.

History of flight

The mission was a single aircraft night and night vision device (NVD) APART evaluation. The accident standardization pilot (SP) started his day at 0700 working as a technician at the support facility until 1730 hours. During the day the SP completed the aircraft preflight and the mission brief/risk assessment worksheet which was briefed by the mission briefing officer. The mission risk was LOW with the supervisor of flight (SOF) as the final mission approval authority. The instructor pilot (IP) receiving the evaluation reported for duty at 1745L. The weather forecast was for broken sky conditions at 10,000 feet and 7 miles visibility. Winds were out of the southeast at 12 knots. Temperature was 19 degrees C and altimeter 30.12 in/Hg. Sunset was 1728L, EENT at 1833 and illumination forecast of 100 percent. Moon was 19.75 degrees above the horizon.

The crew brief was conducted at the aircraft at 1810L followed by aircraft run-up and communications check with flight operations. At 1845L the aircraft departed the airfield en route to an assault strip training area located approximately two miles southwest of the airfield with an arrival time of 1850L. In the first traffic pattern, the crew conducted a simulated engine failure maneuver. The second traffic pattern the crew conducted a simulated NP fail low emergency procedure with the IP in the front seat initiating the maneuver from approximately 450 feet AGL. While performing the DECU lockout procedure, both engines accelerated to the engine overspeed protection limit resulting in a dual engine shutdown. The aircraft crashed resulting in destruction of the aircraft and fatal injuries to the crew.

Crewmember experience

The SP, sitting in the back seat, had 4,000 hours total flight time, 2,800 in the AH-64, 950 NVS, 600 combat and 1300 hours as an IP. The PI/IP located in the front seat, had over 4,600 hours total time with 2,500 in the AH-64, 950 NVS, 1,700 combat hours and 1,000 IP hours.

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Commentary

The accident investigation determined that during the conduct of the DECU lockout procedure with the #1 engine, the IP had started the maneuver by inadvertently taking the #2 engine out of the fly detent before confirming and then re-directing the procedure to the #1 engine. When the #1 engine was placed in lockout and the #2 engine not being seated in the fly detent, both engines accelerated to the overspeed protection trip point resulting in a dual engine shutdown. Rotor RPM rapidly decayed and the aircraft impacted the ground.

Note: The NP overspeed protection system was addressed in Flightfax Forum, January 2014 Flightfax.

	Manned Aircraft Class A – C Mishap Table									as of 28 Feb 14
	Month	FY 14					FY 15			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	0	0	2	0		0	1	3	0
	November	3	0	5	0		2	0	2	2
	December	1	0	3	0		1	1	2	0
2nd Qtr	January	2	2	4	4		2	0	5	0
	February	1	0	3	0					
	March	0	3	0	0					
3rd Qtr	April	1	1	5	0					
	May	3	1	2	2					
	June	2	0	6	0					
4th Qtr	July	2	0	5	0					
	August	0	0	0	0					
	September		1	2						
	Total for Year	15	8	37	6	Year to Date	5	2	12	2
	Class A Flight Accident rate per 100,000 Flight Hours									
	5 Yr Avg: 1.31		3 Yr Avg: 1.25			FY 14: 1.42			Current FY: 1.80	

There is no “I” in “team,” but there are four in “platitude-quoting idiot.”

Risk Management for maintenance NCOs and mechanics

May 1994 Flightfax

Checking his watch on his way to work to make sure he wouldn't be late for the 0530 first sergeant's meeting, SSG Smith was thinking about the helicopter in phase and the one that had been grounded following weekend missions. After providing support for the first sergeant's taskers he was sure he was about to get, he was worried about how many people he would have left in his maintenance platoon to actually work on the aircraft.

1SG Jones looked up from the mound of paperwork to make sure all of his platoon sergeants were present. Today, he was going to need all the support he could get to fill the sergeant major's detail requirements. After all, he had promised the sergeant major that A Company would pull their weight at the battalion's annual weapons qualification range.

At 0530, 1SG Jones began issuing assignments for the day and requesting people from each of the platoons. He then turned to SSG Smith and said "John, I need you to be in charge of the range detail. You're the only available NCO. Any questions?" he asked quickly. "If not, it's time for PT formation."

After PT, SSG Smith took all but three of the people in his maintenance platoon to report to the sergeant major for range-detail assignments. Before leaving, he turned to SPC Pierce and said, "You take PFC Wilson and PVT Oates and go to the hangar. Work on the phase aircraft and see what's wrong with the one that was red X'ed this weekend."

Once SPC Pierce, PFC Wilson, and PVT Oates got to the hangar, the production control (PC) NCO and the maintenance officer called them together along with the technical inspector (TI) to set the priorities for the day. SPC Pierce was tasked to work on the phase aircraft along with PVT Oates. PFC Wilson was assigned to repack a tail-rotor quill on an AH-l.

Getting his assignment, PFC Wilson mused to himself, "I've never repacked a tail-rotor quill, but how hard can it be?" The PC NCO had told him that one of the TIs would supervise the job to make sure he was doing it right. PFC Wilson got out the manual, quickly scanned the maintenance task, put the book away, assembled the special tools along with his general mechanic's tool box, and started to perform the assigned task. He decided in the interest of time that he would do the paperwork after the job was done.

An hour later, the PC NCO called PFC Wilson and told him that he was needed to help with an engine flush on a UH-l because the crew chief was at the range and the aircraft was needed for an urgent mission. SPC Pierce was assigned to complete the job on the AH-l when he finished his present task.

About 45 minutes after starting work on the tail-rotor quill job, SPC Pierce walked to the TI shop and informed the TI that he needed someone to sign off the tail-rotor quill repack. When the TI and SPC Pierce arrived at the aircraft, the TI was surprised to find the tail-rotor drive shaft already installed. "Why did you install the drive shaft before I inspected the tail-rotor quill? I have to see if the grease was properly installed." SPC Pierce looked puzzled and replied "PFC Wilson had the quill installed when he had to go to the flight line. I just installed the drive shaft."

The TI went to his office and called the flight platoon and asked to speak to PFC Wilson. "That's the way I thought you did it" was the reply to the TI's questions. After several minutes of questioning the young private, the TI took SPC Pierce out to the aircraft and had him sign off the entry requiring the quill lube. Although the TI knew he should have SPC Pierce remove the

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drive shaft and plate assembly so that he could properly inspect the grease repack, he signed off the red X because he knew that SPC Pierce was needed to perform other tasks and PFC Wilson would be at the flight line for some time yet. The TI rationalized that surely no one could mess up a simple repack.

The next morning while the aircraft was being test flown for the tail-rotor repack and for rotor tracking, it experienced a complete loss of tail rotor thrust. The aircraft entered a right spin, rotated several times, and crashed. The aircraft was totally destroyed, but fortunately no one was seriously injured.

Inspection revealed that the tail-rotor quill output coupling had been improperly assembled. PFC Wilson had failed to install the centering spring, plate assembly, and retaining ring in the coupling as required by the maintenance manual, which caused the drive shaft coupling to disengage from the spherical coupling, resulting in loss of tail-rotor thrust.

This scenario is a composite of events from actual accidents and illustrates possible actions of sergeants and soldiers who, while trying to do a good job, get into trouble by failing to apply risk-management techniques in day-to-day business. How could a maintenance error of this magnitude have happened?

Applying risk management

Risk management is not a new concept. By now, everyone in America's Army should know the 5-step process (see below). If you still don't fully understand the process, invest some time in learning the basic concepts. Having a good theoretical understanding of the concept will make it a lot easier to apply the process to everyday situations.

Risk management is a tool that commanders, officers, NCOs, and mechanics alike can use to help them get the job done safely, but applying it effectively does take practice. Let's go back and see where and how the first sergeant, platoon sergeant, technical inspector, and mechanic could have more effectively used the risk-management process and principles to guide them in making some changes that might have prevented the serious maintenance error that resulted in the accident. While all the steps within the process are necessary, identifying the hazards and establishing control measures are key to success.

Hazards and control measures

First sergeant. The first sergeant failed to recognize the impact of taking so many people out of the maintenance platoon to support weapons qualification. At a minimum, he should have notified the commander to ensure the commander understood the impact on maintenance for that day. He should also have asked for guidance from the commander with regard to priorities in maintenance. If he had known the priorities, he could have selected better-qualified personnel to perform the maintenance tasks required and still supported the range detail. If necessary, he could have required personnel to be rotated from the range to ensure the maintenance work was continued throughout the day.

Platoon sergeant. The platoon sergeant failed to ascertain the tasks to be completed versus the capability of the mechanics left behind to do the work. He also failed to notify the PC NCO of their capabilities so that the PC NCO could assign tasks accordingly. This lack of communication led the PC NCO to believe the mechanics could do the work unsupervised. As a result, PFC Wilson was given a task he was not capable of doing without supervision. If the platoon sergeant had communicated the mechanics' general capabilities and limitations to the PC NCO, the PC NCO may not have

assumed PFC Wilson was capable of accomplishing the quill repack without supervision.

Technical inspector. This NCO made the most grievous of all the errors in this scenario: he took shortcuts. The TI failed to accurately assess the impact of the hazard of an improperly installed input-drive quill. Although the task might have been an easy one, the TI failed to assess its criticality. He also failed to identify as a hazard the fact that there were no write-ups in the logbook for the tasks completed by PFC Wilson. How could he possibly know what the mechanic had done? He also failed to see that changing mechanics in mid task was a potential hazard. Taken individually, these hazards may not seem to amount to much, but cumulatively, small, seemingly insignificant actions can lead to improper decisions and more critical actions. The TI should have immediately noted that the inexperience of PFC Wilson was a primary hazard.

The TI could have placed several controls on PFC Wilson to ensure he completed the task properly. The mechanic's inexperience was not a reason not to do the task but simply a warning to the supervisors to watch carefully and control his actions. The TI should have made absolutely sure PFC Wilson used the manual on site and reminded him to make the appropriate logbook entries. And he could have had one of the other mechanics work with PFC Wilson to guide him through the task properly. Failing to apply any controls before signing off the work the inexperienced mechanic had performed and his decision to sign off the work without seeing write-ups was not in accordance with the standards. The TI failed to accept the responsibilities placed on him to ensure quality work was accomplished and the aircraft was safe to fly. Don't think this couldn't happen. It did happen!

Mechanic. PFC Wilson failed to realize that not using the manual while performing the repack was a hazard. He thought he could do it without the book. He also failed to understand that not completing logbook entries created a hazard for the person who tried to complete his task after he was pulled away to do another job.

Individual responsibility

Discipline* is *doing the right thing without supervision. And individuals can apply risk management procedures through self-discipline. If you know the standard, perform to the standard. If you do not know the standards, find out what they are. Soldiers should know their capabilities and limitations. If assistance is needed, ask for it. Following by-the-book procedures is a simple control measure for all individuals, regardless of the task being performed. Applying the risk-management process to everyday situations is one means of helping ensure that the right decisions are made regardless of whether we're in the planning or execution phase of a task or mission.

Summary

Risk management is not conducted only during planning and is not performed only by leaders and primary staff officers. Although we hold leaders responsible and accountable for running their organizations, safe mission accomplishment depends on individual soldiers accepting responsibility for risks associated with hazards discovered at their particular level. Only when every individual soldier makes decisions on the spot to manage risks as they occur during the task will an organization function as safely and efficiently as possible.

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Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in January 2015.

Utility helicopters

H-60

-A series. Aircraft crashed just off the runway while on return flight to home station following a training mission. Crew was evacuated for nonlife-threatening injuries. (Class A)

-L series. Crew experienced a TGT over-temp condition (996.5°C/3sec) during engine-shutdown. Engine replacement anticipated. (Class C)

-L series. Crew experienced a TGT over-temp condition during engine-shutdown in conjunction with rotational training. Maintenance inspection confirmed requirement for engine-replacement. (Class C)

-M series. Crew was conducting 'restricted visibility' landing training to a local LZ when the aircraft main rotor system made contacted a 'small cropping' of birch trees. Crew performed a precautionary landing and post-flight inspection revealed damage to all four MRB tip-caps and de-lamination damage. (Class C)

Observation helicopters

OH-58D

-Post-flight inspection revealed tail rotor paddle damage associated with a tree strike. Engine data assessment ruled out associated sudden-stoppage damage.(Class C)

H-6

- Aircraft was witnessed to be spinning out of control prior to contacting a tree and coming to rest on its left side. (Class A)

Fixed Wing

UC-35B

-Crew experienced an engine-exceedance warning while in flight. Post-flight maintenance confirmed #1 and #2 N1 exceedances (103.5%/11sec and 107.9%/19sec, respectively). (Class C)

The purpose of realistic training is to produce combat-ready aircrews and equipment. A smoking hole does neither. The resources lost or destroyed on the way to the battle cannot favorably influence the outcome.

If you have comments, input, or contributions to Flightfax, feel free to contact the Aviation Directorate, U.S. Army Combat Readiness Center at com (334) 255-3530, DSN 558-3530

U.S. ARMY

COMBAT READINESS CENTER

Online newsletter of Army aircraft mishap prevention information published by the U.S. Army Combat Readiness Center, Fort Rucker, AL 36322-5363. DSN 558-2660. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Flightfax is approved for public release; distribution is unlimited.

Number 47 March 2015

Flightfax®

Online newsletter of Army aircraft mishap prevention information

Operating in degraded visual environment (DVE) flight conditions is incredibly challenging even for the best trained and most proficient aircrews. Since the initiation of combat operations in 2002, the loss of situational awareness (SA) or spatial disorientation (SD) within a degraded visual environment has accounted for 24% of our aviation Class A mishaps and 44% of our fatalities. Given the circumstances surrounding two of the Class A mishaps in early 2015, USACRC is highlighting the importance of properly executing an Inadvertent IMC transition when the aircrew loses visual reference with the ground. The improper transition into instrument meteorological conditions contributed to one mishap in FY15 and is suspected in the second with the end result of two aircraft destroyed and eleven fatalities.

The Aircrew Training Manuals outline the task, conditions, and standards to "Respond to Inadvertent Instrument Meteorological Conditions" in Task 1184 with the first step of this emergency being "Announce IMC, maintain proper aircraft control, immediately make the transition to instrument flight, and initiate immediate climb." The flight control sequence for this task that has been drilled into every pilot's head for this contingency is to level the wings, maintain heading and turn only to avoid known obstacles, adjust torque as necessary for a climb, trim the aircraft as necessary, and adjust the airspeed. There are two considerations for the execution of this emergency procedure (and, yes, we should treat this as an emergency).

The first consideration is are the pilots sufficiently trained in their basic instrument procedures so that they can "maintain proper aircraft control." The unplanned entry into IMC conditions rarely occurs in straight and level flight, and will require the pilot on the controls to adjust attitude, pitch, trim and power almost simultaneously to establish a level climb attitude. Without consistent practice in the aircraft or in the simulator, this skill is perishable and will make the recovery back to a level attitude more difficult. The longer it takes a pilot to recover the aircraft, the less of a chance the aircrew has to survive the transition into IMC.

The second consideration is are the pilots prepared to deal with the effects of spatial disorientation. The rapid loss of visual reference combined with the motion of the aircraft during the recovery will induce varying degrees of visual and vestibular disorientation. As stated in the ATM task, the pilot on the controls must transition to the instruments without delay, in order to use the attitude indicator and other flight instruments as the primary means for spatial orientation. Failure to execute this portion of the task quickly and accurately will result in the loss of aircraft control.

The real conversation isn't whether the pilot can properly execute the ATM task, but the decision making process and judgment of the aircrew that placed them into the dangerous circumstance of having to execute an inadvertent transition into IIMC in the first place. It fundamentally boils down to the pilot in command maintaining the flight visibility that is approved by the final mission authority. If the weather conditions deteriorate, the pilot in command must either terminate the mission (land the aircraft, transition to IIMC, or recover VFR back to the

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airfield) or they must seek the approval by the appropriate final mission approval to operate with a higher level of approved risk. It is this fundamental decision making concept that we as a profession are slow to learn.

The very first improper transition to IIMC mishap recorded in the USACRC occurred in 1972, and the findings stated that "THE ACCIDENT INVESTIGATION BOARD'S RECOMMENDATIONS ARE TO INSURE THAT ALL PILOTS KNOW AND ADHERE TO THE PROPER PROCEDURES FOR ENCOUNTERING INADVERTANT IMC AND TO BRIEF ALL PILOTS ON THE HAZARDS AND PECULARITIES OF FLYING MOUNTAINOUS TERRAIN. SPECIAL EMPHASIS MUST BE PUT ON ADHEREING TO PROPER PROCEDURES." Forty three years ago we identified that making good decisions necessary to comply with our minimum weather minimums would help prevent this type of mishap.

Let us not wait another 43 years to implement these lessons. Until next month, fly safe and manage your risk levels!

COL Mike Higginbotham
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U.S. Army Combat Readiness Center
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Manned Aircraft Class A – C Mishap Table as of 30 Mar 15

	Month	FY 14					FY 15			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	0	0	2	0		0	1	3	0
	November	3	0	5	0		2	0	1	2
	December	1	0	3	0		1	1	2	0
2nd Qtr	January	2	2	4	4		2	0	5	0
	February	1	0	3	0		0	0	0	0
	March	0	3	0	0		2	1	8	11
3rd Qtr	April	1	1	5	0					
	May	3	1	2	2					
	June	2	0	6	0					
4th Qtr	July	2	0	5	0					
	August	0	0	0	0					
	September		1	2						
	Total for Year	15	8	37	6	Year to Date	7	3	19	13

Class A Flight Accident rate per 100,000 Flight Hours

5 Yr Avg: 1.31	3 Yr Avg: 1.25	FY 14: 1.42	Current FY: 1.81

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STANDARDIZATION COMMUNICATION
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AVIATION STANDARDIZATION
DIRECTORATE OF EVALUATION AND STANDARDIZATION, USAAVNC, FT. RUCKER, AL 36362

DES Flashback: STACOM 10 published 8 December 1976

THE REALITIES OF INADVERTENT IMC

"If inadvertent IMC is encountered climb to 2,000', contact range control on FM 30.8.“
“Descend immediately to regain VMC when IMC conditions are experienced."
“Inadvertent IMC flight is prohibited at all times."

The above are not excerpts from some inadvertent IMC plans currently in existence - they are the plans. They also represent the attitudes that cause inadvertent IMC to be Army aviation 's number-one killer. No matter how much we wish to ignore the possibility of encountering inadvertent IMC or rationalize that it really doesn't exist at all - "people shouldn't attempt VMC flight when the weather is marginal" - it still happens, generally with catastrophic results. The question is why? Why does an instrument-qualified aviator flying an instrumented aircraft lose control under these conditions when he has obviously demonstrated skill in instrument flight by obtaining the qualification? The answer to this lies primarily in one significant difference between deliberate and inadvertent IMC flight - PLANNING. The pilot undertaking a deliberate instrument flight has studied the weather, thoroughly charted the route, computed fuel requirements, has all the necessary navigation publications, and has a clearance from ATC to cap it off. He knows exactly where he's going and how to get there. Inadvertent IMC, on the other hand, is an unplanned event occurring generally at low airspeed and low altitude, with the crew totally unprepared for instrument flight. Psychologically, it's a nightmare.

The pilot fears the consequences of blundering into the ATC system without a clearance, is probably unsure of his position, and very likely does not have instrument navigation charts available. Add to this the utter lack of a preplanned course of action for a safe recovery and disaster is virtually assured. So to answer the question of why the pilot lost control-he didn't-he never attempted to control the aircraft, only tried to return to VMC - generally in a diving l80-degree turn, terminating in a high speed ground impact. What can be done about this? To begin with, the pilot has to be convinced that a system insuring his safe recovery has been established; therefore, each installation with aircraft assigned must develop a simple, *workable* IMC recovery plan. Keep in mind the pilot will have to memorize the altitude to which he is to climb, the facility to contact and the recovering

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airfield, so keep these immediate actions as straight forward as possible. Additional details such as frequencies, en route fixes, lost communication procedures, etc., must also be made available to the pilot in the form of a local publication permanently carried in the aircraft. All of which brings us to the next point-aircraft and aircrew suitability. Although both civilian and military aviators have tried unsuccessfully for years to disprove this - you still can't fly instruments without instruments nor can you fly instruments when you can't interpret them - so before trying to hack marginal VMC be absolutely certain that both you and the aircraft are prepared for and capable of instrument flight.

The final and most critical consideration - aircraft control. Any survivor of an inadvertent IMC situation will attest to the startling suddenness of the encounter. There is simply no time for an orderly transition to instruments - as in an ITO - which very probably accounts for the fact that in the majority of the inadvertent IMC accidents, the pilot had made no apparent attempt to go to the gauges. Since an attempted immediate return to VMC is virtually a suicidal act, and the pilot has no instrument scan established, the situation is certainly grim - but far from hopeless.

In recognition of this very critical transition period, HQDA directed USAAVNC to develop an immediate action procedure which would enable the pilot to rapidly transition to instrument reference. The procedure developed, which is now DA policy, is a simple step-by-step technique, bringing the instruments into the pilot's scan in order of criticality as follows:

#1. ATTITUDE INDICATOR - level the aircraft. Quite obviously, the most important first step, as no following control input will achieve the desired response if the aircraft is not in a level attitude.

#2. HEADING INDICATOR - maintain heading. Turn only to avoid *known* obstacles. Don't compound things by getting vertigo.

#3. TORQUEMETER - adjust to climb power. Let's get away from the hard ground as fast as possible.

#4. AIRSPEED - adjust to climb airspeed.

#5. RECOVERY PROCEDURES - initiate only after transition to instrument reference is complete and the aircraft has reached a safe altitude. Don't distract yourself from the primary job of regaining control of the aircraft. Save the yelling for later or let the copilot do it.

Remember this above all else - **WHEN INADVERTENT IMC IS ENCOUNTERED, YOU MUST GO ON INSTRUMENTS. THERE IS NO OTHER OPTION.** An immediate landing or a 180 away from the weather will work only when you are still VMC - and, unfortunately, we have the fatalities to prove it.

The 50-50-90 rule: Anytime you have a 50-50 chance of getting something right, there's a 90% probability you'll get it wrong.

IIMC Accident Findings: From the Archives

FINDING (Present and Contributing: Human Error – Individual Failure): After encountering instrument meteorological conditions (IMC) while attempting a visual meteorological conditions (VMC) approach in a UH-60A at approximately 100 feet above ground level (AGL) and 30 knots indicated airspeed (KIAS), the pilot in command (PC) in the left seat and on the controls, encountered inadvertent instrument meteorological conditions (IIMC). The PC failed to properly scan by not directing his attention within the aircraft. That is, the PC did not immediately initiate IIMC recovery procedures upon entering IMC conditions during the approach and transition to instruments. The PC continued a VMC approach for several critical moments after encountering IMC, descending to an altitude of 80 feet AGL before finally attempting IIMC recovery procedures. As a result, the PC failed to maintain control of the aircraft. This delay in implementing IIMC recovery procedures allowed the PC to encounter Type I (unrecognized) spatial disorientation and allowed the aircraft to descend and accelerate, instead of climb. The aircraft was destroyed, one Soldier was fatally injured, and 12 Soldiers were injured.

FINDING (Present and Contributing: Human Error - Training, Leader and Individual Failure) While performing a multi-ship, day out, night vision goggle (NVG) return, with a simulated troop insertion, the pilot failed to maintain orientation in flight environments known to restrict visibility. That is, once the aircraft inadvertently entered instrument meteorological conditions (IIMC), the pilot on the controls induced a spatially disorienting condition when he failed to cross-check instruments and arrest his bank angle after changing heading 20 degrees. This failure caused the aircraft to develop an unusual attitude which became unrecoverable. The aircraft crashed and the three crew members received fatal injuries.

FINDING (Present and Contributing: Human Error - Suspect Individual Failure and Training Failure): While conducting a daytime, two-aircraft general support mission, the crew of a CH-47D (Chalk 1) failed to maintain orientation and aircraft control. That is, after inadvertently encountering instrument meteorological conditions (IIMC), the crew lost control of the aircraft and crashed. The aircraft was consumed by the post-crash fire. The crew and all passengers received fatal injuries. The Board suspects the crew was overconfident in their ability to continue flying in the reduced visibility. They attempted to continue the mission even though visibility was less than the one mile approved for the mission. Previously that day they had successfully found areas of increased visibility and were able to continue the mission. The Board suspects these previous successes caused the crews to think they could find better visibility as they had done earlier in the mission.

FINDING (Present and Contributing: Human Error - Individual and Training Failure) While performing terrain flight during a night vision system (NVS) proficiency flight evaluation, the AH-64D pilot (PI) on the controls in the back seat failed to detect deteriorating weather conditions. That is, he did not recognize the adverse weather conditions until queried by the instructor pilot (IP). This delay reduced the time for the crew to react to the critical situation. As a result, the crew could not recover the aircraft prior to impact with trees. The aircraft was destroyed and consumed in a post-crash fire. Both crewmembers sustained minor injuries. The PI's actions were the result of overconfidence in his own abilities and inadequate hood and weather training. That is, his overconfidence in his own abilities to fly the aircraft using the NVS did not allow him to adequately diagnose and respond to the deteriorating weather conditions. His inadequate training is reflected by his having only 5.9 hours of hood and weather training in recent years. Additionally, the PI did not announce "IIMC," transition to the aircraft flight instruments, and begin instrument meteorological conditions (IMC) recovery procedures.

Mishap Review: UH-60 night unaided IIMC

During the conduct of a night unaided takeoff from a civilian airfield, the UH-60A encountered inadvertent IMC conditions. While attempting to return to the runway the aircraft descended and impacted the ground resulting in major damage to the aircraft and minor injuries to the crew.

History of flight

The scheduled training mission was an afternoon IFR flight to a regional airport with a scheduled stop for refuel, then an unaided VFR return to home base to pick up a crew chief and continue with a NVG training period. The crew reported for duty at 1000 hours local, conducting initial flight planning and preparation. Preflight was conducted at 1130L followed by final mission planning. The scheduled takeoff time was delayed one hour due to weather. The mission was briefed as moderate risk due to weather and approved at the appropriate level.

The aircraft departed home station at 1452L and flew to the regional airport without incident, arriving at 1554L. The aircraft and crew experienced no issues on the initial leg. The aircraft was shut down and refueled. At 1746L, following engine runup, the crew called for taxi for the VFR flight home. Weather at the time of departure was winds 310 degrees at 6 knots, visibility two and one-half statute miles with mist, few clouds at 1,400 feet, temperature 11, dew point 10 and altimeter 29.94. Sunset was 1708L with no illumination.

At 1752L the aircraft received takeoff clearance and departed for the night unaided return to home base. On departure, the aircraft inadvertently flew into a layer of fog while still over the runway. The pilot on the controls applied aft cyclic putting the aircraft into a 30 degree pitch up attitude while he reduced collective to slow the aircraft. Attempting to return to the airport, the pilot started a descending right hand turn. The aircraft struck the ground 22 seconds after takeoff with a 30 degrees nose high attitude, 30 degree right angle of bank and a right lateral drift coming to rest on its right side. The crew received minor injuries.

Crewmember experience

The PC, sitting in the left seat, 2,100 hours of total time, 1,000 in the UH-60, 109 hood/weather, and 44 night unaided. The PI, operating from the right seat, had over 800 hours of total time, nearly 750 hours in the UH-60, 64 hood/weather, and 15 night unaided. There were no additional crewmembers.

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Commentary

The accident board determined that after flying into a layer of fog with the landing light on, the pilot on the controls in the left seat lost orientation with outside visual references and failed to properly respond to inadvertent instrument meteorological conditions (IIMC). Additionally, there was a lack of positive communication between the pilots in that the PC failed to announce that he had entered IIMC, thus limiting the PI's awareness of the severity of the situation as they turned back toward the airfield.

What do the stats show

Human error is the leading cause factor in accident events.

Flight Mishap Rate FY05 – 14 (Ten years)

Total FY 2005 -2014 manned flight and flight-related mishaps

Hours flown: 11.6 million

CLASS A (202) Cause factor

Human Error :	165 (82%)	Rate/100K: 1.42
Materiel Failure:	32 (16%)	Rate/100K: 0.27
Environmental:	1 (0.5%)	Rate/100K: 0.01
Unknown:	4 (2%)	Rate/100K: 0.03
Overall	202	Rate/100K: 1.74

CLASS A - C (1003) Cause factor

HE:	768 (77%)	Rate: 6.60
M:	144 (14%)	Rate: 1.24
E:	54 (5%)	Rate: 0.46
U:	37 (4%)	Rate: 0.32
	1003	Rate: 8.62

Flight Mishap Rate FY10 – 14 (Five years)

Total FY 2010 - 2014 manned flight and flight-related mishaps

Hours flown: 5.8 million

CLASS A (80) Cause factor

Human Error :	61 (76%)	Rate/100K: 1.05
Materiel Failure:	16 (20%)	Rate/100K: 0.28
Environmental:	0	
Unknown:	3 (4%)	Rate/100K: 0.05
Overall	80	Rate/100K: 1.38

CLASS A - C (442) Cause factor

HE:	334 (76%)	Rate: 5.75
M:	57 (13%)	Rate: 0.98
E:	20 (5%)	Rate: 0.34
U:	31 (7%)	Rate: 0.53
	442	Rate: 7.61

Flight Mishap Rate FY05 – 09 (Five years)

Total FY 2005 - 2009 manned flight and flight-related mishaps

Hours flown: 5.8 million

CLASS A (122) Cause factor

Human Error :	104 (85%)	Rate/100K: 1.78
Materiel Failure:	16 (13%)	Rate/100K: 0.27
Environmental:	1 (1%)	Rate/100K: 0.02
Unknown:	1 (1%)	Rate/100K: 0.02
Overall	122	Rate/100K: 2.09

CLASS A - C (561) Cause factor

HE:	434 (77%)	Rate: 7.44
M:	87 (16%)	Rate: 1.49
E:	34 (6%)	Rate: 0.58
U:	6 (1%)	Rate: 0.10
	561	Rate: 9.62

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[Views expressed are to generate professional discussion and are not U.S. Army or USACR/SC policy]

Inadvertent IMC

Although both civilian and military aviators have tried unsuccessfully for years to disprove this - you still can't fly instruments without instruments nor can you fly instruments when you can't interpret them - so before trying to hack marginal VMC be absolutely certain that both you and the aircraft are prepared for and capable of instrument flight.

Not sure where I picked up that illuminating information but it remains as true today as 40 years ago. We've been stressing the degraded visual environment (DVE) and the effects of operating in those conditions, and yes, flying in marginal weather falls into that category. IIMC is not as insidious as operating in the low contrast - low illumination - no horizon situation because, for the most part, you see it coming. That wasn't always the case.

Because successful IIMC recovery events are not tracked, it is difficult to determine how often they occur. Accidents, on the other hand, are better documented. Looking back through the last four decades a couple of things stand out. In the 70's to mid-80's a typical case would involve a crew flying VFR at night in poor weather and entering IMC conditions. Spatial disorientation would occur and the aircraft would crash. These type of events were described as the most deadly killer in the aviation force. There could be a couple of catastrophic incidents a year. Remember folks, during that timeframe, they were flying night unaided.

Enter the aided night flying regime which continues to present day. In the 90's and first 10 years of this century the total number of Class A mishaps dropped by 50% but there was no drop in the number of marginal weather related mishaps with an average of over one a year. Early fears when operating under NVDs were that the crews would push the envelope in operating in bad weather because it would be easier to maintain visual contact with the environment (see through the obscurants) until suddenly the crew would be confronted with an abrupt end to visuals and have to transition to instruments. I'm sure to an extent that is true.

The last five years have shown a decrease in IMC related mishaps. Better aircraft, better weather forecasting and active mission risk mitigation has contributed greatly to this decline. But they still happen. Operating in marginal weather is more than inadvertently punching into the weather and making a recovery. Before the punching in, that same weather often pushes an aircrew into an operating environment that was not planned. Getting lower to stay below the clouds and to maintain visual contact with the ground brings new hazards into play – wires, towers, and other obstructions that would be less of a hazard with a few hundred feet of altitude.

IIMC is an emergency situation. Most emergencies will give you a caution light when it presents itself. A chip light comes on and you know what to do. But what's your caution light for IIMC? A good trigger point is the briefed ceiling and visibility. When it reduces to the minimum you are supposed to be operating at then your caution should illuminate. Start the plan for a safe landing area or turning around or your transition to IMC flight. Get the crew coordination going. Just like other emergency procedures, your training establishes how well you and your crew successfully respond to an event.

Speaking of training, what have you, your instructor pilots and unit overall done to optimize an aircrew's success when confronted with marginal weather? I'm sure once or twice a year each pilot

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has an instructor pilot evaluate an unusual attitude recovery by having the pilot bend over in the seat, close their eyes, then wiggles the sticks and announces "recover!" You may even get to follow that up with an instrument approach. How about throwing a little innovation into the training. Set up marginal weather scenarios in the simulators with conditions that deteriorate progressively so crews have to hit their trigger points and make decisions ahead of the curve. Or block some airspace in the training area, put a pilot under the hood and have them simulate encountering lowering conditions. When ready, make them land, turn around or do a smooth transition to a simulated IMC recovery. How about doing it with a flight of five or 10? There are many variations to the types of training that could be included.

Additionally, there is a new player in town for the Black Hawks and Chinooks with the new digital multi-functional display cockpits. An aviator transitioning from the old 'steam' gauges found on the UH-60A/L or the CH-47D may need a little more time and experience to make the adjustment to multi-functional displays. Your crosscheck with the old gauges will be different from the new. Just out of the UH-60M or CH-47F transition might not be the time to be flying in the worst of the VMC weather because a crew's limited exposure to the MFDs may not be enough to comfortably operate in those circumstances, especially if an emergency type situation such as inadvertent IMC occurs. For your proficiency, add a few more unusual attitude recovery training events and practice using the new aircraft systems previously unavailable in older airframes.

One more thing. If you find yourself inadvertent at low or no airspeed and you've leveled the wings but still have a rotating course indicator – neutralize your pedals. It's difficult to maintain a heading with a pedal input causing a turn. **Jon Dickinson, Aviation Directorate**

UAS Class A – C Mishap Table as of 30 Mar 15

	FY 14					FY 15			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	6		3	9	W/GE				
MQ-5	1	1		2	Hunter	1		1	2
RQ-7		12	11	23	Shadow		2	3	5
RQ-11			1	1	Raven			1	1
RQ-20			1	1	Puma				
YMQ-18									
SUAV					SUAV				
UAS	7	13	16	36	UAS	1	2	5	8
Aerostat	3	2	3	8	Aerostat	0	1	0	1
Total for Year	10	15	19	44	Year to Date	1	3	5	9

Unplanned doesn't have to be unprepared

The Army is still losing personnel and equipment because of unplanned flight into instrument meteorological conditions (IMC). While the number of mishaps from this cause has decreased substantially over the past few years, we can still expect at least two or three a year.

These mishaps are almost always catastrophic, resulting in fatalities, injuries, and destroyed aircraft. All six aircraft involved in IMC mishaps over the past 2 years were destroyed. Eight people were killed and 12 injured. Only one of the pilots and copilots had more than 600 flight hours. This was a UH-60 pilot with approximately 1,000 hours. **Four of the six** mishaps involved **supervision.**

In two separate incidents, OH-58 pilots were the only crewmembers on board when their aircraft entered IMC. One of the OH-58 pilots took off from a field site at night to fly to the airfield because weather conditions were rapidly deteriorating. A field training exercise was just about over, and the unit commander wanted to avoid another night in the field. **This was the first time the pilot had flown at night without a copilot.**

Weather conditions at the time of departure were within the guidelines for VFR flight, and the airfield was only a few miles away. Shortly after the OH-58 pilot took off, the aircraft entered a fog layer and was then seen emerging from the top of the fog layer in a climbing turn, as required by vertical helicopter IFR recovery procedures. While following this procedure, the pilot apparently decided to try to return to low-level visual flight conditions. The OH-58 was seen at a low altitude in a right descending turn just before it crashed. The pilot was killed.

The other OH-58 pilot who was flying without a copilot was also on a night VFR flight. En route to the unit field site, he had to go through an airfield control zone. Unable to find the field site because of an overcast condition and lack of ground reference lights, the pilot began flying in left orbits, searching for the site. About 2 minutes later, the pilot entered instrument meteorological conditions. **The tower operator did not tell the pilot that the weather had deteriorated to IMC.** The pilot tried to maintain control of the aircraft and started to climb to a higher altitude. He was unable to maintain or establish control as the aircraft banked left and right several times. The OH-58 hit the top of a tree and crashed. **The pilot had no documented Instrument training In the OH-58 and no actual Instrument flight in IMC anytime in his aviation career.**

A UH-1 pilot, also flying without a copilot, was on a medevac mission. After overflying the pickup point, the pilot began a right descending turn to land. During the approach, a heavy rainstorm severely reduced his visibility and he became spatially disoriented. The aircraft continued to descend, and the main rotor blades hit a large tree. The UH-1 crashed through the trees and came to rest on its left side. **The detachment commander authorized the mission to be flown with only one pilot on board.**

Another UH-1 crashed as it was being moved from a field site to an airstrip. The ceiling was estimated to be below 100 feet, and visibility was limited due to darkness and clouds. **The air mission commander had directed that five aircraft be repositioned to the airstrip in weather conditions less than those prescribed for VFR flight.** When the UH-1 pilot picked his aircraft up above the trees, it entered clouds. The low-time pilot became disoriented, and the aircraft was seen in a left turn which continued until impact on a ridgeline. The pilot, copilot, and crew chief were killed.

Continued on next page

Four people were killed and six seriously injured when a UH-60 crashed while flying through fog. Two UH-60s were transporting troops. The weather began to deteriorate about 20 minutes after takeoff. The aircraft were flying low level through valleys and over rising terrain. The flight leader told the No.2 pilot to drop back and **he would try to find a route through the fog.** When radio contact could not be made with the flight leader, the No.2 pilot reversed course, crossed over into a parallel valley, and proceeded to destination.

The crew of the No.1 aircraft lost visual reference because of the fog and tried to transition to instrument flight. Before they could do so, the main rotor blades hit a large tree and the aircraft crashed almost inverted.

Supervision played a part in the crash of an AH-1 whose pilot flew into IMC. As a flight of four Cobras started through a mountain pass, a low cloud cover caused visibility to decrease substantially. The flight leader thought they should turn back, **but the platoon leader, who was in one of the other aircraft, urged him to go a little further.** The flight leader continued on, became disoriented, and lost his composure. The aircraft hit the side of a hill, injuring both occupants.

Although unplanned entry into IMC can occur at any altitude, the most critical is close to the ground or obstacles such as mountains, trees, or buildings. The difference between planned and unplanned entry into IMC is usually dramatic because of several factors. Unplanned entry into IMC is unexpected, requires immediate transition to instrument flight, and usually causes the pilot to become extremely anxious about the possibility of a collision with the terrain or some other object. Unplanned entry can result in poor cockpit coordination, jerkiness on the controls, and poor instrument scan.

The briefing before the flight usually focuses on who will do what in the event of an emergency, such as an engine failure. The crew should also discuss what each will do in case of unplanned entry into IMC. During the flight, the crew should be mentally prepared for the possibility of entering IMC and know exactly the steps they will take if this should happen.

The 5 Cs

Successful transition from visual meteorological conditions to instrument meteorological conditions requires the logical application of a step-by-step procedure to avoid loss of control, confusion, and a catastrophic mishap. An inadvertent IMC procedure was developed several years ago. Labeled the 5 Cs - control, coordination, clearance, course, and call-this procedure gives the pilot something to follow when confronted with inadvertent IMC.

The 5 C procedure Is a fast acting antidote to confusion and anxiety during the first 10 to 15 seconds after IMC penetration. It is during the first few seconds that the battle with inadvertent IMC is won or lost. If aircraft control can be maintained during this initial crucial period, the chances of surviving an IMC experience are greatly enhanced. Whether or not all 5 Cs will apply in each IMC circumstance will depend on existing conditions, e.g., terrain, obstacles, etc. The procedure is to be carried out in conjunction with and as a part of the unit vertical helicopter IFR recovery procedure plan.

1. **Control of the aircraft** is the most important factor in recovering from unplanned flight into IMC, so that is the first C. You must convince yourself ahead of time that should you enter IMC and lose ground reference, your only option is to immediately transition to instrument flight. Level the wings in the attitude indicator, maintain heading, adjust to climb power, and adjust to climb airspeed. Once you make the transition, control is established by crosschecking the flight instruments. If you fail to make this transition, you're in serious trouble. The four subsequent Cs depend on the successful accomplishment of the first C.

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2. The second C is Coordination. As we said earlier, before a crew begins a flight, they should discuss what each will do in case of unplanned entry into IMC. It should be understood that the pilot at the controls will concentrate on the instruments and the copilot will look outside.

3. Next comes Clearance. To insure that the highest terrain feature along the route of flight will be cleared, gain altitude with a straight controlled climb.

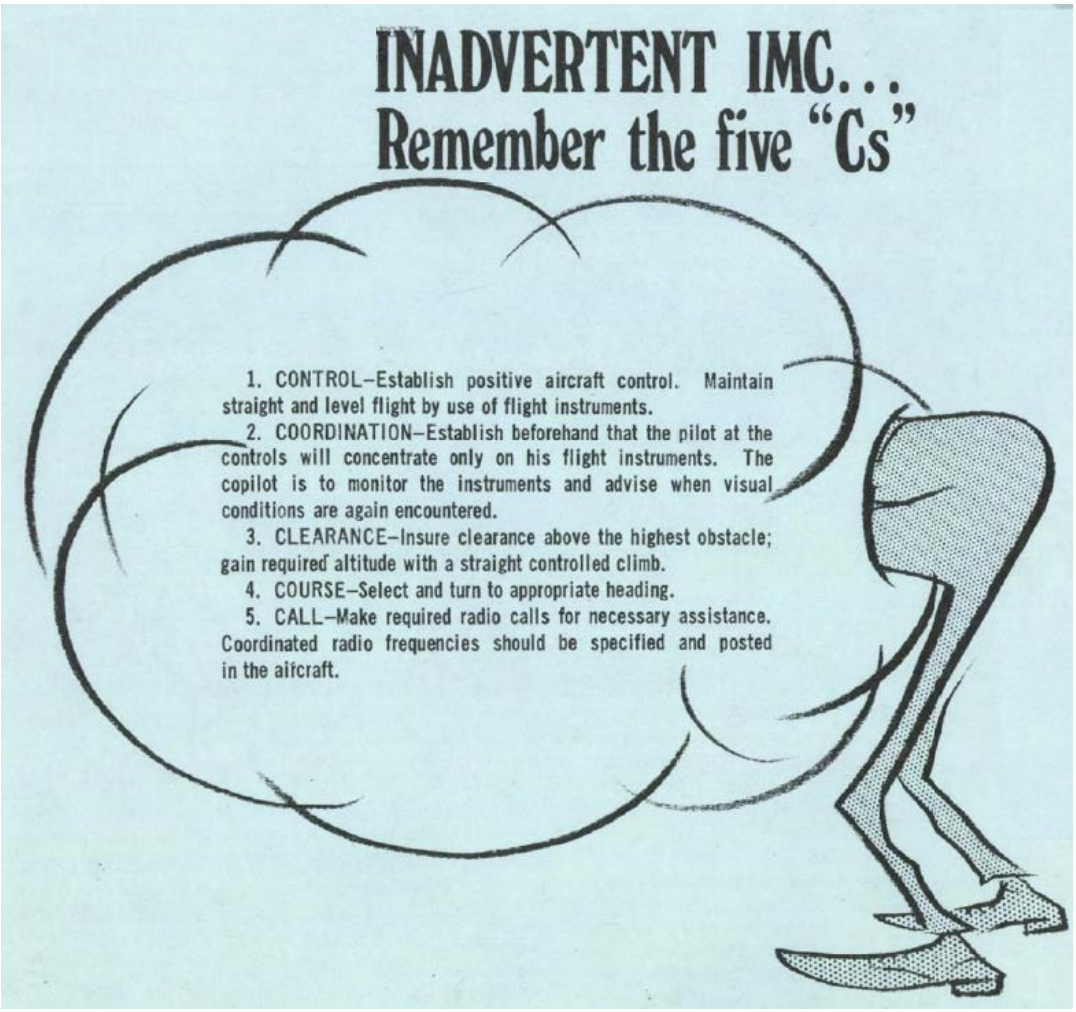
4. The fourth C is Course. Select and turn to the appropriate heading.

5. The last C is Call. Make required radio calls for assistance. Coordinated radio frequencies should be specified and posted in the aircraft.

FM 1-202, Environmental Flight, gives slightly different procedures to follow if enemy weapons are active and the terrain along the route rises rapidly.

Why have inadvertent IMC recovery plans when regulations specify certain weather minimums for VFR flight? We're certainly not advocating entry into IMC, and we know that the best approach is to land before entering IMC. But, as you can see from the mishaps for the past 2 years, pilots are sometimes forced to cope with instrument meteorological conditions.

Practice of the 5 Cs under visual meteorological conditions will boost your confidence in your ability to control the aircraft in IMC. Remembering the 5 Cs and being able to make them work may someday get you out of a bad situation.



Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in February/March 2015.

Attack helicopters

AH-64D

-After landing, crew heard a 'squealing' sound, followed by low hydraulic fluid indicators and a burning odor. Post-flight maintenance inspection revealed that the hydraulic pump had seized, resulting in transmission damage. (Class C)

-Aircraft experienced inadvertent BUCS-activation and a left yaw and spin during ground taxi for take-off. Crew/IP performed an emergency engine shutdown and arrested the spin. Post-flight inspection revealed damage to the aircraft as a result of 'rapid' spin action. (Class C)

Utility helicopters

UH-60

-M series. Flight of two aircraft reportedly experienced deteriorating weather conditions shortly after take-off for a night training mission. One aircraft impacted the water resulting in 11 fatalities. (Class A)

-A series. Aircraft stabilator made contact with the ground during an executed autorotation. (Class C)

Cargo helicopters

CH-47D

-Aircraft experienced a # 1 engine TGT exceedence (1100°C/12 SEC) during shutdown. (Class C)

Unmanned Aircraft Systems

RQ-7B

-Crew experienced multiple computer malfunction indications during flight and engaged the flight termination system. Recovery chute was deployed and the system was recovered with damage. (Class C)

-Normal take-off was aborted and aircraft was flown to the point of fuel starvation, at which point, emergency landing procedures were initiated and recovery chute deployed. Damage was sustained by the aircraft and payload during landing. (Class C)

-Crew experienced an engine-temperature spike during training flight and initiated the landing sequence. The recovery chute was deployed but the system contacted the ground nose first and sustained significant damage. (Class B)

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U.S. ARMY

COMBAT READINESS CENTER

Online newsletter of Army aircraft mishap prevention information published by the U.S. Army Combat Readiness Center, Fort Rucker, AL 36322-5363. DSN 558-2660. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Flightfax is approved for public release; distribution is unlimited.

Number 48 April 2015

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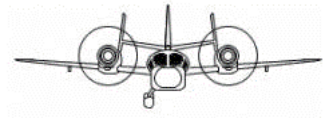

Online newsletter of Army aircraft mishap prevention information

This issue of *Flightfax* is the midpoint review of the FY15 mishaps. The goal of this issue is to learn the lessons of other pilot's mistakes so that we can reduce the number of accidents for the remainder of the fiscal year. The historic trend of human error causing more than 80% of our mishaps continues to be true with 6 of the 7 Class A's and 2 of the 3 Class B mishaps attributed to pilot error.

The midpoint Class A flight mishap rate is 1.53 which compares to the FY14 end of year rate of 1.52. This rate is higher than the three year average of 1.28 and above the 5 year average of 1.33. In real terms, we have had seven Class A mishaps resulting in thirteen fatalities (6x Army, 7x USMC). This mishap count is two lower than the number of FY14 mishaps (9) at the midpoint, but the number of fatalities are already higher now than the total number of aviation fatalities (6) for the entirety of last year. Within the six human error mishaps, four resulted from not executing basic ATM tasks to standard, three had individual failure/decision making errors, two occurred with standardization pilots conducting formal training, all six occurred at night, and three happened while operating in DVE. Of significant note, in 5 of the 6 human error mishaps there were failures in aircrew coordination that contributed to the mishaps.

The observation from USACRC is that the three broad concepts of standardization, risk management and aircrew coordination are inextricably linked. One way to think about this is that standardization is "how we perform the task", risk management is "should we perform the task," and aircrew coordination is the bridge between the two defined as the "cooperative interaction between crewmembers for the safe, efficient, and effective performance of flight tasks." In simpler terms, if we use all of the strategies within aircrew coordination, we will naturally improve our task performance and our risk management decision making.

Both risk management and aircrew coordination begin in the pre-mission planning phase. By applying the principles of risk management (as outlined in ATP 5-19), we identify the known hazards, apply the appropriate controls, and have the mission approved by a commander with the authority to accept the risk. Parallel to the risk management process, aircrew coordination is started by planning and discussing the crew level actions needed to accomplish the mission tasks and to implement the hazard controls directed by the commander. As stated in the Aircrew Training Manuals, this "involves the crew collectively visualizing and discussing expected and potential unexpected events for the entire mission. Through this process, all crewmembers discuss and think through contingencies and actions for difficult segments, equipment limitations and failures, or unusual events associated with the mission, and develop strategies to cope with possible contingencies (METT-TC)." So at this point the mission is planned, the hazards are identified, and the entire crew has discussed the detailed aircrew actions they will use during each phase of the mission.

Once in flight, both risk management and aircrew coordination are still used continuously to ensure the safe, efficient, and effective performance of flight tasks. These two decision making systems naturally go together. The aircrew uses the five steps of the risk management process over

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and over again to identify any unplanned hazards, which is then followed by the elements of aircrew coordination to communicate effectively and exchange mission information necessary to make the decisions on how to handle these emerging hazards. Once the crew determines "if we should do the task," then the aircrew coordination process bridges over to "how we perform the task" – the standardization part. The pilot on the controls flies the aircraft adhering to the standards and descriptions found in the ATM while the aircrew coordination process continues to work with the other crewmembers cross monitoring performance, providing situational aircraft and mission advisories, and by coordinating actions, events, and workloads. If another unplanned hazard is identified, then the risk management decision making process is restarted and again supported by aircrew coordination so that the crew can select another course of action that mitigates the new hazard.

Standardization errors, risk management decision errors, and aircrew coordination errors can all result in an aircraft mishap if not corrected. It is easy to think of these three broad concepts as separate and distinct, but they are much more effective when they are used together as part of the aircrew's continuous decision making process. When an aircrew collectively understands "if we should do a task" and "how we perform the task," and those decisions are managed using the cooperative interaction of aircrew coordination, then we will have all the tools necessary to begin reducing the number of human error accidents.

Until next month, fly safe and manage your risk levels!

COL Mike Higginbotham
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Manned Aircraft Class A – C Mishap Table as of 22 Apr 15

	Month	FY 14 Class A Mishaps	FY 14 Class B Mishaps	FY 14 Class C Mishaps	FY 14 Fatalities		FY 15 Class A Mishaps	FY 15 Class B Mishaps	FY 15 Class C Mishaps	FY 15 Fatalities
1st Qtr	October	0	0	2	0		0	1	3	0
	November	3	0	5	0		2	0	1	2
	December	1	0	4	0		1	1	2	0
2nd Qtr	January	2	2	4	4		2	0	5	0
	February	1	0	3	0		0	0	0	0
	March	0	3	0	0		2	1	9	11
3rd Qtr	April	1	1	7	0					
	May	4	0	3	2					
	June	2	1	7	0					
4th Qtr	July	2	0	5	0					
	August	0	0	1	0					
	September		1	5	0					
	Total for Year	16	8	46	6	Year to Date	7	3	20	13
	Class A Flight Accident rate per 100,000 Flight Hours									
	5 Yr Avg: 1.33		3 Yr Avg: 1.28			FY 14: 1.52			Current FY: 1.53	

Preliminary Report on 1st Half FY15 Aircraft Mishaps

In the **manned aircraft** category, Army aviation experienced 29 Class A - C aircraft accidents the first half of this fiscal year. These mishaps resulted in 13 fatalities. Seven of the accidents were Class A, three were Class B, and 19 were Class C. For comparison, the first half of FY14 had 30 Class A – C aircraft accidents – seven Class A (four fatalities), five Class B, and 18 Class C.

For the first half of FY15, six of the seven Class A mishaps and two of the three Class B mishaps were the result of human error (80%) with one Class A unknown/not yet reported and one Class B materiel failure. All of the seven Class A and one of the B mishaps occurred at night. One Class B materiel failure was reported (main rotor blade failure in flight). There were two bird strike Class C mishaps. Two of the 10 Class A and B mishaps occurred in OEF/Iraq.

Operations in degraded visual environments were contributing factors in three Class A mishaps. Additionally, there was one Class A C-27 mid-air collision.

	Class A	Class B	Class C
H-60	4	2	9
AH-64	1	0	3
H-47	0	0	1
OH-58D	0	0	1
LUH-72/Mi-17	0	0	1
TH-67/OH-58A/C	0	1	0
H-6	1	0	1
Fixed Wing	1	0	3
Total	7	3	19

Synopsis of selected Class A accidents (Oct – Mar 15). (N/NVD) denotes night/night vision device mission:

Manned Class A

-AH-64D (NVS). Crew was conducting DECU lockout training when both engines increased to the over-speed protection limit and shut down. Aircraft crashed. Two fatalities.

-H-6 (NVG). Aircraft contacted trees en route to laager site. Cause not yet reported.

-H-60A (N). Aircraft crashed just after take-off trying to return to the airfield after encountering fog. Class A damage reported. Crew received minor injuries.

-C-27J (NVG). Aircrew was conducting a training flight when the aircraft made contact with a C-130 at 1,500 feet MSL.. Both crews were able to land their aircraft.

-H-60M (NVG). While conducting dust landing training, main rotor blade contacted and severed tail rotor driveshaft. Aircraft landed hard.

-H-60A (NVG) Aircraft developed a right spin when picked up to a hover with main rotor blades contacting T-barriers. Hydraulic line to #1 hydraulic pump found disconnected.

-H-60M (NVG) Flight of two reportedly experienced reduced weather conditions shortly after take-off for a NVG training mission. One aircraft impacted the water causing 11 fatalities.

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In the **unmanned aircraft systems** for the first half FY15, there were eight Class A–C incidents with one Class A, two Class B, and five Class C mishaps (total eight). For the same time period in FY14 there were three Class A, five Class B, and seven Class C mishaps (total 15). The single FY15 Class A was a MQ-5B Hunter. The two Class B mishaps were RQ-7B Shadows and the five UAS Class C mishaps included three RQ-7Bs, one MQ-1C, one MQ-5B, and one RQ-11A Raven.

	Class A	Class B	Class C
MQ-1	0	0	0
MQ-5B Hunter	1	0	1
RQ-7B Shadow	0	2	3
RQ-11 Raven	0	0	1
RQ-20A Puma	0	0	0
Total	1	2	5

Synopsis of the UAS Class A mishap (Oct 14 – Mar 15):

UAS Class A

-MQ-5B. System struck the arresting gear drum during landing to the airstrip. The main landing gear separated. Potential total loss.

UAS Class B

-RQ-7B. UA was on final approach at approximately 30' AGL when it lost power and crashed onto the runway.

Aerostat. There was one reported loss of an aerostat. The crew was attempting to lower the aerostat for impending weather when the tether broke. System was deemed a loss after failed attempts to track/locate.

UAS Class A – C Mishap Table									as of 22 Apr 15
	FY 14					FY 15			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	6		3	9	W/GE				
MQ-5	1	1		2	Hunter	1		1	2
RQ-7		12	11	23	Shadow		2	3	5
RQ-11			1	1	Raven			1	1
RQ-20			1	1	Puma				
YMQ-18									
SUAV					SUAV				
UAS	7	13	16	36	UAS	1	2	5	8
Aerostat	3	2	3	8	Aerostat	0	1	0	1
Total for Year	10	15	19	44	Year to Date	1	3	5	9

A New Mission Brings New Focus

Chief Warrant Officer 5 Jim Strine
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
Fort Rucker, Ala.
Eastern Flight Standardization Branch Chief

After more than a decade of focusing on standardization and assistance to the active component CABs as they prepare for and fight the war, MG Lundy charged the Directorate of Evaluation and Standardization (DES) with a new mission. He wants us to get back to regular assessments of both the active and reserve components of Army aviation. For those of you who were around in the 1980's or 1990's, this does not mean a return to the DES of "yesteryear." The goal is to emphasize and promote safe, standard, training policies and practices across all Army components.

Many Army National Guard aviation (ARNG) units encountered DES while deployed down range in Iraq and Afghanistan. Those assessments were conducted in relation to the theater and CAB SOPs and policies for which the unit was deployed. This new directive will bring the Directorate to ARNG aviation units while in garrison. Assessments will focus on the SOPs and policies of the unit, its support facilities, and the state.

To accommodate the unique structure of ARNG aviation, the Directorate designed a flexible base model for assessments. The eight day model starts on Monday, proceeds through drill weekend, and concludes with an out-brief on the following Monday. After the initial in-brief on Monday, the assessment begins with the ARNG aviation support facility (AASF). The AASF portion of the assessment will focus on flight operations, facility and supported unit programs, facility and supported unit SOPs, CAFRS and/or IATF/IFRFs, and evaluations of full time AGR and technician personnel. All crewmembers, including those arriving for drill weekend, will be administered a written evaluation, preferably Friday evening. The focus on Saturday and Sunday will be flight, oral and written evaluations of the M-Day Soldiers.

DES is working with the National Guard Bureau Aviation and Safety Division (NGB-AV) to schedule assessments. The State ARNG Aviation Officer (SAAO) and brigade commander will be notified as early as possible of the upcoming assessment. We would like to see the unit conduct a MUTA-5 during the assessment to facilitate event scheduling, however, a MUTA-4 is acceptable. As the schedule is developed, final coordination with the state will determine the best week for the assessment to prevent unnecessary burden on the unit.

DES will contact the state approximately 90 days from the assessment date to gather POC information for commanders, and key standardization and safety personnel. This also marks a period of key information exchange as we prepare for the assessment; we will request the current SOP's and policies of the AASF and supported units, and provide POCs with demographic templates to complete and return. New SOPs are not required! Send the SOP that is being used. Complete the demographics completely and accurately, without changing any fields, to enhance evaluation scheduling and prevent unnecessary effort during the assessment. Flight schedules will be developed with appropriate POCs after the demographics are complete.

The following trend data can be used as guide to prepare for a DES Assessment. Data presented is compiled from both DES assessments and ARMS inspections, and is not intended as a comprehensive list. It is a discussion of recurring, common issues found across all ARNG units who have completed some type of assessment or inspection.

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SOP is an area of particular focus for several reasons. ARMS data indicates ATP SOPs are improving drastically, and recent DES assessments revealed units do have comprehensive SOPs. In fact, years of deployment and operations under other unit SOPs has positively influenced the content of all SOPs. But there are still some issues. An ARNG battalion in garrison may consist of companies comprised of several different airframes, each aligned with different "war time" headquarters. This has driven companies to operate on their own SOP, which creates standardization problems within the battalion. Another issue with a company SOP is the level of command. Many programs and policies defined in AR 95-1, NGB Supplement 1 to AR 95-1 (NGB 95-1), and TC 3-04.11 are battalion or higher level programs, and as such cannot be directed by the company commander in a company SOP. When adopting an SOP from down range, be sure to review the ATP section for compliance with ARNG requirements. Common errors include: 1) Omitting compliance with NGB 95-1, paragraph 4-11, which requires simulator minimums for "RW aviators **regardless of RL status**…" 2) Omitting compliance with STM 14-02 paragraph 4k and 4s, which requires ACTE completion as a condition of qualification and refresher training, and prior to progression to RL2. 3) Omitting compliance with STM 14-02 paragraph 4l, which requires assigning M-day crewmembers FAC 2 minimums upon designation of RL2. Finally, as stated before, don't make a new SOP for the assessment. The greatest number of incorrect answers on written evaluations consistently comes from the section on unit SOP.

RL progression errors closely parallel some of the SOP issues mentioned above. Units are failing to assign simulator minimums to aviators who are RL3. (Note that STM 15-02 was recently released, relieving UH-72 aviators from the simulation requirements of NGB 95-1.) Another common RL progression error is failing to complete ACTE prior to progressing any ARNG crewmember to RL2. The final common error is determining the correct progression date. Paragraph 4i of STM 14-02 includes other considerations for M-day crewmembers and a 90-day exclusion period.

Maintenance programs in general lack detailed, relevant maintenance SOP's. MOS Training documentation is often missing, and technical libraries contain outdated or missing publications. MEs, MTPs, and maintenance officers overall often lack the proper education and experience to perform their duty as program managers.

Other program trends include IFRFs missing CTLs, Aviation Badge Orders, course certificates, and timely closeout signatures. Academic programs are poorly documented and contain weak makeup procedures. Gunnery programs haven't been updated to the latest guidance in TC 3-04.45, and required documentation is missing. Many AIRFs have outdated publications and weak or no guidance on periodic review timeline limits and procedures.

Expanding the focus of DES means resuming assessments of the reserve components, while maintaining our existing footprint in the active component. The information presented in this article is intended to inform the ARNG and reserves of the assessment process, and relay common trends from historical data. Although the information is not all inclusive, my hope is it will be used a starting point to review current programs and operations for applicability. The goal is to produce safe, standard operating programs and procedures to protect our greatest asset, the Soldier, and the resources he or she interacts with. A byproduct of that is a successful assessment.

Mishap Review: UH-60 NVG training

As the UH-60A lifted from the parking pad, it began a right yaw. The aircraft completed two rotations before the PC forced the aircraft back down onto the parking pad. The aircraft received major damage with minor injuries to the crew.

History of flight

The mission was a two-ship NVG flight from their flight detachment location to the airport to pick up personnel and associated gear and return. The crew began their duty day at approximately 1500 hours for a scheduled 1930L departure. Preflight was conducted at 1530. The mission brief was completed with final approval from the task force commander. The reported weather was few clouds at 8,000 and 15,000 feet with visibility greater than 7 statute miles. The winds were 230 degrees at 8 knots. The temperature was 68 degrees Fahrenheit with a dew point of 48 degrees. The altimeter setting was 29.90 Hg with a pressure altitude of 131 feet. Illumination was zero percent.

At 2007L, following aircraft run-up, the PC began to lift the aircraft off the parking pad to a high hover to remain clear of the 12-foot high concrete T-walls on each side of the pad during back taxi. As soon as the tail wheel left the ground the aircraft began a clockwise right-yaw rotoation. The PC increased collective to maintain clearance from the T-walls as the aircraft rotated almost two full revolutions to the right before the PC forced the aircraft back down onto the parking pad resulting in a hard landing. The main rotor blades struck the barriers during the emergency engine shutdown. The aircraft sustained significant damage with minor injuries to the crew.

Crewmember experience

The PC, sitting in the left seat, had 1,200 hours total flight time, 950 hours UH-60A/L, 325 hours NVG and 525 hours combat. The PI had 466 hours total time of which nearly 400 were in the UH-60, 100 hours of NVG and 6 hours combat.

Commentary

The investigation determined the #1 hydraulic pump return line quick disconnect was not connected to the pump module which prevented the tail servo from actuating, resulting in an inadequate fixed pitch setting for the tail rotor. It could not be determined how/when the return line was disconnected but an undocumented action was suspected. Additionally, the crew failed to identify the disconnected line on preflight.

Flightfax® Forum Op-ed, Opinions, Ideas, and Information
[Views expressed are to generate professional discussion and are not U.S. Army or USACRC policy]

Aircrew coordination - not just for your crew

I want you to do something in conjunction with reading this month's Flightfax. Dig out an ATM and read the chapter (usually chapter 6) addressing crew coordination. It's not that long and is not a difficult read. You will find the crew coordination elements and basic qualities as well as objectives and terminology. These aren't necessarily things you need to memorize, but you should be familiarized enough to understand and implement them. You should also notice that the message seems to be directed at internal crew communications – those within your own aircraft. But what about communications between flight elements in a formation?

Broadly defined, aircrew coordination is the interaction between crewmembers necessary for the safe, efficient, and effective performance of tasks. Got that right out of the manual. I don't see any limitations on applying these principles with other aircrews in the conduct of multi-aircraft operations.

If you again read back through Chapter 6 and substitute aircraft elements or chalks for crewmember you see how the message doesn't change for multi-aircraft operations. The two-challenge rule may be a bit of stretch but you get the idea. So we've pretty much been following these guidelines but has it been with the same vigor as within your personal aircraft?

How many times have you been in a formation and discussed amongst your own crew what lead was doing up front? Perhaps they have deviated from the route or are setting up for an alternate landing direction, speeds and altitudes weren't as briefed or outside influences have changed such as weather. You're just not sure what is going on and the lead aircraft or the AMC hasn't provided additional information. But you keep strumming along maintaining your position and radio silence.

You wouldn't allow this breakdown in communication and subsequent lack of situational awareness to occur in your cockpit, so why remain silent when it occurs in the formation? Conversely, if you are lead or AMC and were making changes within your aircraft, wouldn't you inform your crew? Of course you would, so extend the courtesy to your formation elements.

There are probably a hundred points that could be made on crew coordination within a flight but I'll focus on just two. Under the elements you'll see **"offer assistance"** for the following: (3) any time a crewmember sees or recognizes anything that poses a hazard to flight.

Some time ago an accident occurred involving a flight of two aircraft operating in low contrast, low illumination conditions resulting in Chalk 2 becoming spatially disoriented and impacting the ground. It was noted in describing the accident that the training area the two aircraft were transiting toward was occupied by other aircraft and that flight lead communicated they would orbit the flight until the area was clear. My initial thought was that you don't orbit a formation under those flight conditions. That wasn't based on my knowledge of the outcome but on my experiences of operating under similar conditions. It's already a tough flight environment to deal with and continuous turns would only increase the difficulty. The PC of Chalk 2 should have realized the increased workload and hazardous condition that would accompany the orbiting and "offered assistance" to flight lead by recommending an alternate course of action.

My second point. **"Cross monitoring"** performance is the primary mechanism for breaking error chains that lead to accidents or degraded mission performance. Crewmembers must be capable of

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detecting each other's errors. This is not just the PC watching his/her crew, it is every crewmember monitoring crew performance, including that of the PC, for mistakes, distractions or reduced performance. Additionally, this ACT element doesn't just apply to your own crew but to the other aircraft within your formation.

A flight of two was providing mission support to a small unit doing insertion training. Weather encountered for the NVG portion of the mission fell below that which was authorized. Knowing the flight conditions that existed, flight lead/AMC still proceeded with the mission in marginal weather conditions. Consequently, the lead aircraft crashed due to weather-related factors. The PC of the non-accident aircraft did not reinforce to the AMC that the weather was below authorized minimums for the mission and an alternate course of action was necessary.

So how do you address an error such as this? You are not the AMC or flight lead, but you know that taking off or operating in the marginal conditions poses a potential hazard to flight and is not within briefed guidelines. When you note an error, you quickly and professionally inform and assist the flight lead/AMC committing the error. Using **"advocacy and assertion",** you should be proactive in advocating a course of action you consider best—even if others may disagree.

Most important, every member of the crew or flight displays a sense of responsibility for adhering to flight regulations, operating procedures, and safety standards.

Jon Dickinson, Aviation Directorate

Accident findings: From the archives for your review

FINDING 1: (Present and Contributing: Human Error - Individual Failure): While performing as a mission briefing officer (MBO) for a RL progression training flight, the MBO failed to properly identify and mitigate risk for the flight in contravention to the unit's SOP and AR 95-1. That is, he approved a mission brief and risk assessment filled out by a platoon leader who was not part of the aircrew for the mission, and the Board suspects he did not conduct a face-to-face briefing with any crewmember.

FINDING 2: (Present but Not Contributing): Review of the risk assessment showed multiple inconsistencies. Examples include: multiple moderate risk conditions do not add up to high risk. Night unaided flight in zero percent illumination is low risk with a low NVG time PI (under 50 hours) where NVG night is an automatic moderate risk mission. Failure to properly identify/assess risks could lead to mistakes in mission planning and execution.

FINDING 3: (Present but Not Contributing): The board found the mission approval process was not adhered to in accordance with AR 95-1 and the Tactical Standard Operating Procedures. This was evident from the lack of interaction between the AMC, briefing officer, and final mission approval authority. There were mistakes made on the Electronic Risk Assessment Worksheet (ERAW) and 5484-R made by the AMC that should have been addressed during the briefing process. Additionally, the briefing officer did not conduct a brief-back with the AMC and was unclear on all the information on the 5484-R. Finally, the mission approval authority did not catch any of the errors on the ERAW and 5484-R.

RISK MANAGEMENT FOR COMMANDERS

I knew from the look on my safety officer's face as he walked in the door that I was about to hear the news that every commander dreads most. "Sir, there's been an accident; one of our Cobras has gone down!" he said. I felt my stomach twist into knots; my worst nightmare as a troop commander had happened. "Fatalities, injuries?" I muttered as I tried to grasp this painful news. "Yes sir, both crewmembers are dead."

"What happened?" I stammered, still trying to accept that this could really happen in my unit. "Apparently, they went inadvertent IMC, lost control of the aircraft, and crashed into the trees," the safety officer replied as he turned away to begin executing the pre-accident plan.

I hadn't called the battalion commander earlier for mission approval because it was only a medium risk mission. Now I had to call and tell him about the accident, but first I needed a minute alone. I must somehow be responsible. It was a simple mission … *I thought.*

The mission

The mission was a multi-ship (two aircraft) NVG cross-country flight, point A to point B and return after refueling. How easy could it get? The weather wasn't all that great - but nothing the crews couldn't handle … *I thought.* My new, aggressive AH-1 instructor pilot was flight lead; how could there have been any problems? I know the crews did their mission planning because I signed the mission brief sheet and reviewed the risk assessment. I didn't evaluate their assessment but everything seemed in order.

The risk assessment showed that it was just another medium risk mission, and it was assessed as medium risk rather than low risk primarily because it was an NVG mission with a newly assigned aviator as part of the crew. I'm the approving authority for medium risk, and I didn't concern myself with that too much since it was just a cross-country flight.

It was a low-stress mission; the crew was in no hurry to get there and back. We didn't violate any procedures or policies that I knew of. The aircraft was in top shape – no reported deficiencies, not even on the dash 14. What could have gone wrong?

Focus on commander's role

As the commander agonizes over what went wrong, let's look at the accident from another perspective. Rather than dwell on any individual errors made by the crew, let's focus on the role the commander played or should have played in applying risk management in the unit.

Applying risk management

By now, just about everyone in America's Army should know about and understand the five-step risk management process. People in the field seem to have a good grasp of the risk management steps and are doing a good job in accomplishing some of them; but more work is needed on some of the others.

• **Identify the hazards.** In Army aviation, we're doing this well. The process by which hazards may be identified include brainstorming, METL assessments, reviewing exercise lessons learned, experienced - aviator recommendations, and accident reports as well as unit hazard matrices and ones from similar units.

• **Assess the hazards.** We need to do a lot more work in this area. This is where we can reduce the

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hazards identified by asking the hard questions and getting the right answers to help us make smarter risk decisions. This takes thought and vision before attempting the mission. Commanders must decide what constitutes a low, medium, high, or extremely-high risk mission beginning with their METL assessment. And they must ensure the assigned risk level accurately reflects all risks associated with the mission. In other words, don't let the high risk mission slip through the cracks and be assessed as only medium or low risk.

• **Make risk decisions.** Decisions become more obvious if the hard questions are asked first. Will the benefits to be gained from doing this mission outweigh the potential costs? Is there any single identified hazard that could of itself cause this mission to be a higher risk than is reflected on the risk assessment? Perhaps an independent assessment by the commander would bring this to light. If the mission is, in fact, a higher risk than identified on the risk assessment, then the commander should elevate the risk decision to the next level in the chain of command.

• **Implement controls.** This is where we begin to make money in risk management. Leaders must take steps to eliminate or reduce the risks that have been identified for every mission regardless of the risk level. If the risks cannot be eliminated, then we must look for ways to control them.

• **Supervise.** Leaders earn their pay in this step of the risk-management process. You must ensure your subordinates are carrying out your directives so that the unit can successfully execute the mission without an accident or injury.

Risk-management principles

The word is getting out on force protection and safety. It's being taught in the classrooms to officers and NCOs. On the flight lines, in the briefing rooms, and in the maintenance hangars, people are talking about how to identify, assess, and manage the risks associated with the task they are about to perform. But before commanders can effectively use risk management as an accident-prevention tool, they must remember to-

• Integrate risk management into planning.
• *Accept* no *unnecessary risk.*
• Make risk decisions at the proper level.
• Accept the risk if benefits outweigh the cost.

The probability is high that the accident in the scenario would have been prevented if the commander had made better decisions by more aggressively and effectively managing the risks within the confines of the stated rules and steps.

How could the accident have been prevented?

In the accident scenario, the commander briefed the mission, reviewed the risk assessment sheet, saw that it was in order, and signed as the approving authority. Because it was only a medium-risk mission, he signed off on the assessment without giving any further thought to altering the mission profile to lower the identified risks. In his mind, he fulfilled the requirement by filling out the necessary forms so his crews could train.

Remember the risk management principle: *Accept* no *unnecessary risk.* Although the risk assessment showed that the mission was only medium risk, the following identified hazards could have been eliminated or controlled to further reduce the mission to a low risk one:

• **The weather was forecast marginal VFR throughout the night.** Was this a necessary mission? Did it have to be done that particular night? Probably not. Rescheduling the mission for a time

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when the forecast weather would have been better was an option the commander could have considered.

• **The crew had fewer than 700 hours each of total time and fewer than 100 hours collectively under goggles.** Were these crewmembers ready for this mission - even as simple as it seemed? Considering the weather conditions, the commander could have given extra thought to the fact that the mission was going to be performed by a newly assigned pilot and instructor pilot rather than two fully trained pilots. Perhaps there were other crew mixes the commander could have selected for the mission. And if the mission was readiness level training, why did they need to push the weather?

• **The mission was not part of the unit's METL.** Were both crews trained to routinely execute this mission under the identified conditions? Was the training necessary? Performing a non-METL task may include additional hazards not previously identified; for example, inadvertent IMC formation breakup procedures. The risk may automatically be higher when performing a non-METL task. If any question existed, the commander should have notified the next higher level in the risk decision-making chain.

• **The route of flight was over large areas of low or very poor contrast (large bodies of water coupled with low ambient light). The moon was just on the horizon at takeoff time and there was an intermittent cloud deck at 1,000 feet AGL.** Since there was no urgency to complete the mission, it could have been rescheduled for a time when light levels would have been higher. Rather than hoping that while en route the weather would improve, the commander could have had the crews delay their takeoff or change the route.

Did the risk assessment accurately reflect the true risk of the mission? Using the "prudent man" concept, flying a newly assigned pilot under goggles in formation and in marginal weather conditions would constitute a high risk within itself. In cases such as this one, would it hurt to notify the boss, just so he is aware, even if it is only a medium-risk mission? If it doesn't feel right, talk to your boss. Perhaps it's actually a higher risk than your assessment shows. Your commander may be able to provide some insight. **Numerical values on a risk assessment are not the end all.**

The commander in the accident scenario saw that his crews had accomplished the requirement for the risk assessment; however, he failed to apply sound *risk management.* He did not get actively involved in the risk assessment by thoroughly reviewing it or doing any further evaluation of the assessment. And his decision-making process did not include the steps to eliminate or control the known risks. The fact that he was the approving authority for a medium-risk mission meant he could sign off the mission. However, he still had an additional responsibility to aggressively pursue ways to reduce the identified risks.

This is perhaps the crux of many of our accidents: leaders are failing to complete the risk management (decision-making) cycle and in some cases are failing to become actively involved. Commanders are allowing crews to simply identify the hazards, assess the risk, get a numerical value on the assessment, decide who is the approving authority, get it signed, and off they go. *This is* a *leadership failure.*

Leader responsibility

Leaders are responsible for ensuring soldiers are not placed in situations where the risk is higher than the payoff. The risk management process is an integral part of leadership. "I thought it

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was a simple mission" has killed far too many people.

Doctrine demands leaders do all they can to protect the force. Skillful risk management is the way to do just that. However, risk management does not end with the risk assessment; the terms are not synonymous. Risk assessment is a two-step process: identify the hazards associated with the mission and assess the hazards.

The risk assessment of those hazards is where leaders need to get more involved. While we review many hazards associated with a particular mission profile, it may be that only one or two hazards in that profile would be considered risky. The problem occurs when crews finish their assessment and come up with a numerical value that is assessed as low or medium risk even though there are one or two hazards that could pose a high risk. Using good judgment, commanders should review the assessment and upgrade the mission to a high risk because that one hazard that is risky could taint the whole mission unless steps are taken to eliminate or reduce that high-risk factor.

Heightened awareness of risks is a good tool for reducing accidents. If you believe numerical values are the end all to identifying and assessing the risks, then how do you explain the startling fact that most accidents happen during numerically defined low-risk missions? Accidents are not happening in the high-risk missions because of awareness. The more aware crews are of the possible hazards, the more prepared they are to execute the mission successfully.

The risk assessment is completed before the mission begins. It can be a quick mental process or a detailed formal document. However, managing the risks is a continuous process. As new hazards are encountered during the mission, crews must continually apply the rules and mentally reassess the situation to determine if the risk level has changed.

All commanders have a responsibility to ask the hard questions of their mission planners, crews, and themselves. "Have we looked at every single identified hazard to determine if it could reasonably cause this mission to be a higher risk than is reflected on the risk assessment? Have we done everything possible to reduce or control the identified hazards?" If the answer is "No," be prepared for your worst nightmare.

Short of losing a loved one, losing soldiers under your command may be the most painful emotion you'll ever experience. Just imagine feeling somehow responsible for someone losing their life or suffering a disabling injury when you could have prevented it...if you had effectively managed the risks.

There are two kinds of people who don’t say much: those who are quiet and those who talk a lot.

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Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in late March 2015.

Utility helicopters

UH-60

-M series. During conduct of dust landing training the main rotor blades contacted and severed the tail rotor drive shaft. Aircraft subsequently landed hard. (Class A)

-M series. #2 engine overspeed occurred at a 10' hover. (Class C)

-A series. During a NVG insertion the tail rotor and stabilator contacted an object. (Class B)

-L series. On run-up, fire extinguisher cover blew into the rotor system damaging two blades. (Class C)

Mi17

On run-up tail drive shaft bearing failed. (Class C)

Attack helicopters

AH-64D

-During gunnery training, aircraft tail rotor contacted a tree. (Class C)

Observation helicopters

H-6

Tail rotor contacted MOUT site during training. (Class C)

Unmanned Aircraft Systems

RQ-7B

-During approach, UA lost power at 30 feet AGL and landed hard. (Class C)

Why is it that if someone tells you that there are one billion stars in the universe you believe them, but if they tell you a wall's paint is wet, you will touch it to be sure?

If you have comments, input, or contributions to Flightfax, feel free to contact the Aviation Directorate, U.S. Army Combat Readiness Center at com (334) 255-3530, DSN 558-3530

U.S. ARMY

COMBAT READINESS CENTER

Online newsletter of Army aircraft mishap prevention information published by the U.S. Army Combat Readiness Center, Fort Rucker, AL 36322-5363. DSN 558-2660. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Flightfax is approved for public release; distribution is unlimited.

Number 49 May 2015

Flightfax®

Online newsletter of Army aircraft mishap prevention information

AR 385-10 outlines the requirements for The Army Safety Program. In general terms, commanders are charged with the responsibility to establish, emphasize, resource, evaluate, and ensure a vital, organization-wide safety program.

DA Pam 385-90, Army Aviation Accident Prevention Program, tells you aviation operations involve inherently higher risk than most ground operations. Because of this, commanders of units involved in aviation operations must emphasize the safety component of protecting the force. It gives guidance on the aviation accident prevention program which can be more accurately described as a program of programs involving aviation safety and the integration other safety-related programs.

The prevention of foreign object damage (FOD) to aircraft is an essential part of each unit's aviation accident prevention program and is emphasized in this issue. For many, the flight line FOD walk is what comes to mind when a FOD prevention program is mentioned. The 'blast from the past' article reflects a much broader picture of what a FOD prevention program entails. An accompanying mishap review from not so many years ago is also included. It relays the most serious of consequences – loss of life - as well as loss of an aircraft due to a FOD related accident.

As with any safety-related program success is often based on the emphasis the commander places on it, the quality of the individual(s) charged with running the program and the culture created by the participation of unit members. This makes the FOD walk more than just a police call. It instills the value of participation in the safety program. This is represented by the fact that in good programs you don't pick up FOD items only on the designated walk day, but any time you encounter it. A good program ensures post-maintenance inspections are properly completed and tool accountability is enforced to maintain the high standards required to prevent accidents.

Also included this month is an article from DES addressing some of the common issues experienced during visits and includes specific recommendations for UAS units. Additionally, there is another mishap review on a recent dust landing accident. Dust landings continue to be a challenge.

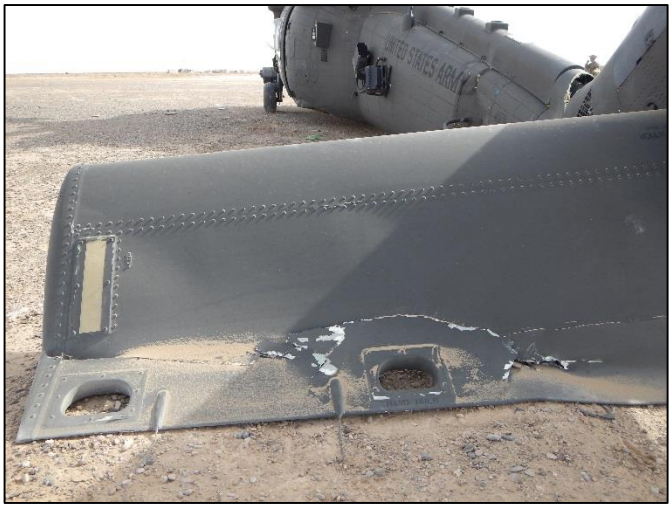
In closing, this month we bid farewell to COL Mike Higginbotham, the Aviation Director here at the Combat Readiness Center, as he departs for senior service college and wish him the best of luck on his future endeavors. We'll utilize his sign-off one last time.

Until next month, fly safe and manage your risk levels!

Aviation Directorate, Future Operations
U.S. Army Combat Readiness Center

Mishap Review: HH-60M Dust Landing

During the conduct of a dust landing, the main rotor blades of the HH-60M contacted and damaged the tail rotor drive shaft. As the collective was increased for takeoff, the drive shaft broke causing the aircraft to spin uncontrolled in a clockwise rotation. The aircraft impacted the ground in a clockwise spin causing damage but no injuries.



History of flight

The accident unit aircraft was performing Medical Evacuation (MEDEVAC) duties or "First Up" in support of combat operations. The accident crew was briefed and approved to conduct continuation training flights by the task force commander. The planned training flight was to include traffic patterns, roll-on landings, visual meteorological conditions (VMC) approaches, and hovering flight which was approved by the brigade commander.

At 0925L, the crew participated in a daily synchronization meeting which consisted of an Operations and Intelligence (O&I) update brief, training being conducted that day, and assumption of duty brief. The assumption of duty brief included the Air Mission Brief (AMB) and multi-ship brief with the crew of the second MEDEVAC aircraft. At 1000L, the accident crew conducted a pre-flight inspection of their aircraft and crew mission brief, after which the crew and aircraft were postured for duty. The weather was winds 270 degrees at 06 knots. Visibility was unrestricted. Sky condition was FEW clouds at 25,000 feet. Temperature was 20 degrees Celsius with DEW point -09 degrees Celsius. Altimeter setting was 30.11 in/Hg. Pressure Altitude was 2204. Sunset was at 1820L, EENT at 1913, and illumination at 23% at 33 degrees above the horizon.

At 1900L the crew met at the aircraft and conducted a crew brief for their training flight. At 1930L the aircraft repositioned and conducted their health indicator test (HIT) check on their engines and confirmed the weight with the flight management system. With the PI on the controls, the accident aircraft repositioned to the runway and conducted continuation training which included traffic patterns, VMC approaches, roll-on landings, hovering flight, and a practice autorotation. The crew then repositioned and refueled the aircraft to keep it in a state of readiness for MEDEVAC duty. After refueling, the crew decided to practice some dust landings. The SP discussed the different techniques for dust landings as the PI flew the aircraft to where they would conduct environmental training.

With the PI on the controls, a "Go Around" was called for the first two VMC approaches. The first was due to the slow airspeed and the second, a fence post and wire were observed. The third approach terminated to the ground with some forward roll. The forth landing had a higher rate of descent at touchdown. During the landing sequence, there was a flight director fail and master

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caution, which the SP reset. The SP took the flight controls and informed the crew they were going to conduct another iteration. As the SP increased collective for takeoff, the aircraft began to spin uncontrolled in a clockwise rotation. The SP immediately announced he had a tail rotor problem and lowered the collective. The aircraft impacted the ground in a clockwise spin causing moderate damage and no crew injuries.

Crew Experience

The SP/PC, sitting in the left seat, had over 2,700 hours total time with 2,100 in the UH-60A/L, 75 UH-60M, 1,160 IP hours, 650 NVG and nearly 1,300 combat. The PI had a total time of 386 hours with 300 in the UH-60, 70 UH-60M, 75 NVG and 24 combat.

Commentary

The investigation determined that during the conduct of the approach the aircraft exceeded a decent rate of greater than 300 feet per minute at landing. The pilot on the controls then applied excessive aft cyclic to aid in slowing the aircraft. Two of the main rotor blades, undetected by the crew, contacted the tail rotor drive shaft, damaging two of the main rotor blade tip caps, the intermediate gearbox cover, and section III of the tail rotor drive shaft. The damaged drive shaft failed when the crew initiated a follow-on takeoff.

	Manned Aircraft Class A – C Mishap Table									as of 26 May 15
	Month	FY 14					FY 15			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	0	0	2	0		0	1	3	0
	November	3	0	5	0		2	0	1	2
	December	1	0	4	0		1	1	2	0
2nd Qtr	January	2	2	4	4		2	0	6	0
	February	1	0	3	0		0	0	0	0
	March	0	3	0	0		2	1	9	11
3rd Qtr	April	1	1	7	0		0	1	0	0
	May	4	0	3	2		1	2		
	June	2	1	7	0					
4th Qtr	July	2	0	5	0					
	August	0	0	1	0					
	September		1	5	0					
	Total for Year	16	8	46	6	Year to Date	8	6	21	13
	Class A Flight Accident rate per 100,000 Flight Hours									
	5 Yr Avg: 1.33		3 Yr Avg: 1.28			FY 14: 1.52			Current FY: 1.46	

Unmanned Aircraft System (UAS) Unit Training

Sergeant First Class Matthew Clubb
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U.S. Army Aviation Center of Excellence
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UAS Standardization Operator

Since 2005, the UAS Branch of the Directorate of Evaluation and Standardization (DES) has evaluated and assessed many units and assisted with several FORSCOM ARMS Inspections. The primary mission of the UAS branch is not only to assess the Aircrew Training Program (ATP), but to provide mentorship to unit standardization personnel with the goal of improving the unit. The following article addresses some of the common issues experienced during visits and includes specific recommendations for UAS units.

UAS is unique in Army aviation for many reasons; one of them being that the majority of our operators, instructor operators and standardization instructor operators are enlisted. While a UAS operator may not be a pilot in the most traditional sense, they are most certainly aviators. Currently, the Army is integrating UAS units into Full Spectrum Combat Aviation Brigades, developing doctrine and including UAS requirements into existing aviation regulations. In the near future, manned and unmanned requirements will be part of the language and experience of all aviation units. Whether manned or unmanned, all aviators must be able to understand requirements, capabilities and doctrinal principles about how Army aviation will fight and win as a team. Army aviators are much more than pilots of aircraft. All aviators, whether manned or unmanned, must be professional aviators and warfighters, well versed in doctrinal principles and, most importantly, trained and ready to be force multipliers high above the rest.

One of the major issues facing the UAS community is quality training. While this comes across as an obvious statement, it is often incorrectly justified as a lack of opportunity to train. I have first hand experience of the pains of trying to get range control on board with flight operations and getting air space, ground space and facilities to conduct flight operations. This is a reoccurring problem for all UAS units. To alleviate last minute confusion or cancellation of important training UAS operations must be scheduled and deliberate to the maximum extent possible. UAS training must be scheduled on the unit training calendar in order to ensure proper coordination for airspace, ranges etc. During a majority of visits, standardization personnel must be asked when and what training will be conducted since the training is not included on training calendars. In many cases, training time is lost due to little or no coordination between the company and higher headquarters.

Individual training is the foundation of our ability to conduct combat operations and should be continuous; from RL progression, to daily operations, into the APART. As UAS leaders it is incumbent upon us to continually train our aircrews by all means available. Simulation, academic classes or table talking required tasks are among many tools that we have at our disposal to train outside of live flight. Since my tenure at DES, I have seen what appears to be an upward trend in the individual proficiency of operators in regards to technical operations of the aircraft, which speaks to the progress we are making as a community.

To say that we are making progress, however, is not to say that we have arrived. We must do a better job of developing our tactical sense, situational awareness, and instilling a sense of tactical curiosity within our aircrews. All of our training flights should be scenario based; and include collective and METL tasks to the maximum extent possible. We must break the habit of putting the

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aircraft into the air with no task and purpose in order to take advantage of every training opportunity. Due to the autonomous nature of our aircraft, we can start to introduce our flight crews in mission type flights earlier in the training cycle; i.e. we don't have to be concerned with things such things as power management, auto-rotations, etc. This allows us to spend more time teaching warfighting tasks, fundamentals of reconnaissance and radio operations.

An area of improvement that is always of great benefit to UAS formations is mentorship of UAS instructors. A solid training program at a unit will identify potential IOs quickly and it is incumbent on standardization personnel to identify potential and mentor and groom crewmembers for greater positions of responsibility. Once identified, these crewmembers should begin a period of training that will indoctrinate them with skills for records maintenance, ATP Integration/Management, fundamentals of instruction and the evaluation process. This mentorship should begin well before a proficient operator goes to the instructor operator course and continue throughout and individual's career.

The benefits of aviation mentorship inside of UAS formations cannot be understated. Integration of UAS into combat aviation brigades has been a long time coming, but will have great benefits to Army aviation. Assigning UAS units to established aviation units with experienced standardization personnel has proven to be very successful and ends with trained, ready and relevant UAS units available to provide aviation support to our brothers on the ground. In order for the integration to be effective, the entire aviation community has to be involved in order not to succumb to the same issues, problems and concerns that we have learned since becoming an aviation branch. It may seem a daunting concept to treat manned and unmanned aviators alike, but the end payoff will be worth the effort. The flight operations, safety and standardization of UAS operations and training can be positively augmented by good communications and mentorship between unmanned and manned standardization personnel.

<u>UAS Unit Recommendations:</u>

- Identify and mentor potential instructor operators by developing and enforcing a quality unit trainer program. Although they cannot evaluate, UTs can enhance unit training and learn records maintenance, ATP Integration/Management, and fundamentals of instruction prior to attending the IO course.
- Seek out experienced aviation leaders for mentorship and development of quality academic training programs. These personnel may or may not be in your unit. It is important for the community to remember that the majority of RQ-7B Shadow formations are not assigned to aviation units.
- Ensure training schedules are used to maximize available training time. Include in these schedules all ranges of academic, flight, simulated flight and integration training.
- Take unit training plans and be sure warfighting and reconnaissance tasks are reinforced as well as individual aircraft tasks. IOs need to ensure they are proficient warfighters and verify that adequate training time goes to how to fight and not just how to fly.
- Develop collective and mission training that is conducted with other army aviation assets. Increasing familiarity between the manned and unmanned communities will only strengthen Army aviation on the battlefield.
- The SP's, Master Gunners, and S-3's in aviation units with UAS assets assigned have to reach out and embrace the UAS operators, include them in pilot's calls, ensure that all operators on the

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mission will attend briefs and debriefs, when able, integrate them into your SOPs and risk assessments, give and receive academic and operational classes from each other. If we truly integrate UAS into our manned units, we are only limited by our imaginations on the employment of a formation that will bring an unparalleled force multiplier to ground commanders.

--SFC Matthew Clubb, DES UAS Standardization Operator, may be contacted at (334) 255-1449, DSN 558.

UAS Class A – C Mishap Table									as of 26 May 15
	FY 14					FY 15			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	6		3	9	W/GE		1	1	2
MQ-5	1	1		2	Hunter	1		1	2
RQ-7		12	11	23	Shadow		2	5	7
RQ-11			1	1	Raven			1	1
RQ-20			1	1	Puma				
YMQ-18									
SUAV					SUAV				
UAS	7	13	16	36	UAS	1	3	8	12
Aerostat	3	2	3	8	Aerostat	1	0	0	1
Total for Year	10	15	19	44	Year to Date	2	3	8	13

Random Finding from the archives. FINDING 1 (Present and Contributing – Human Error): While flying a UH-60A helicopter on an external load mission, the aircrew allowed the load, an empty pallet, to "fly" into the tail boom of the aircraft and subsequently enter the rotor system. This event rendered the helicopter uncontrollable and resulted in a tail boom separation, a right roll, and impact in a near inverted attitude. A post crash fire ensued which resulted in the complete destruction of the aircraft and one fatality. This mishap was the result of the copilot's inattention to his most critical flight element, airspeed. Immediately following a transfer of controls from the pilot and while the pilot was tuning radios, the copilot allowed the airspeed to increase 10 to 15 knots in excess of the airspeed designated as the maximum (55 knots) by the pilot. This increase was sufficient to produce aerodynamic lift on the empty cargo pallet causing it to start flying. Once this sequence had begun, the pallet entered the rotor system before the crew could react. The copilot's inattention is attributed to his relative inexperience in transporting non-typical loads and the lack of adequate operator's manual cautions concerning such loads. Specifically, the absence of appropriate cautions allows inexperienced aviators to become overconfident in the aircraft's performance capabilities. In this case, both pilot and copilot were aware of the unstable potential of their load; however, neither were aware that when the load initially became unstable, it was already too late to take corrective action. An operator's manual caution which restricts forward airspeed to effective translational lift (ETL) or below for such non-typical, light, aerodynamic loads would serve to properly caution aviators and cause the less experienced pilot to consider such characteristics in all external load operations.

Mishap Review: FOD Related Mishap

While conducting a two-ship extraction in support of combat operations under NVGs, the aircrew experienced a loss of tail rotor thrust. The aircraft spun multiple times and crashed. All four crew members and ten passengers received fatal injuries and the aircraft was destroyed.

History of flight

The mission for the flight was to conduct a night extraction of a scout team which had been inserted the previous night in support of combat operations. The mission was planned, briefed, and approved. The flight was to last approximately one hour with two OH-58Ds in over-watch positions, while two UH-60Ls conducted simultaneous landings in two separate pick-up zones. The mission was briefed by the platoon instructor pilot and approved by the battalion commander.

The crews reported for duty at 1600L with a preflight time of 1900. The crew received the mission/threat update briefing at 2000L. The AMC conducted a team briefing at 2030L and the crews performed a crew briefing at their respective aircraft prior to departure. The mission was assessed as a medium risk.

The flight of two UH-60Ls departed at 0018 en route to the pick-up zone with the accident aircraft flying Chalk 2. The flight arrived at the PZ at 0044L. Chalk 1 attempted four approaches and executed four go-arounds due to brown out conditions before landing safely and loading their team of 10 scouts. Chalk 2 attempted two approaches (due to dust), landed safely and picked up the remaining 10 scouts. The trail aircraft announced to lead they were ready for take-off. The flight then departed at approximately 0049L and made a right turn en route to home base. At 0050L Chalk 1 received a radio call from Chalk 2 announcing that his aircraft had a "Tail Rotor Quadrant" caution light and would return to the FOB. Soon after, Chalk 2 made a radio call that their aircraft was "going down." The two OH-58Ds in over watch position witnessed the aircraft slow down, pitch up, spin to the right, and impact the ground.

Crew Experience

The PC/AMC, sitting in the left seat, had nearly 1,000 hours total time with 800 in the UH-60, 300 PC hours, 200 NVG and 330 combat. The PI had a total time of 470 hours with 285 in the UH-60, 82 NVG and 100 combat. The CE had incomplete records but showed over 125 total hours with 100 in combat and 54 NVG. The OR had 125 hours total time with 90 combat and 31 NVG.

Commentary

The investigation determined the aircrew lost all tail rotor control due to failure of the section II number two tail rotor drive shaft. This resulted in the aircraft spinning multiple times to the right and subsequent crash. It was determined the drive shaft sheered due to the effect of an

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unidentified object in the area of the section II number two drive shaft. The drive shaft had several scoring marks with one very deep cut where the failure occurred. The investigation was not able to identify the specific mechanism that caused the deep scoring on the drive shaft, but suspects an unknown maintainer or crewmember left either a tool or other materiel that scored the drive shaft. The aircraft had recently its first phased maintenance inspection including foreign object damage (FOD) inspections conducted in accordance with (IAW) the unit standing operating procedures and published maintenance procedures. A unit tool box inventory was conducted with no reported losses.

FOD findings from the archives for your review

FINDING: As the aircraft was climbing thru 500 feet AHO at 100 KIAS the crew began experiencing load bangs and a temperature increase up to 851 degree on the #2 engine. The PIC diagnosed and announced the malfunction as a compressor stall. The PIC identified the #2 engine power control lever and was confirmed by the CE, he then retarded it back to idle. The aircraft landed and taxied back into parking with no further damage or injuries. Upon post-flight inspection, it was discovered that both #1 and #2 inlet plugs were still installed in the engine inlets.

FINDING: While completing a normal approach to an LZ marked with three VS-17 aerial marker panels, one of the panels and an attached metal tent peg were blown out of the ground by rotor-wash. This debris was carried into the air and impacted the main rotor system. The aircraft was shut down immediately thereafter without further incident. Post-flight inspection revealed a quarter size hole, and several small dents on one main rotor blade.

FINDING: Aircraft experienced engine surges while running on the ground. After shutdown the engine shop inspected the inducer bleed port filter hose where they identified small pieces of paper. The crew chief then removed the left side engine barrier filter (EBF) and found a shop towel in front of the engine compressor.

FINDING: A 12-inch adjustable wrench was left on top of the aircraft, and presumably, during engine start and run-up procedures, was projected from its resting position into the forward rotor disk resulting in damage to two forward rotor blades.

FOD is picking up

FOD-foreign object damage-was once one of aviation's minor problems. Over the years the problem has built up. Various things-loose change, nuts and bolts, stray tools- have been jamming controls and other moving parts since before Lindbergh's day. During World War II, pilots swore that little men called Gremlins went around at night distributing foreign objects the way Santa Claus hands out gifts at Christmas-only with different purposes in mind. And since the helicopter came along, blades have been chewed up by everything from turkey buzzards to ham sandwiches.

Then along came the turbine engine. Overnight the situation changed from bad to worse. If you were to make up a list of all the foreign objects which have interfered with turbines' innards from time to time you would have a list long enough to fill a mail order catalogue. Sand, gravel, loose change hauled out of mechanics' pockets along with their handkerchiefs, assorted military insignia, straw and hay, tools, flashlight batteries, nuts and bolts, and what do **you** have loose around you right now a turbine or rotor **won't** eat?

The point to be noted about FOD is that the foreign object involved doesn't have to be the size of a basketball or a pair of overalls to interfere with a turbine's digestive system. That fishhook you have in your tackle box might not be big enough to handle anything above the size of a minnow. Try sticking it in your ear if you want to see what even a small object in the wrong place can do.

FOD is a source of reduced efficiency which can pile up faster than snowdrifts in a North Dakota blizzard. When foreign objects cause turbines to run high fevers, you wind up with more maintenance piled on already overworked mechanics and more aircraft sitting around out of commission. What is more important, operational missions have to be curtailed or reduced, meaning that some poor soul somewhere else goes without the air support he desperately needs.

It's like that old story about the king who lost the battle because his horse lost his shoe - and the shoe dropped off because it needed a nail. This might be called FOD-in-reverse. Nobody ever has discovered what happened to the nail, but one thing's for sure: It wasn't where it was **supposed** to be when it was needed.

A foreign object which lodges where it is **not** supposed to be at a critical moment can be just as costly. A lot of people get involved.

Sounds pretty grim, doesn't it? It's a problem, all right, and a major one at that. But if you're the courageous type who will agree that sticking your head in the sand is no way to fend off attacking lions, you'll go along with the theory that **any** problem can either (a) be eliminated or (b) reduced to manageable proportions if it is handled the right way. Medical pioneers long ago demonstrated this when they set out to eliminate various unpleasant ailments such as beriberi, yellow fever, and polio. If they had sat around muttering about how tough things were there wouldn't be much of a population problem today.

We might as well start on a solution by being honest. Until some bright lad comes up with an Instant Automatic Handy-Dandy Foreign Object Eliminator it's a problem we will always have in some degree, the way some people have football knees or tennis elbows.

It's a sure fact the dangers you **know** about are the ones you can **do** something about. Once everybody in Army aviation is aware of how lethal FOD can be, what kind of a problem it really is, and what to **do about it**, its size as a problem will shrink considerably.

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All hands alert

Check that **everybody**, folks. FOD is one problem which every person in an aviation unit can have a hand in (a) causing or (b) solving. Even if the table of organization called for a special FOD officer, section, or platoon, foreign objects could still creep in and snuggle up inside turbines unless the entire unit is on the alert. Let's take a look at some of the openings which foreign objects can take advantage of when collective backs are turned.

• Grease on a mechanic's shoes picks up bits of gravel which in turn is deposited on a walkway where the turbine can get at it.
• Litter-paper cups, oily rags and the like- is allowed to accumulate along ramps and runways where wind blows it onto the flight line.
• A mallet is left in an intake by a forgetful mechanic.
• Loose objects accumulate in cockpits (a paper clip can do the job nicely if it hides in the right place).
• Foreign objects are introduced into parking areas by snow removal operations.
• Panel markers anchored in mud or loose
• Buckets-don't laugh, it's happened-wooden blocks and similar unsecured items in baggage compartments.

And so on and so on. If you put one person to work on the problem he'd end up climbing the walls at the funny farm.

Basically, it's a matter of good housekeeping, a happy arrangement under which every member of the household takes pride in keeping the pad straight. If Mom spends all day cleaning up while Pop sits in front of the TV set rolling empty cans under the sofa and sprinkling ashes on the rug, and Fido is shedding hairs on the best chairs, the joint is going to look like a devastated area no matter how hard she works.

The same goes for Army aviation. When everybody has the kind of pride his job demands- pride in the unit and its record and pride in himself as a professional- rooting out foreign objects before they can do the damage becomes an automatic reflex, like swatting flies.

The all-out assault on FOD is a team effort, like any good military operation. The trouble is that in any operation, like furniture moving, some unfortunate person always is handed the heavy end of the load. Some poor soul has the job of sweeping up after the parade has gone past.

As far as FOD is concerned, the maintenance people get the task of carrying the ball about the same proportion of times as the running back on a pro football team. The mechanics, supervisors, inspectors, and the rest of the experts charged with the job of keeping aircraft hale and hearty work in areas where foreign objects are spawned and where they are likely to do the most damage. So it falls on them to get rid of potential FOD down where it usually begins.

What's sadder to relate, maintenance personnel not on the alert can bring on FOD the way Typhoid Mary used to spread germs around the land like a crop duster. Anybody who doesn't pay proper attention to his job in Army aviation sooner or later will cause trouble for somebody else. And bringing on FOD is the easiest and surest way to do it.

Take tools, for example. Needle nose pliers left where they can fall into engines or jam controls. Oily rags and paper served up to hungry turbines like TV snacks. Mallets, hammers, and a hundred or so other kinds of gadgets lying around loose in cockpits and other areas they'd no business being in.

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Sloppy? You can say that again. What is worse, it's unprofessional, and the Army has about as much use for a bumbling amateur as the Philadelphia Eagles.

Toolbox sense

One mark of the sure professional in any trade is the respect he has for his tools. Where would Joe the Safecracker be today if he was in the habit of leaving his drills behind at the scene of the crime? In Sing Sing, that's where. If you ever consult a surgeon and he starts patting his pockets and mumbling about a lost scalpel you'd do well to hunt up another sawbones.

When they put you under for the operation, you want to feel it is being performed by a real pro, even if it's only for an ingrown toenail. Pilots, aircrew members, and passengers aboard Army aircraft feel the same way about maintenance personnel. It doesn't help their state of mind if they have to keep wondering if **their** mechanic was some absentminded knucklehead with 10 thumbs.

Absentminded knuckleheads are about as numerous in Army aviation as dinosaurs in downtown Chicago. But how about those needle nose pliers and those oily rags? They are solid evidence that maintenance goofs do occur, that some people aren't always performing like the real pros they've been trained to be. We'll grant there can be reasons-fatigue, haste, pressure, overwork and all the rest. But you can't tell that to a turbine trying to spit up a pair of pliers.

One sign of a real pro is the solid organization he brings to his work. A golf pro organizes the clubs in his bag the same way every time he goes out on the course. A football coach organizes his bench to avoid sending in the waterbody instead of the quarterback.

A professional aviation mechanic's toolbox is a model of organization. In the first place, it helps him get the job done faster and more efficiently, with less wear and tear on his nervous system. As far as FOD is concerned, the toolbox is a model **before** the job begins and **after** it is over. Everything is where it should be-in the box or in actual use. No needle nose pliers will ever get a turbine in trouble if they are accounted for, in their proper slot, and under lock and key when the aircraft goes out to the flight line.

Toolbox inventory is one of the heaviest weapons maintenance personnel have in the front-line war on FOD. For one thing, it helps them sleep better at night. Generally, when an aircraft crashes because a tool is left where it shouldn't be, nobody knows who was responsible. Except for one person.

One big family

The toolbox inventory is mostly a matter of individual responsibility and sound training, like the use of any personal equipment.

But a properly trained unit can develop the kind of pride the FOD war calls for-and here the maintenance personnel in the front lines of the battle are joined by everybody from the commander on down. Take the case of an aircraft cockpit. As somebody has neatly put it, a cockpit is a pilot's place of business and the maintenance people are his office managers. It's a team, a family relationship, and when it works properly it's the kind of family marriage counselors like to dream about.

A pilot has a right to raise sand if he comes to work to find enough rubbish strewn around to start a rummage sale. The maintenance person has an equal right to feel a little tired, and to mutter bad words under his breath, if **he** arrives at a cockpit which looks like the floor of a dime store lunch counter after the noon rush. It's a two-way street.

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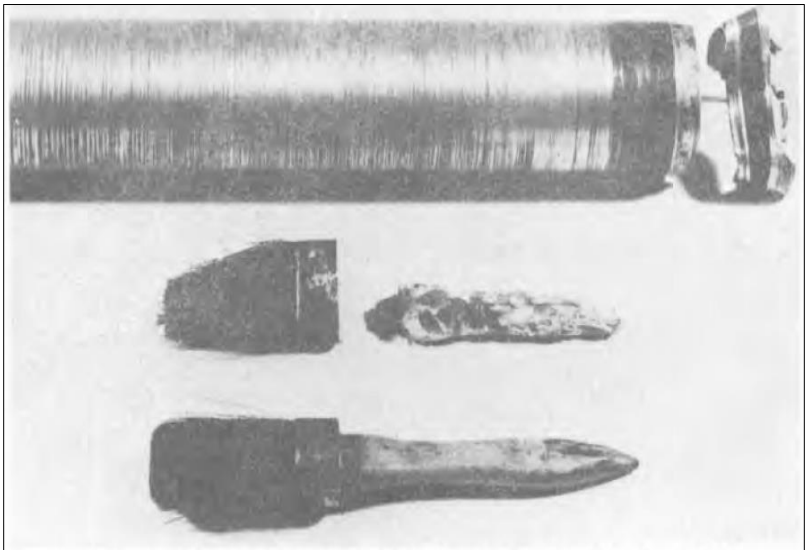
In FOD-conscious units this doesn't happen. A pilot who realizes what a foreign object can do to his controls, his engine or his rotors, keeps everything - ham sandwiches, canteens, map cases, extra jackets-as shackled as a chain-gang convict to keep them out of trouble. And the mechanic-well we know how a professional FOD-hating mechanic feels about things being out of place.

It's a two-way street **outside** the aircraft as well. Your FOD-trained unit is always keenly aware that (a) just about anything movable qualifies as a potential foreign object and (b) as a general rule somebody put it or left it where it is. Those paper cups and bottle tops and the assorted litter beside the runway didn't grow there all by themselves. Some Sloppy Joe dropped them there. And while he might be a crack mechanic or a red hot pilot when he's wide awake, he doesn't know much about FOD. Or he has forgotten. Or he doesn't care. In any case, he's not the kind of professional Army aviation has to have.

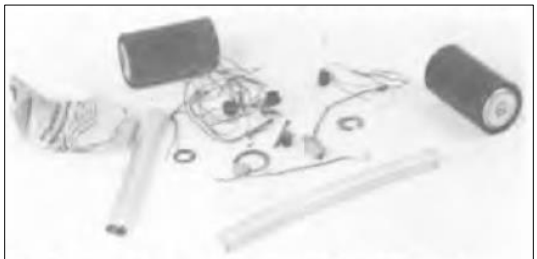
Well, so okay, maybe the paper cup blew there. Maybe the other litter fell off a passing truck. Why is it **still** there? Whose responsibility is it to pick it up, anyway? Everybody's. You see it first, you pick it up. And if you find a cotter pin, bolt, or nut near an engine, don't discard it until you have closely checked to see where it came from.

Foreign object damage, like just about everything else which can go wrong in the Army, is almost always preventable. And, like just about everything else, the ounce of prevention is so simple you find yourself wondering why everybody doesn't practice it faithfully all the time.

Alertness, professional pride, individual and unit responsibility-these are the tools to do the trick. If an aircraft has been maintained by a tool-conscious crew which has wound up the job by a thorough inside and out once-over for potential foreign objects, if the aircrew has every movable item secured, if the runways and ramps are cleaner than a Dutch housewife's kitchen-then your FOD worries are largely over. They are over, that is, if this sort of housekeeping is standard unit procedure that goes on night and day every day in the year.•



Sheared tail rotor drive shaft caused by paint brush. New brush is shown with brush that caused damage.



During a safety survey of an airfield, these objects were policed up from the ramp and helipads where aircraft were in operation.

Selected Aircraft Mishap Briefs

Information based on preliminary reports of aircraft mishaps reported in April 2015.

Utility helicopters

UH-60

-A Series. Crew was ground taxiing out of parking when the tail rotor made contact with wire fencing. Metal shards from the fence also resulted in fuselage damage. (Class B)

Unmanned Aircraft Systems

MQ-1C

-After take-off, the UA settled and impacted the runway then continued climb-out. The front and left-rear landing gear were unable to fully retract during its ascent. The crew diverted the UA for landing onto the airfield runway. (Class B)

RQ-7B

-Crew was conducting training when the UA experienced an engine failure at an altitude of 5,000 feet. Crew deployed the FTS chute and the system was recovered. (Class C)

Old aunts used to come up to me at family weddings, poking me in the ribs and telling me, "You're next!" They stopped after I began doing the same thing to them at funerals.

If you have comments, input, or contributions to Flightfax, feel free to contact the Aviation Directorate, U.S. Army Combat Readiness Center at com (334) 255-3530, DSN 558-3530

U.S. ARMY

COMBAT READINESS CENTER

Online newsletter of Army aircraft mishap prevention information published by the U.S. Army Combat Readiness Center, Fort Rucker, AL 36322-5363. DSN 558-2660. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Flightfax is approved for public release; distribution is unlimited.

June, July, August 2015

Flightfax®

ISSUE 50

Online newsletter of Army aircraft mishap prevention information

Although the summer months are firmly in the rearview mirror, it does not mean hot, dusty, and/or high density altitude environments with their associated hazards have disappeared. Deployed locations, as well as our own desert/mountain training areas, offer challenges to the aviation force. This, coupled with the normal changeover in experienced aircrew members, makes it important for units and aircrews to review the requirements for operating aircraft in these environments. Increased emphasis on performance planning, the effects of higher ambient temperatures and density altitude are a must. Dry conditions increase the exposure to dust landings. No less a concern is the weather. With a change in seasons so come changes in the weather patterns.

Do you have an upcoming NTC rotation? Training center rotations always provide a challenging environment to operate. CW4 Martinez's article 'New Challenges with Decisive Action Rotations from a Safety Perspective' found in the October 2014 issue of *Flighfax* reviews some of the hazards associated with DA rotations and is worth a second look. A concerted effort to fly trained, disciplined, and informed crews should lead you in your aviation accident prevention effort.

In this newsletter we play a little catchup from our summer hiatus with some mishap reviews from some recent incidents as well as our standard selected mishap briefs. DES addresses IIMC and the BFTP reaches back to 1981 and density altitude. Currently, the Class A flight accident rate is holding about the same as last year. Next issue we'll take a closer look at FY 2015 and the trends that have emerged.

This issue also marks the 50th newsletter produced since *Flightfax* was re-introduced in May 2011. While not enough to qualify for series syndication, it has enough history to use in your unit's accident prevention effort. Information, articles and mishaps found in this newsletter make a great addition to your safety training/meetings. If you have the opportunity, take time to research archived issues. Not just from the past few years but from as far back as the mid-1970s. You will find that the lessons learned in the earlier years are as pertinent today as they were back then. Past issues can be found at the following site:

https://safety.army.mil/ON-DUTY/Aviation/Flightfax/Archives.aspx

Until next time fly, safe and manage your risk levels!

Aviation Directorate, Future Operations
U.S. Army Combat Readiness Center
334-255-3530 DSN 558-3530

TSAS – Tactile Situation Awareness System: A Survey

Background. The Tactile Situation Awareness System (TSAS) uses the sense of touch to provide situation awareness information to pilots. It presents information, including aircraft position, attitude, altitude, acceleration and velocity through the use of tactile stimulators distributed on the torso. The potential safety benefits of TSAS include reduced spatial disorientation mishaps, improved situational awareness, improved pilot control, and reduced pilot workload during critical flight maneuvers such as hovering in zero visibility, flight transitions, approach and landing. TSAS reduces pilot workload, increases situational awareness and mission effectiveness allowing pilots to devote more time to other tasks requiring visual attention. (U.S. Army Aeromedical Research Laboratory system description.)

The Purpose. The purpose of the survey was to determine the potential effectiveness of TSAS in relation to past recorded Army mishaps. The Aviation Directorate, U.S. Army Combat Readiness Center, conducted a survey using trained accident investigators, familiarized with TSAS, to review past mishaps and score the effectiveness of the system as a mitigation measure to the mishap.

Survey participants. Five experienced aircraft mishap investigators from the USACRC were asked to evaluate all Class A and B rotary-wing mishaps from 1992 through 2011 (20 year period) to determine whether the mishap could have been prevented if the accident pilots had been wearing TSAS. All the participants had a minimum of 2,500 (median 3,200) hours of flight time and a minimum of 1,000 hours of night vision goggle/night vision system time with a self-reported moderate to significant level of experience in degraded visual environment (DVE) operations.

The method. Prior to the survey, each investigator viewed an instructional video on TSAS abilities and application followed by a hands on demonstration/orientation in a H-60 motion based simulator wearing a TSAS garment.

In reviewing the mishaps from the 20 year period, investigators were first asked (A), to rate whether they would classify the mishap as controlled flight into terrain (CFIT). Second (B), whether degraded visual environment (DVE) was a condition and contributor to the accident. Investigators were then requested (C) to rate whether they felt TSAS would have prevented the accident. Ratings were recorded using a seven point Likert scale with strongly disagree receiving a score of (1) and strongly agree scoring out at (7).

Based on the ratings, cases were divided into three categories: agree, disagree and neutral. These categories indicated whether, on average, the raters felt that the mishap could have been prevented by TSAS (agree), could not have been prevented by TSAS (disagree), or indicated no significant feelings one way or the other (neutral).

The results. There were 330 Class A mishaps rated for the selected 20 year period. Based on analysis of the data by USAARL, the investigators determined that 23.9% (79) of the Class A mishaps could have been prevented by use of the TSAS. There were 63 fatalities associated with the mishaps and a total cost of over $700 million.

For the latter ten year period of 2002 - 2011, there were 204 Class A mishaps reviewed. 21.6% (44) fell into the category of those that could have been prevented by TSAS, representing 34 fatalities and accidents costing over $500 million.

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Additional information. In-depth analysis of the survey results as well as additional information on the Tactile Situation Awareness System may be found in the conference paper: *A Materiel Solution to Aircraft Upset* authored by Amanda M. Kelly, Richard L. Newman, Ben D. Lawson and Angus H. Rupert.

SUBJECT: Tactile Situation Awareness System (TSAS) Survey.

Instructions: You have been asked to participate in a study designed to collect information on the potential effectiveness of the Tactile Situation Awareness System (TSAS). You should have completed a simulator demonstration of the TSAS with USAARL. Additionally, prior to starting the survey, please review the video at the below link: http://www.pentagonchannel.mil/recon/ Search: Game Changer (Jun 4, 2012)

Prior to starting the survey, familiarize yourself with the below listed definitions for CFIT and DVE:

Controlled Flight into Terrain (CFIT): A mishap where an airworthy aircraft, under pilot control, inadvertently flies into terrain, water, or an object. This does not include incidents where there is intent to land, object/wire strikes, or the aircraft departs controlled flight.

Degraded Visual Environment (DVE): A mishap where an airworthy aircraft, encounters reduced visibility of potentially varying degree, wherein situational awareness and aircraft control cannot be maintained as comprehensively as they are in normal visual meteorological conditions and can potentially be lost. Brownout is the predominant contributor, but DVE includes all conditions (i.e. brownout, whiteout, blowing sand, dust, smoke, fog, heavy rain, salt spray, low contrast conditions) that partially or completely reduce aircrew visibility.

You are being asked to review each of the enclosed mishaps provided with a Summary and Findings. From the information presented, indicate if you feel the mishap was CFIT related (column C); if you believe DVE was a condition and contributor to the mishap (column D); and if TSAS would have prevented the mishap (column S). An example is shown below. *(Put your answers on the score sheet supplied – not the test sheet)*

Please enter an 'x' for each mishap in the associated column.

C. Based on the above definitions, how would you classify this mishap?

(x) CFIT (No response if you do not feel this is a CFIT mishap)

D. Was DVE a condition of the accident?

(x) Yes – DVE was a condition and contributor to the accident? (No response for non-DVE)

S. TSAS would have prevented the reviewed mishap. (respond to each mishap regardless of type)

(1) Strongly Disagree **(2)** Disagree **(3)** Somewhat Disagree **(4)** Neither Agree nor Disagree **(5)** Somewhat Agree **(6)** Agree **(7)** Strongly Agree **(0)** Not enough information

Example:

#	Type Acft	Period of Day	Summary	Findings	C	D	S 1 2 3 4 5 6 7 0
2	UH 1H	Night	DURING A FORMAL COURSE OF INSTRUCTION FOR NVG REFRESHER/MISSION TRAINING, A FLIGHT OF FOUR UH-1 AIRCRAFT DEPARTED FORBES FIELD IN TOPEKA, KANSAS, FOR A NIGHT VISION GOGGLE NAVIGATION AND FORMATION TRAINING FLIGHT. THE FLIGHT WAS UNEVENTFUL AND THE AIRCRAFT LANDED AT MARSHALL ARMY AIRFIELD, FORT RILEY, KANSAS, FOR REFUEL AS A LIGHT RAIN BEGAN TO FALL. THE AIRCRAFT WERE REFUELED WHILE THE PILOTS UPDATED THE WEATHER. BECAUSE OF DETERIORATING WEATHER CONDITIONS ALONG THE PLANNED ROUTE, THE AIR MISSION COMMANDER CANCELLED THE REMAINING TRAINING. HE PLANNED TO RETURN TO FORBES FIELD BY A DIRECT ROUTE ALONG I-70 AT 500 FEET AGL. THE FLIGHT DEPARTED MARSHALL ARMY AIRFIELD AT 2105 AND AT APPROXIMATELY SIX (6) MILES TO THE EAST, THE TRAIL AIRCRAFT IMPACTED THE GROUND IN A LEVEL ATTITUDE. ALL THREE CREWMEMBERS EXITED THE AIRCRAFT WITH MINOR TO MAJOR INJURIES.	FINDING 1: (PRESENT AND CONTRIBUTING: HUMAN ERROR - INDIVIDUAL/LEADER FAILURE): DURING A NIGHT VISION GOGGLE (NVG) FORMATION TRAINING FLIGHT, AT AN ALTITUDE OF APPROXIMATELY 200 FEET ABOVE GROUND LEVEL (AGL), THE PILOT-IN-COMMAND (PIC) OF THE TRAIL AIRCRAFT, FUNCTIONING AS A UNIT TRAINER (UT), FAILED TO FOLLOW WRITTEN PROCEDURES. WHEN OUTSIDE VISUAL REFERENCE WAS LOST DUE TO WEATHER CONDITIONS, THE UT LEVELED THE AIRCRAFT, BUT FAILED TO ADD POWER TO ESTABLISH A CLIMB AS PRESCRIBED IN TC 1-211, TASK 1083 (VERTICAL HELICOPTER INSTRUMENT RECOVERY PROCEDURES (VHIRP)). AS A RESULT, THE AIRCRAFT WAS ALLOWED TO DESCEND INTO THE TERRAIN RESULTING IN TOTAL LOSS OF THE AIRCRAFT AND INJURIES TO THE CREW. THE UT'S FAILURE WAS DUE TO A COMBINATION OF INADEQUATE PROFICIENCY, TRAINING, AND SUPERVISION. THE UT'S PROFICIENCY WAS INADEQUATE IN THAT HE WAS NOT CURRENT WITH NVG'S NOR HAD HE FLOWN NIGHT FORMATION RECENTLY. THE UT'S UNIT TRAINING WAS INADEQUATE IN THAT HE WAS NOT UNIT MISSION TRAINED NOR QUALIFIED AS AN NVG UNIT TRAILER	x	x	o o o o o x o o

I wish I had a blue chip to spend . . .

We don't usually get favors (blue chips) to cash in. They do occasionally happen. Your career manager calls you up and asks if you would take a short-fuse relocation to a less than optimum location or job. If you will do this, you'll get your choice of return locations or a school or something you desire. It's a fair exchange. Sometimes units do a little horse trading - parts or people for a player or a favor to be named later. It might not make the world go around but it provides an assist.

My 'blue chip' is a little more grandiose. More along the lines of the movie 'Clear and Present Danger.' The scene where the president is talking to the Harrison Ford character about covering up the illegal activities the government was involved with in a foreign country in countering the drug war. In particular, the part where the president tells him "we'll keep this quiet and you can tuck this chip in your shirt pocket and pull it out at a later time when you need something." Probably not the exact wording but I wasn't going to watch the movie again just to get it verbatim. I don't have the ear of the president or a congressman or general officer, but that is the kind of chip I would spend right now.

So what could be so important that a blue chip is required? It's TSAS – the tactile situation awareness system that was developed within the military and currently under the auspices of the USAARL at Fort Rucker. It is a system that uses tactile cues to expand situational awareness to an aircrew. It is effective in degraded visual environments (DVE) as well as other situations that may incur loss of situation awareness. Bottom line - it is a system that gives a crew cueing information without eating up precious visual bandwidth that can sometimes become oversaturated in information displays which can lead to a loss of situational awareness. It's scanning without using your eyes.

TSAS has been addressed several times in *Flightfax* the last few years. An article is included in this issue. As a risk mitigation measure for operating in the degraded visual environment, it makes the list of potential buy items but is not far enough up the list to actually fund. To be sure, there are several high-speed low-drag systems being developed to be the see-all end-all system to operate an aircraft under any and all conditions. The cost will be high, both in dollars and flash to bang time. The acquisition train moves slowly.

TSAS does not have all the gee-whiz components as envisioned in future systems. But it does have the potential to be in the aircraft much sooner and at a much lower cost. Would it prevent all the accidents that a whiz-bang system 15 years in the future will prevent? Absolutely not. Will it help prevent some of them? Absolutely yes, and not 15 years from now. It would be an effective part in a bridging strategy to utilize until the newer technologies mature. I look at it in terms of giving me the 70% solution now instead of the 100% solution too late. **Jon Dickinson, Aviation Directorate**

TSAS on YouTube (copy exactly even if it looks funny): http://youtu.be/5MCtv5WDU5U

Be Prepared for the Unexpected

CW5 Richard E. Arnold
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
Fort Rucker, Ala.
H60 Assault Branch Chief

Our aviation enterprise has recently experienced a rash of accidents related to Inadvertent Instrument Meteorological Conditions (IIMC) and a failure of aviation crew members to recover from the subsequent unusual attitude as required by the ATM.

Think about your preflight procedures. You have obtained a legal weather brief from the appropriate agency. You have conducted a thorough crew brief. All preflight requirements are complete including filing your flight plan and you are ready to go. You had a great night's sleep. Your weather brief is good, but the potential for decreasing weather conditions exist. You conduct a text book run up in accordance with the checklist and you are ready to go. You take off and everything is going exactly as planned. As you continue flying, weather starts to deteriorate. You slow down and realize you may have to land. Upon reaching that decision, you are suddenly engulfed by clouds and you can't see the ground. You have done everything right, but weather gets a vote and it has decided you are now IIMC.

In those first few seconds, you are disoriented, concerned that you are now in the clouds with no instrument flight plan. Your crew becomes quiet and you think back to your training. As you begin to focus on your instruments, you are already in a serious bank and losing altitude. Your mind is trying to register where you are in relation to the earth's surface. Your inner ear is trying to convince you that you are straight and level. At this point, your proprioceptive and vestibular system is not giving you accurate information and your bodily senses have been taken out of the recovery equation. You finally calm down and focus harder on the instruments and begin talking with your crew. Your training takes over and you ignore the overwhelming disorientation. You level the wings and begin a climb. Now everything starts to make sense. This scenario depicts a successful recovery; many time the opposite result happens.

The above scenario does happen all too often, and proper recovery is paramount. Our aviation crews are completing demanding missions all over the world safely and efficiently. Unfortunately, improper recovery and spatial disorientation has caused horrific accidents which have claimed many lives of our aircrews and passengers.

So what is the key to a successful recovery?

Our standardization sections conduct evaluations with each aviator on an annual basis which includes IIMC procedures and unusual attitude recovery. But think about that for a second: that is an evaluation and only happens once a year. The frequency at which these evaluations occur may be insufficient to provide proficiency oversight in these critical tasks.

So what's the answer?

The Army spends millions of dollars on state-of-the-art flight simulators. These important devices allow training at all times on every critical task, including tasks that may only be performed with an IP/IE in the aircraft. Trainers must take the time to design relevant, instrument focused scenarios that truly challenge our aircrew members. Conducting unusual attitudes that are serious but recoverable is important. Trainers should take the time to practice multiple recoveries until our aircrew members are comfortable in an uncomfortable situation. Our chains of command must

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enforce strict adherence to flight simulator scheduling and make sure that even one hour does not go unutilized.

Standardization trainers should also make the best use of the aircraft for training IIMC and unusual attitudes. Don't be tempted to "check the block" for an unusual attitude. While the trainer maintains absolute control of the aircraft, provide pilots the opportunity to recover from various forms of spatial disorientation. Another important facet of the unusual attitude is that it can occur in any flight environment. By selecting an open field under NVGs, a trainer can induce an unusual attitude and train the pilot to recover even under this usually stable flight mode. Also, don't forget the usefulness of our advanced aircraft. Utilizing the flight director when available will help to control the aircraft because "an ounce of prevention is better than a pound of cure".

Finally, ensure our aircrew members are conducting instrument flight IAW AR 95-1. Our flight regulations specifically state when an instrument flight will be conducted. The old adage that "practice makes perfect" is applicable to instrument flight and proficiency will be improved. Enforcing the requirement to conduct instrument training upon our crew members is vitally important, not just to complete three hours (as an example) required by the commander, but to truly become comfortable with instrument flight. Recent Directorate of Evaluation and Standardization visits identify the fact that many aircrew members are not completing semi-annual requirements. This fact coupled with less instrument training is a recipe for disaster when confronted with an IIMC and unusual attitude recovery.

Our aviation crew members are the best in the world. Losing even one more to a senseless accident due to spatial disorientation or IIMC is unacceptable. As a team, we can overcome this trend and save the lives of our fellow soldiers through training and utilizing the technology that is provided to us.

--CW5 Richard E. Arnold, DES H60 Assault Branch Chief, may be contacted at (334) 255-1441, DSN 558.

UAS Class A – C Mishap Table as of 8 Oct 15

	FY 14					FY 15			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	6		3	9	W/GE	3	2		5
MQ-5	1	1		2	Hunter	1		1	2
RQ-7		12	11	23	Shadow		5	8	13
RQ-11			1	1	Raven			1	1
RQ-20			1	1	Puma				
YMQ-18									
SUAV					SUAV				
UAS	7	13	16	36	UAS	4	7	10	21
Aerostat	3	2	3	8	Aerostat	1	0	0	1
Total for Year	10	15	19	44	Year to Date	5	7	10	22

Mishap Review: MD530F

During the conduct of a day VMC approach to an unimproved landing site, the MD530F began an un-commanded right yaw at approximate 15 feet AGL. The aircraft did not respond to the aircrews attempt to control the heading, descended and impacted the ground. The aircraft sustained major damage with no injuries to the crew.

History of flight

The mission of the accident crew was basic pilot skills training which included terrain flight and visual meteorological conditions (VMC) approaches and departures. The IP met his pilot at the AAF flight training building at 1230L to conduct academic flight training, pre-mission planning, and their mission brief. The training being conducted by the accident crew was low risk. At 1300L, the accident crew moved to the aircraft and conducted a crew brief and preflight inspection of the aircraft, finding no faults. Weather at the time of the mishap was winds 090 at 15-20, visibility was unrestricted, temperature 23 degrees Celsius, and density altitude 8893 feet.

The aircraft departed the airport at 1345L as a flight of three and proceeded toward the training area. At 1355 the accident aircraft separated the formation to conduct an aerial recon where the crew intended to conduct training. Upon locating a suitable location, the IP initiated a demonstration of a VMC approach to a hover from 200 feet AGL and 60 knots airspeed. When the aircraft reached 15 feet AGL it started an un-commanded right yaw which increased as the IP attempted to initiate a missed approach. The aircraft did not respond to the IP's attempts to control the heading before impacting the ground. The aircraft sustained major damage with no significant injuries to the crew.

Crewmember experience

The IP, sitting in the left seat, had 3,200 hours of total time, 158 in the MD530, 2,500 combat and 880 as an IP. The PI, operating from the right seat, had 200 hours of total time, 53 hours in the MD530 and 53 hours combat.

Commentary

Investigation determined the aircraft would not provide sufficient tail rotor authority during an approach to a hover at the density altitude and weight at which it was operating. The aircraft's flight manual provided only one chart indicating less than 10% control authority at DA greater than 5,000 feet at a heavier gross weight. This fact was not adequately addressed by written warnings or in the limitations section of the flight manual. Additionally, the IP's aircraft qualification training did not teach the performance limits of the aircraft at high gross weights and/or high density altitude.

Mishap Review: UH-60 Microburst

While hovering to parking, the UH-60L encountered a strong force of wind and rain which induced a sudden left yaw and rapid descent of the aircraft and ground impact. The aircraft was severely damaged with no injuries to the crew.

History of flight

The mission was scheduled pilot flight training. Tasks included formation flight, emergency procedure training and terrain flight. The crew consisted of an instructor pilot with two additional pilots that divided their time between two training periods. The aircrew conducted a mission rehearsal at 1000L and pilot daily brief at 1130L followed by aircraft preflight. Mission risk was briefed as low. Weather briefed before takeoff was 7 miles visibility with rain, clouds few at 5,000 feet, temp 37 degrees Celsius, pressure altitude +140 and wind 230 degrees at 7 knots. A weather watch was issued prior to departure for lightning within 15 nautical miles valid 1400 – 1900L.

The accident crew departed as a flight of five aircraft at 1356L, conducting formation and terrain flight training within the local flying area. At approximately 1500L the aircraft refueled and swapped pilots. After refuel, the flight departed to return to home base. While en route, a weather warning was issued at 1542L for moderate thunderstorms in the area with a maximum wind of 38 knots valid from 1630 to 1830L.

The flight landed at 1615L and separated for further flight training or termination. The accident crew contacted tower and requested to reposition to the hover training area to continue training. While in the HTA conducting training, the aircraft landed due to heavy rain from a passing cell. After the rain passed, the crew decided to terminate training and requested to reposition to parking. Estimated winds were 360 degrees at 18 knots gusting to 28 knots.

While hover taxiing to parking, a 44-knot gust of wind from 340 degrees impacted the left side of the aircraft coupled with an extreme downdraft that impacted the top of the aircraft. The combined force of the wind and rain induced a sudden left yaw and rapid descent of the aircraft. The aircraft pitched down with the main rotor blades striking the ground followed by impact on its right main landing gear with separation of the tail rotor pylon and rolling on its left side. The aircraft was severely damaged with no injuries to the crew. Another unoccupied parked aircraft was rolled on its side during the severe weather.

Crewmember experience

The IP, sitting in the left seat, had 6,900 hours of total time, 5,400 in the UH-60, and 4,600 hours of IP time. The pilot in the right seat had 97 hours total time with 14 in the UH-60.

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Commentary

The investigation determined the aircraft encountered an un-forecasted sudden wet microburst with a severe downdraft wind. Wet microbursts are environmental events that cannot be seen or forecasted with present meteorological measuring equipment, nor are they visible to aircraft crewmembers. They are a rare phenomenon associated with thunderstorms. Two thunderstorm cells merged and collided with an outflow boundary (the remnants of a previous thunderstorm) to form a wet microburst. This event also created a rapid intensification of the thunderstorms as they moved across the heliport and the local flying area.

Manned Aircraft Class A – C Mishap Table as of 8 Oct 15

	Month	FY 14					FY 15			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	0	0	2	0		0	1	3	0
	November	3	0	5	0		2	0	2	2
	December	1	0	4	0		1	1	3	0
2nd Qtr	January	2	2	4	4		2	0	6	0
	February	1	0	3	0		0	0	0	0
	March	0	3	0	0		2	1	9	11
3rd Qtr	April	1	1	7	0		0	1	0	0
	May	4	0	3	2		1	3	3	0
	June	2	1	7	0		1	0	8	0
4th Qtr	July	2	0	5	0		1	3	7	0
	August	0	0	1	0		2	2	2	0
	September	0	1	5	0		1	1	3	0
	Total for Year	16	8	46	6	Year to Date	13	13	46	13

Class A Flight Accident rate per 100,000 Flight Hours			
5 Yr Avg: 1.33	3 Yr Avg: 1.28	FY 14: 1.52	Current FY: 1.52

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Mishap Review: AH-64D Engine Failure

During the conduct of aerial gunnery training, the AH-64D descended rapidly from a climbing high hover and landed hard on the firing pad. The aircraft sustained serious damage. There were no injuries.

History of flight

The mission was scheduled training as part of an aircraft qualification course. Tasks included terrain flight, emergency procedure training and live fire training at the aerial gunnery range. The crew consisted of an instructor pilot and a PI/student pilot. Mission risk was briefed as low. The aircrew show time was 1100L for a daily brief followed by aircraft preflight and runup. Weather was few clouds at 4,100 feet, scattered clouds at 5,000 feet and 10 miles visibility. The temperature was +32 degrees Celsius with winds variable at 2 knots.

The aircraft departed home station at 1310L and flew to the aerial gunnery range to load ammunition. At 1351 the aircraft occupied the firing pad where they conducted a firing pad brief which included verification of the firing pad range limits and the training to be conducted. The crew also discussed required actions in the event of an emergency over the pad to include the possibility of the loss of an engine and the subsequent actions to be taken to accomplish a safe landing if it occurred. With the PI on the controls, the accident aircraft began a slow hover upward to assume a pre-planned altitude of 160' AGL. At approximately 66' AGL, both crewmembers heard a sharp noise, described as a loud bang, which came from the right side of the aircraft, followed by a 'rotor RPM low' audio annunciation. The IP immediately took the controls and executed the emergency procedure for an engine failure while hovering OGE. The aircraft impacted in the center of the firing pad with damage to the main landing struts, tail landing gear strut and the cannon weapons system. There were no injuries.

Crewmember experience

The IP, sitting in the front seat had 1,000 hours of total time, 231 in the AH-64 and 142 hours as an IP. The PI, operating from the back seat, had 915 hours of total time with 47 hours in the AH-64D.

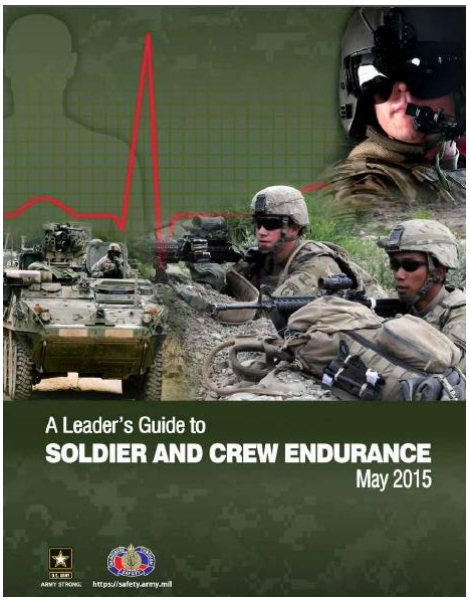
Commentary

Investigation determined the aircraft experienced an engine failure of the No. 2 engine. The aircraft weight and environmental conditions precluded single-engine flight resulting in decreasing rotor RPM and a rapid descent to a hard landing.

The No. 2 engine failure was attributed to a fracture and separation of a compression blade on the stage 2 compressor blade disc. The separated disc resulted in downstream compressor engine object damage, high cycle fatigue to the engine compressor and subsequent, abrupt engine failure with catastrophic internal engine damage.

NEW!

A Leader's Guide to SOLDIER AND CREW ENDURANCE - available on line.



The fundamental purpose of this guide is to provide leaders with information and tools for effectively managing crew endurance hazards. It focuses on the need for minimizing fatigue, sleep deprivation, environmental extremes and stress, and problems resulting from circadian rhythm disruptions caused by jet lag and shift lag. It also provides guidelines for managing the hazards associated with these stressors when they cannot be eliminated entirely.

Originally developed in 1997 to address crew endurance issues experienced by aviators, the revised Leader's Guide to Soldier and Crew Endurance includes the current medically-supported strategies for managing fatigue in an operational environment for both air and ground assets. It provides specific information and tools to help leaders eliminate or mitigate the hazards associated with fatigue.

Fatigue has always been a pervasive problem in the military. With multiple root causes, it is exacerbated by still more elements commonplace in an operational environment. The result has been compromised missions and senseless loss of life, both directly and indirectly attributable to fatigue. Every leader, and in fact, every Soldier, has a responsibility to protect against the dire impact of fatigue by realizing the true hazard it represents to safety and operational effectiveness. The information provided in this guide will help leaders effectively mitigate crew endurance hazards.

It can be accessed with the following link:

https://safety.army.mil/LinkClick.aspx?fileticket=HpiP2FnXMdQ%3d (AKO Login Required)

Army Safe is Army Strong!

A whale swims all day, only eats fish and drinks lots of water, but is still fat. A rabbit runs, hops and jumps all day, but only lives for 15 years. A tortoise doesn't run and does mostly nothing, yet it lives for 150 years. And you tell me to exercise? I don't think so.

Accident findings: From the archives for your review

FINDING 1: (Present and Contributing: Human Error - Individual and Leader Failure): While conducting a daytime approach to a tactical landing zone, the PC failed to detect hazards. That is, the PC failed to update the aircraft performance data in flight and identify that the aircraft performance was going out of limits for the landing conditions.

As a result, both engines reached the temperature and power limit, the main rotor rpm drooped, and the aircraft experienced a hard landing causing significant airframe damage to the underside of the transition section and the tail rotor pylon, and catastrophic failure of the intermediate gearbox output flange.

The PC's failure to identify that the aircraft performance was going out of acceptable limits was a result of his overconfidence and improper supervision by the unit command. The PC contributed to the error by assigning the Performance Planning Card (PPC) task to the PI without verifying that the task was done to standard. He did not compute his performance limitations again in flight, with current conditions, even though his maximum gross weight OGE was within 300 pounds of his arrival weight on his PPC. He also did not compute his zero weight again, even though his hover power check was 3% over the PPC value. The PI relied on the company SP to fill out the data for the PPC program without verifying the data reflected the current weather brief. The company SP contributed to the error by allowing the crew, and potentially other crewmembers, to have the perception that it was acceptable not to conduct dynamic recalculation of power requirements in flight.

An interesting read on a hazard to shipboard operations:

http://www.militarytimes.com/story/military/2015/06/28/lawrence-helicopter-tragedy-accident-ddg-investigation-hazrep/29162991/

It’s not hard to meet expenses. . . They’re everywhere.

Fixed facts of life

It is common knowledge that most any aircraft can usually take more punishment than the handbook recommends if the occasion seems to demand it. That doesn't mean that an aircraft, fixed or rotary wing, should be pushed past the red line. Sometimes, when the density altitude (DA) has soared out of sight, an aircraft can be pushed too far. It will cling to the ground with a grip of steel. You just might be able to coax it into the air by using spurs and horsewhips. You are not going to coax it very high or very far.

Just the same, the temptation is there for a pilot who doesn't know or fully respect his operators manual. The temptation to forget the limitations. To overlook them. Or, what is probably the case 99 times out of a hundred, to gamble. Gambling can be great sport, if you can afford to lose.

There are several interesting ways pilots gamble with weight and balance with Army aircraft, particularly helicopters. You may well win for a while, too, but don't worry. The odds will surely catch up with you in the end.

- You can grossly overload an aircraft under the simple theory that it will obligingly haul upstairs anything you can cram into It. This is known in gambling circles as the Beginner's Approach and is not recommended by old hands.
- You can make a hasty estimate of the weight and balance situation rather than arrive at an exact figure. This is the mark of the born gambler. All born gamblers are due to die broke.
- You can forget about the whole thing, ignore the odds. People like this aren't even allowed at the tables at Vegas. They make the other players nervous.
- You can look at one aspect of the situation and forget the other. In gambling circles this is referred to as Blind Man's Bluff and nobody will argue that it isn't as exciting as all get-out-as long as it lasts, which probably won't be too long.

One long-shot way of gambling is to tinker with density altitude.

Most aviators associate high DA with summertime flying and have an almost intuitive feeling that it reduces aircraft performance. What is not fully understood are the factors that make up density altitude and their direct application to mission planning and execution. Mishap files are full of cases in which the aviator did not fully understand the concepts involved or attempted to substitute "technique" for sound planning.

A UH-1 H, loaded with crew, three passengers, 21 mermite cans, 18 cases of soft drinks, and other food items was making an approach to a tactical landing site in mountainous terrain. On final approach, an excessive rate of descent developed. A go-around was initiated with a right turn. During the turn, the aircraft struck trees, the main rotor hit the ground and separated, and the aircraft came to rest in an inverted position and was destroyed by fire. The aircraft was over gross and out of C.G.

A UH-1 H with crew of three and nine combat-equipped troops took off across a shallow gully. Just after takeoff, cyclic feedback occurred, the low rpm audio came on, and rpm dropped to 6200. The pilot lowered collective slightly and rpm returned to 6600. A right turn was made toward a landing area. Rpm again dropped to about 5800 and the aircraft touched down hard, yawing to the right. Substantial damage resulted from an attempt to take off with the aircraft over gross weight limitations.

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The big trouble with density altitude is that you can't see it. When a pilot about to take off is confronted with a thunderhead which looks like the after-effects of a 20-megaton nuclear blast, he prudently stays on the ground. The same aviator, no matter how experienced, can be capable of sailing blithely off into the wild blue yonder on a sunny day which is every bit as lethal for an aircraft which has been loaded with no thought to DA.

It's no great secret that hidden dangers are the ones most likely to trip you. DA may be hidden from you. It isn't hidden from Army rotary wing aircraft, which are as sensitive to sudden changes as a skittish colt. On a sunny summer day, Fort Rucker looks the same at noon as it did at breakfast. No new mountains, or anything. Just the same old flat Alabama landscape we all know.

But no Huey in its right mind is fooled. It knows that while Rucker's actual altitude is under 400 feet, its density altitude varies between minus 1,000 and plus 4,000, depending on the time of day and the mood the sun is in. To a hard-working Huey, that makes the difference extra pounds do to a horse in a handicap race. It will tell you so, too, and in no uncertain fashion, if you load it with no thought to density altitude.

Rucker is not an exception. There is hardly any place where Army aircraft are operating that DA ranges can't vary widely on a day-to-day basis. A jungle which can be comparatively cool at night can be steamier than a commercial laundry by mid-morning.

What really is this thing called density altitude?

It obviously has something to do with air density or mass per unit volume. To be specific, density altitude is altitude corrected for changes in temperature, pressure, and, oftentimes, humidity. Air density will be decreased by a rise in temperature, a drop in pressure, or an increase in humidity. This last effect is due to the fact that while water is obviously more dense than air, water vapor is a gas which is less dense than air. A mixture of dry air and water vapor is therefore less dense than an equal amount of dry air.

As the temperature of air increases, so does its ability to hold moisture, and thus it becomes less dense. Density altitudes obtained from sources such as Air Force weather stations include the effects of humidity. The standard density altitude formula, the dead reckoning computer and most density altitude charts are based on dry air; humidity is not considered. If the air is hot and the relative humidity is high, the error can approach 500 feet. Mission planning that does not consider the effects of humidity can thus result in a decision to carry an extra passenger or extra cargo with potentially dangerous results.

The steps to take then are:

• Check weight and balance.

• Make an approximate correction for humidity. If the air is cold and dry, the correction is negligible. If it is hot and humid, add 400 feet to the pressure altitude to correct for humidity. This will effectively increase the density altitude by about 500 feet.

• Use performance charts to determine mission allowable gross weight.

• Repeat above steps for each point of intended landing (or hovering).

• If the result is marginal, reduce the load or fuel still further since the charts are not exact, and other parameters have not been considered, such as load factor due to angle of bank or deceleration, engine condition, winds, and nonstandard lapse rate.

Everybody's problem

In Army aviation, weight is everybody's problem. It is true the helicopter is about as sensitive to

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density altitude changes and weight loads as a hay fever sufferer is to milkweed and goldenrod, but even workaday fixed wings can become balky if you put too much of a burden on them.

It's a fact that **any time** you improperly load an aircraft you are imposing additional stresses which are not going to improve its flying performance or lengthen the time before it will have to be retired to pasture.

Weight is one thing. Balance is another. The two have a definite connection, though. Weight is a simple matter of pounds and ounces. Balance is how it is distributed. Much to the Army's distress, pilots who are careless about weight requirements aren't exactly as scarce as watermelons in Greenland.

Here's a classic case involving some UH-1s. Several of them were assigned the task of carrying troops from a point at low altitude to one up in the hills. One of the helicopters broke down at an intermediate point and the pilot of another, obliging soul that he was, loaded aboard the stranded troops. Not that they ever got there. Long short of the destination, rising actual and density altitudes forced the laboring Huey to a messy landing in a patch of woods.

Here was a pilot who had given no thought to the mission as a whole from takeoff to touchdown, not in the way the pro would handle it. Instead, using his own crystal ball, he managed to arrive at the conclusion that he could pack aboard more passengers than they do on subways at the rush hour and still land them safely at a place where even Alpine climbers would have trouble handling the thin air. He was wrong.

Expecting miracles

Every aircraft has definite limitations. You might get a near-miracle in performance from your helicopter for a while, but only as long as it can deliver maximum performance under optimum conditions. For instance, everybody knows that it is not unusual for a helicopter to lose rpm on takeoff. You won't get the miracle you are asking for when that happens to you in an overloaded helicopter when the DA is high.

About the only miracles being passed these days are the result of solid hard work and unremitting attention to detail. As a matter of fact, once you have that I lesson under your belt you don't need any miracles.

Where you **will** find density altitude and weight and balance given its proper share of respect is in units which have sound training and supervisory programs aimed at impressing younger pilots with the importance of weight and balance and keeping old hands from forgetting about it.

Training and supervision can go only so far. After that it is a matter of mature responsibility.

Weight and balance and density altitude, like calories, are fixed facts of life. Pretending they aren't there, or can be tinkered with, isn't going to make them go away.

It is just going to weigh on you that much heavier. That's all. •

Selected Aircraft Mishap Briefs

Information based on preliminary reports of aircraft mishaps reported in May 2015.

Cargo helicopters

H-47F

-Crew was attempting to release the aircraft's M1151 load when the front hook reportedly failed to release immediately. The vehicle was dragged by the aircraft's forward momentum and sustained damage as a result.(Class C)

-Post-flight inspection revealed that lubricant was leaking from the swashplate area. Further inspection revealed a bushing was jammed as FOD in the non-rotating swashplate area. (Class C)

Observation helicopters

MD-530

-During landing aircraft lost tail rotor effectiveness, entered an unrecoverable attitude and crashed. (Class A)

Fixed-wing

C-12

-V Series. Engine torque exceedance was discovered during routine FDR download. Exceedance is suspected of having occurred during flight featuring single-engine operation. (Class C)

Utility helicopters

H-60

-M Series. Aircraft was landing for a MEDEVAC mission in dust conditions when it touched down and rolled forward into a ditch. All four main rotor blades subsequently made contact with the ground and sustained damage. (Class B)

-L Series. Crew was conducting NOE flight training on an approved route when the aircraft contacted wires. Aircraft was landed without further incident. (Class B)

-L Series. Crew was executing a dust landing when the main rotor blades made contact with the tail rotor, severing the drive shaft. (Class B)

Unmanned Aircraft Systems

RQ-7B

- Engine failed. Chute deployed. UA recovered with damage. (Class C)

Information based on preliminary reports of aircraft mishaps reported in June 2015

Cargo helicopters

H-47

F Series. Aircraft sustained damage during connection of a 155MM howitzer for sling load operations. A stabilizing arm from the howitzer contacted the ramp, which resulted in damage to the lower edge of the ramp. (Class C)

Observation helicopters

AH-6M

-During AH-6M FADEC demonstration, aircraft experienced rotor over speed. (Class C)

During AH-6M manual FADEC operation, aircraft experienced rotor over speed. (Class C)

Fixed-

C-12

-W Series. Crew experienced over temp condition of right engine during flight. Engine replaced. (Class C)

- P Series. During approach, crew experienced a significant wind gust. Left landing gear contacted ground and aircraft bounced back up. During post flight, right prop was found to be damaged. (Class C)

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Utility helicopters

H-60

-A Series. Aircraft was hovering to parking, crew experienced severe wind gust. Aircraft made un-commanded contact with the ground. (Class A)

-L Series. HH-60L crew experienced a No. 1 engine fire warning light and smoke emanating from left side of the aircraft. Crew conducted emergency landing and egress. Spindle damage noted on post flight. (Class C)

-L Series. During normal approach crew did not notice a stump in the LZ. The stump made contact near the No. 1 fuel cell creating a hole in the sheet metal and internal damage to the aircraft. (Class C)

Unmanned Aircraft Systems

MQ-1C

-After 10 hours of flight, the MQ-1C lost altitude at a rapid rate striking power lines and crashing. (Class A)

RQ-7B

-UA climbed 15 feet in un-forecasted winds prior to TALS touchdown point. Engine automatically disengaged and the UAS dropped to the runway, damaging the payload, wings and center of aircraft. (Class B)

-During flight training, the crew experienced failure of the left flap servo. UAS landed with the chute and sustained damage. (Class C)

-UAS experienced loss of link during flight. Aircraft landed with chute and sustained damage. (Class C)

Information based on preliminary reports of aircraft mishaps reported in July 2015

Cargo helicopters

H-47

-G Series. CP door separated in flight. (Class C)

-G Series. Crew experienced a bird strike. Windscreen, MRB damage. (Class C)

Attack helicopters

H-64

-D Series At 100 FT AGL, crew heard loud report from No. 2 engine area, low rotor RPM followed by a hard landing. (Class A)

-D Series Aircraft descended into trees during combat maneuvering flight. Damage to MRS and right-side fuselage. (Class B)

Observation helicopters

MH-6M

-FADEC failure at a hover. Aircraft experienced rotor over speed. (Class C)

Utility helicopters

H-60

-A Series. During NVG RL progression roll-on landing, MRB made contact with the aircraft tail rotor driveshaft. (Class B)

-A Series. Dual engine over-speed condition occurred during simulated engine emergency. (Class B)

-M Series. During live fire training, the crew experienced an explosion and separation of the 30mm cannon flash suppressor. Damage to one MRB and fuselage. (Class C)

Continued on next page

Fixed-wing

C-12

-W Series. Crew experienced over temp condition of right engine during flight. Engine replaced. (Class C)

W Series. #1 Engine over-temp after take off. (Class C)

U Series. #2 Engine over-temp during climb out. (Class C)

Unmanned Aircraft Systems

MQ-1C

-UA crashed following lost link after GCS shutdown. (Class A)

RQ-7B

Engine failed after launch and struck trees. (Class B)

Information based on preliminary reports of aircraft mishaps reported in August 2015

Observation helicopters

OH-58D

-Crew was conducting an MTF when the aircraft reportedly initiated un-commanded rotations and descended into trees. Post-flight inspection revealed that the aircraft nose cover was intermeshed in the tail rotor, presumably after having been blown out of the aircraft from its stowed position. (Class A)

-Crew was training in manual throttle maneuvers while in cruise flight when they experienced an engine failure indication following vibrations and a loud report from the engine compartment. On landing aircraft sustained skid gear damage. (Class C)

Utility helicopters

H-60

M Series. Crew was conducting a shipboard landing when the aircraft sustained damage as the result of structural contact. (Class A)

A Series. Crew was attempting a dust landing when the aircraft landed hard, resulting in MRB strike with the tail boom drive shaft. (Class B)

M Series. Main rotor blades contacted the tail boom during a roll-on landing for a CE RL progression training mission. (Class B)

Unmanned Aircraft Systems

MQ-1C

-Crew reportedly received battery/alternator warning indication while system was in flight and subsequently lost link while attempting to maneuver the system for return. Crew initiated a controlled landing and the system came to rest largely intact. (Class A)

If you have comments, input, or contributions to Flightfax, feel free to contact the Aviation Directorate, U.S. Army Combat Readiness Center at com (334) 255-3530, DSN 558-3530

U.S. ARMY

COMBAT READINESS CENTER

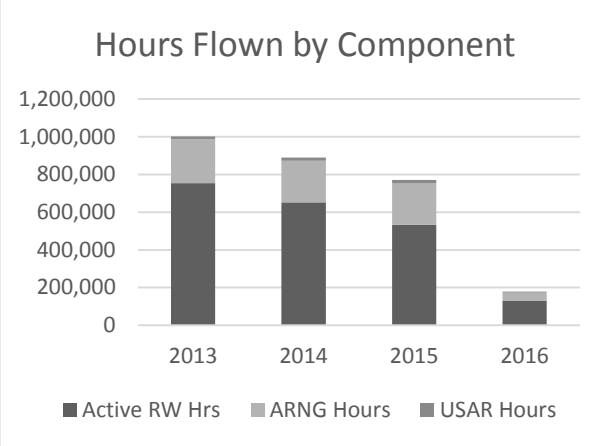
Online newsletter of Army aircraft mishap prevention information published by the U.S. Army Combat Readiness Center, Fort Rucker, AL 36322-5363. DSN 558-2660. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Flightfax is approved for public release; distribution is unlimited.

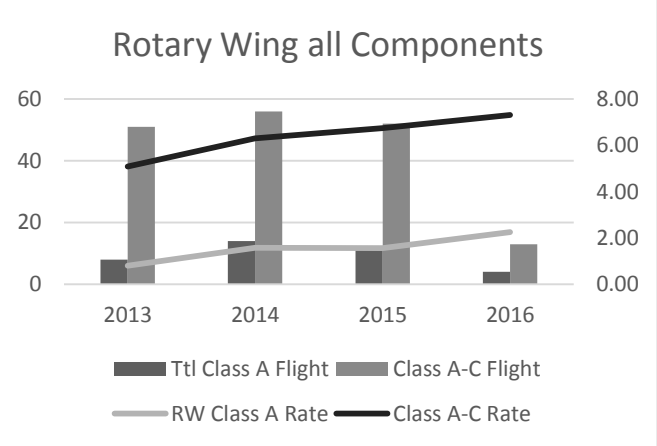
Number 51 September - December 2015

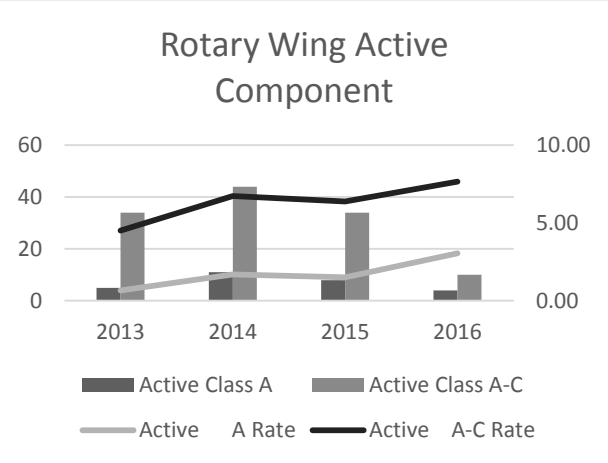
Flightfax®

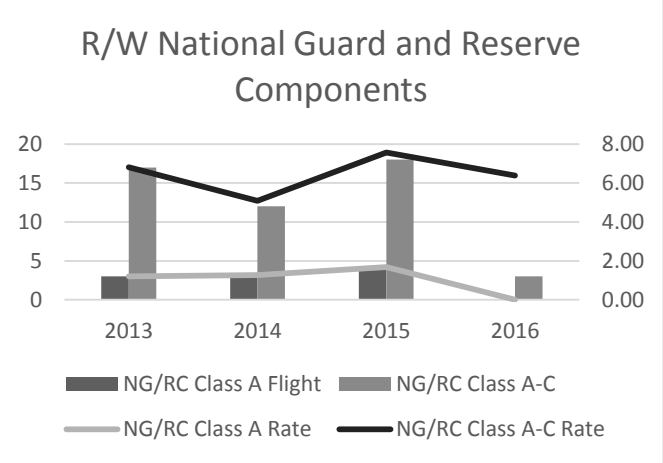
Online newsletter of Army aircraft mishap prevention information

Army Aviation has seen a 30% increase in Class A-C mishaps over Fiscal Years 2013 – 2015, with a corresponding decrease in flying hours by approximately 25%. In the same period, non-deployed mishaps accounted for nearly 70% of the Class A accidents, a near reversal of previous trends. Given the FY 13 historic low starting point, the fluctuating rates by component and varying causal factors since then, these accidents don't indicate a specific trend but there is concern that these mishaps are a harbinger of future accidents.









As the Army experiences a reduction in manpower, decreasing budgets and an increasing OPTEMPO to train a globally deployed and regionally aligned force - Army Aviation faces significant training and risk management challenges to keep pace. We are asking aviation units to train a force that is more flexible, lethal, and adaptable. To succeed in the Decisive Action Training Environment aviators must train on a wider array of tasks. Some skills are new; attack helicopters taking on increased scout and reconnaissance roles and manned and unmanned teaming (MUM-T). Other tasks are combined arms maneuver skills that have languished over the last decade as

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we focused on Counter Insurgency Operations (COIN) in Iraq and Afghanistan. Terrain and nap of the earth flight, hovering fire, external loads, collective gunnery and larger scale multi-aircraft operations are increasingly important. As we reset task lists and go beyond currency to build new proficiencies we can expect a transitional increase in risk.

The transition from COIN to Decisive Action requires aviation units to increase their overall proficiency from the Team/Platoon level required for COIN to the Company/Battalion level maneuver required for Decisive Action. The types of hazards encountered are not new; they're the same ones Aviators have always faced. However, proficiency suffers as flying hours, time on the controls, and the frequency of task iterations decrease -- increasing the risk level and with it the probability of an accident. If the hazards from this transition aren't properly identified and the risk mitigated to an acceptable level, the result could lead to a real trend in increased aviation mishaps.

The Army Chief of Staff and Vice Chief of Staff are very concerned with the recent increase in mishaps and have directed a holistic assessment of Aviation which will examine leadership, readiness, training, sustainment, resourcing, policy, and other areas as required. This assessment will undoubtedly yield benefits for the entire force over time. Meanwhile, every Commander can take action now to assess their own Aircrew Training Programs, aggressively manage this transitional risk, and optimize the resources they have. Higher collective training proficiency coupled with pro-active hazard identification, risk reduction, and rigorous mission risk approval processes will prevent loss and buttress readiness in every formation.

Class A – C Manned Aircraft Mishap Table

	Manned Aircraft Class A – C Mishap Table									as of 30 Dec 15
	Month	FY 15					FY 16			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	0	1	3	0		1	3	5	0
	November	2	0	2	2		2	1	0	6
	December	1	1	3	0		1	1	1	2
2nd Qtr	January	2	0	6	0					
	February	0	0	0	0					
	March	2	1	10	11					
3rd Qtr	April	0	1	1	0					
	May	1	3	5	0					
	June	1	0	8	0					
4th Qtr	July	2	3	7	0					
	August	2	1	3	0					
	September	1	1	3	0					
	Total for Year	14	12	51	13	Year to Date	4	5	6	8
	Class A Flight Accident rate per 100,000 Flight Hours									
	5 Yr Avg: 1.28		3 Yr Avg: 1.25			FY 15: 1.52			Current FY: 2.02	

Preliminary Report on FY15 Aircraft Mishaps

In the **manned aircraft** category, Army aviation experienced 77 Class A-C aircraft mishaps in FY15. This is an increase from the 74 Class A-C aircraft mishaps reported in FY14, including an increase in fatalities from 6 to 13. There was a decrease in Class A mishaps from a total of 16 in FY14 to a total of 14 in FY15.

	2014	2015
CLASS A	**16**	**14**
CLASS B	**8**	**12**
CLASS C	**50**	**51**
TOTAL	**74**	**77**
FATALITIES	**6**	**13**

CLASS A Summary: There were 14 (13 flight, 1 flight related) Class A mishaps, seven of which occurred at night. Four of the 14 occurred in Iraq/Afghanistan. Human error was the cause factor in 11 (79%) of the mishaps. Materiel failure or suspected materiel failure was contributing in two (14%) of the mishaps. There was one environmental-related mishap. Two flight mishaps resulted in 13 fatalities.

The flight category Class A mishap rate (RW+FW) for FY15 was 1.52 (Class A flight mishaps per 100,000 hours of flight time). For FY 14, the rate was also 1.52.

CLASS B Summary: 12 (all Flight) Class B incidents were reported, 11 with a human error cause factor and one materiel failure. Five mishaps occurred at night. 12 total mishaps represent a 33% increase from FY14.

CLASS C Summary: 51 (40 Flight, 9 Ground, 2 Flight-related) Class C mishaps reported with 11 occurring at night. Cause factors included 26 human error, four materiel failures, five environmental (typically bird strikes), and 16 unknown or not reported.

Operational Assessment :

Human Error: Degraded visual environment was a contributing factor in three Class A, two Class B, and three Class C aircraft mishaps. This included two Class A night IIMC, one Class A dust landing, two Class B dust landing events and three Class C dust events. There were 11 fatalities associated with a single IIMC mishap. Power/maneuver management contributed to two Class A and one Class C incidents. Additional Class A mishaps included one fratricide, one mid-air, and one shipboard operation.

Materiel Failures: Class A materiel failures included one engine failure (AH-64D) and one flight control malfunction (MH-6M). One Class B - a main rotor blade failure in flight (H-60).

2015 breakdown by aircraft type:

	Class A	Class B	Class C
H-60	7	9	16
AH-64	3	2	3
H-47	0	0	8
OH-58D	1	0	2
LUH-72	0	0	3
TH-67/OH-58	0	1	2
AH/MH-6/MD530	2	0	5
Mi-8/17	0	0	2
C-12/26/27/37/UC-35	1	0	9
EO-5C/DH-7	0	0	1

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Synopsis of selected FY15 accidents (* denotes night mission)

Manned Class A

* AH-64D: During demonstration of DECU lockout maneuver, both engines shut down following overspeed condition. Aircraft crashed resulting in two fatalities.

* UH-60A: Aircraft spun right as it came to a hover. Aircraft landed hard with main rotor blades contacting adjacent cement barriers. The #1 hydraulic pump module return line QD was found disconnected resulting in a tail rotor fixed pitch setting.

* C-27J: During NVD training flight aircraft was involved in a mid-air collision with a C-130. Both aircraft landed with damage.

* UH-60A: Following a night VMC unaided takeoff the aircraft entered a layer of fog with the landing light on. The pilot on the controls lost orientation with outside visual references and started an uncorrected descending right turn until it impacted the ground.

* MH-6M: Materiel failure. Aircraft struck trees. Suspected flight control malfunction.

* UH-60M: Shortly after takeoff for an overwater NVG mission the crashed into the water at a high rate of speed and descent, resulting in 11 fatalities and catastrophic damage.

* HH-60M: Aircraft landed hard during dust landing training. Main rotor blades contacted and severed the drive shaft.

- MD530FF: During landing at high altitude, aircraft lost tail rotor effectiveness and crashed.

- UH-60L: While hover-taxiing to parking, the aircraft encountered an unforecasted sudden wet microburst with a severe downdraft wind. The aircraft entered a left descending yaw impacting the ground and coming to rest on its left side.

- AH-64D: Aircraft experienced a number two engine failure at 66 feet above ground level. The aircraft weight and environmental conditions at the time of the engine failure precluded single engine flight. The crew was able to perform a forced landing emergency procedure and arrest some of the descent before the aircraft struck the ground causing severe damage.

- AH-64E: Fratricide incident reported.

- H-60M: While landing on a ship, the main rotor blades contacted the ladder cage on the bow mast multiple times. Aircraft landed hard on the ship's deck resulting in 7 injuries and severe damage to the aircraft.

- OH-58D: During a maintenance test flight, an unsecured aircraft cover struck the tail rotor. Aircraft descended into trees.

- UH-60L: Crew was performing combat maneuvering flight and initiated a 60-degree right bank angle with a 24 degree nose low attitude and was not able to recover due to exceeding aircraft performance limitations and insufficient altitude. The aircraft was destroyed and the crew was injured.

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In the **unmanned aircraft systems**, there were 22 Class A – C incidents with five Class A, seven Class B, and 10 Class C mishaps reported. The Class A mishaps included one aerostat balloon, three MQ-1s, and one MQ-5B. The RQ-7Bs comprised 13 of the 17 Class B and C mishaps with cause factors relating to engine failures, landing problems, and lost link.

2015 breakdown by aircraft type:

	Class A	Class B	Class C
MQ-1	3	2	0
MQ-5B	1	0	1
RQ-7B	0	5	8
RQ-20A	0	0	0
RQ-11	0	0	1
Aerostats	1	0	0
Total	5	7	10

Synopsis of selected accidents (FY15):

UAS Class A

- MQ-5B: Aircraft contacted arresting gear drum on landing.
- MQ-1C: Uncommanded descent with engine RPM fluctuations.
- MQ-1C: Lost linked following GCS shutdown. UA failed to return.
- MQ-1C: Alternator failure.

Aerostat Class A

- PGSS: Aerostat tether broke while lowering.

Other UAS mishaps

- RQ-7B: During approach UA lost power at 30 feet resulting in a hard landing. (Class B)
- RQ-7B: Engine malfunction. Chute deployed. UA recovered with damage. (Class B)
- MQ-1C: Gear collapsed on landing. (Class B)
- RQ-7B: UA lost engine RPM after launch and crashed. (Class B)
- MQ-1C: UA descended after takeoff – hard landing. (class B)
- RQ-7B: Flap servo failure. Chute deployed. UA recovered with damage.
- MQ-5B: UA departed runway on rollout following landing. Damage to landing gear. (Class C)
- RQ-7B: ECU COMMS Fail, Ign and gen fail. Chute deployed. (Class C)

Men marry women in the hope they won't change. Women marry men in the hope they will change. Both are doomed to disappointment.

AH-64 BEARING CAP TOOL

CW4 Richard Crabtree
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
Fort Rucker, Ala
AH-64D/E Maintenance Test Pilot Evaluator

During recent assessment visits to five locations, DES has identified the use of an unauthorized tool referred to as the "Lead Lag Link Bearing Cup Wrench" or the "Spatula." This tool is not an issued item, but is commonly being used to align the main rotor bearing caps during installation, loosen them during removal, and to realign them in the event they rotate during flight.

AH-64-07-ASAM-11 and the AH-64 IETM instructs maintainers to check for a gap greater than .020" between the bearing cap and the retainer every 25 flight hours. If this gap cannot be reduced below .020" by reseating or replacing the retainer, then both references instruct the maintainer to remove the main rotor blade and lead lag link assembly and replace the hub bearing. By using this unauthorized tool as a time-saving measure to turn the bearing cap back into position, Soldiers may be inadvertently masking internal wear that is causing the caps to rotate. This type of procedure may seem logical and resourceful to a Soldier or supervisor who doesn't understand the purpose and background of the ASAM, however, the results of using this unauthorized tool are potentially catastrophic.

DES is concerned that this tool is not authorized by the IETM or any separate references available to the unit, yet its use is being discovered at nearly every location visited. More importantly, unauthorized maintenance practices such as this may be masking much more serious aircraft deficiencies, which will go unnoticed due to failure to adhere to authorized, published maintenance standards. Although this particular example is specific to the AH-64, it provides all units the opportunity to self-assess their own maintenance practices, determine whether they are in accordance with approved standards, and take appropriate corrective actions.

--CW4 Crabtree, DES AH-64D/E MTFE, may be contacted at (334) 255-1446, DSN 558.

Class A – C Unmanned Aircraft Mishap Table

UAS Class A – C Mishap Table									as of 30 Dec 15
	FY 15					FY 16			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	3	2		5	W/GE	1			1
MQ-5	1		1	2	Hunter				
RQ-7		5	8	13	Shadow			1	1
RQ-11			1	1	Raven				
RQ-20					Puma				
YMQ-18									
SUAV					SUAV				
UAS	4	7	10	21	UAS	1	0	1	2
Aerostat	1	0	0	1	Aerostat	1			1
Total for Year	5	7	10	22	Year to Date	2	0	1	3

Accident findings: From the archives for your review

FINDING 1: (Present and Contributing: Human Error - Individual and Leader Failure):

While conducting night vision goggles (NVG) gunnery training at approximately 110 feet above ground level (AGL) and 90 knots indicated airspeed (KIAS), the crew of the OH-58D failed to scan. That is, the pilot in command (PC) and pilot (PI) did not properly scan outside the aircraft when distracted with radio communications. This is in contravention of Training Circular (TC) 1-248, Tasks 1408 and 1026. As a result, the aircraft made contact with wires at approximately 115 feet AGL, causing separation of major aircraft components and impacting the ground. The crew received fatal injuries and the aircraft was destroyed.

The crew's actions were a result of limited NVG experience and overconfidence in each other's abilities to conduct NVG training under zero illumination in the vicinity of known obstacles.

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Margin of Survival

"They sounded so calm." It's almost always the first thing you notice about cockpit recorder audio as a doomed aircrew enters a degraded visual environment. Like a frog in a pot of cool water just sits there as it is slowly brought to a boil, those haunting voices remain so calm; only alarmed at the very last moments, if at all.

From outside the aircraft, listening to the voices and watching the animation of the IVHMS data, you want to scream at them, shake them, wake them out of their disorientation and tell them how to save their own lives! Yet, it's too late. There's pictures of the aftermath. They're gone. But, hadn't they been in your seat? Hadn't they seen the animations and pictures? Hadn't they heard the voices? Why didn't they see it coming? It begs the question: What could we do differently, train differently, to save the next crew? How do we keep our brothers, sisters, and ourselves from calmly hurtling toward our own demise?

I think we need margin. A simple word that most people don't use unless trying to write a memo or get an Excel sheet to print on one piece of paper. We hear about margin of error in calculations or predictions. But, as aviators, we don't use margin and it may be what is killing us.

So, what is margin? The margins on a sheet of notebook paper keep the writer's pen from slipping off the paper and protecting the desk. The margins in a book protect the printed information from being lost to damage from the outside. Margin is an indicator to keep us safely away from the edge, away from that absolute limit. We can apply margin in aviation to keep us away from insidious dangers, away from that absolute limit from which no one returns.

But how do you apply margin? Simple, draw a line. We know the limitations given in 95-1, -10s, SOPs and the FARs. We are encouraged to assess ourselves and set personal limits for weather, crew mix, mission complexity and physical and mental state. But we need to establish margins on those limits.

Here's how:

1) Determine how far back from the limit you have to be to safely turn the situation around.

2) Know how you will react when reaching that point.

3) Brief your crew. An individual is much less likely to change their standards in the moment if someone is there to hold him accountable. Direct assistance from the people whose lives depend on your margin.

4) Repeat as necessary.

But please, don't stop at aviation. Look at every aspect of your life. Margin can be applied to standards of morality, sobriety, tact, professionalism, etc. Like bumpers on a bowling lane, it will keep you going in the right direction.

CW2 Jesse L. Tait
Instructor Pilot
2CAB, Korea

Articles from the archives of past Flightfax issues

Safe winter flying means training and maintaining (Sep 93)

Nature has a way of keeping aircrew members on alert. Throughout the year, each season adds a little something extra for them to think about before the next mission. Sometimes the weather even surprises a crew during the mission with unexpected changes. As the winter season approaches, a combination of cold temperatures, high winds, ice, and blowing and drifting snow – hazards that greatly increase the likelihood of a winter-related accident – will soon be challenging crews.

We don't hear too much about successful winter aviation operations. But we do hear about the ones where crews were unprepared to handle the elements the winter season added to the aviation safety equation. The Safety Center's data base has lots of information taken from accident scenarios about what happens when crews aren't prepared and fail to follow accepted standards and procedures.

The present rightsizing of the Army and corresponding reduction in available resources makes it readily apparent that losses due to costly accidents cannot continue. The Army simply cannot maintain its warfighting capability when trained crewmembers and hard-to-replace aircraft are lost in preventable cold-weather accidents.

Improper cold-weather operational and preventive maintenance procedures and inadequate training and mission planning are often cause factors in winter-related accidents. Overcoming cold-weather environmental problems is not impossible. To ensure safe mission accomplishment during the harshest season of the year, now is the time to start preparing.

Preventive maintenance procedures

Crew chiefs and maintenance personnel should consult applicable operators and technical maintenance manuals to determine those extra procedures required to safely operate and keep aircraft running in cold weather. Some specific tips on cold-weather preventive maintenance for your aircraft are shown in the accompanying article.

Training

Units should develop a cold-weather training plan that ensures aviators are familiar with flight techniques to use during winter flying before it becomes necessary to use them. Most units require that aviators not trained or current in winter operations demonstrate proficiency to an instructor pilot before being released for regular missions. Special consideration should be given for night checkouts when night vision systems are to be used.

- Scenario. While attempting to avoid whiteout during an NVG blowing-snow approach to a frozen lake surface, the UH-1 pilot maintained excessive airspeed to touchdown. After touchdown, he attempted to aerodynamically brake the forward motion of the aircraft. The aircraft slid 309 feet before coming to a stop slightly right of another aircraft that had already landed in the LZ. As the pilot leveled the rotor system, it struck the rotor system of the other aircraft, causing major damage to both aircraft and minor injuries to one crewmember.

The pilot failed to anticipate the effects of excessive closure speed because of his inadequate experience and lack of formal NVG unit training in the harsh conditions of cold-weather environment.

Additional training is needed for unaided snow takeoffs and landings too. Many accidents result when crews encounter whiteout.

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- Scenario. While landing to a sloping, snow-covered field, the pilot encountered whiteout and lost all visual reference. The aircraft rolled left and entered the trees, coming to rest on its left side. Although the pilot was familiar with various snow-landing techniques, he selected an approach-to-the-ground technique that was not suitable for the landing site selected. After touching down, he felt uncomfortable with the slope and attempted to abort the landing while engulfed in whiteout.

Another problem occurs when crews attempt to land with a tail wind, which increase the difficulty in keeping ahead of the snow cloud during approach. Make landings to areas that provide vertical relief and contrast to use as reference points and to aid in depth perception.

Aviators should always leave themselves an out – never commit to a course of action or a maneuver that cannot be aborted or fail to leave room to accomplish a go-around. Follow procedures outlined in Army regulations, local policies and procedures, and FM 1-202: Environmental Flight.

Ensuring winter survival kits are on board the aircraft is not enough; crewmembers must be thoroughly trained in cold-weather survival kit components. Don't wait until you need to use an item in your winter survival kit to see if it works or even how it works.

Unit train-up should follow the crawl-walk-run principle to ensure that adequate individual, crew, and small unit proficiency in required skills is achieved before participation in a major field exercise. This is not restricted just to aviator training; maintainers need to fine-tune their cold-weather procedures to be able to provide around-the-clock support for air operations.

Mission planning

Effective risk management is the best method to ensure safe operations. Managing the additional risks that result from winter operations demands increased attention to detail from the mission planning phase through preflight checks and post-flight shutdown and inspection.

Unit operations personnel and aircrews must identify and assess hazards associated with adverse weather conditions expected to be encountered during winter flying. Integrate force protection (safety) into mission planning by eliminating unnecessary risks and implementing controls to ensure that those risks that cannot be eliminated are reduced to the lowest level possible.

Remember that cold weather makes everything, especially maintenance, more difficult and time consuming to accomplish. Even moving aircraft around on the ramp requires more caution during the winter season. Speeds at which aircraft are towed must be slower because control is harder to maintain while turning or stopping. Plan for the extra time that will be needed.

Don't forget to carefully select aircraft landing and parking areas in field sites. If you choose the wrong area, a sudden thaw can cause aircraft to sink to their belly panels in mud, or the landing gear can freeze to the ground during the night.

- Scenarios.

* The UH-60 was landing in a snow-covered LZ. The LZ was marked by an inverted Y, and each landing spot was marked by a separate light. Upon landing, the UH-60 settled in the snow and sank into the mud.

* The UH-1 crew performed a blowing-snow approach to semi-frozen muskeg. When the pilot attempted to take off, the crew realized the left skid had frozen in the ice and snow. The PC applied pressure/counter pressure to the tail rotor in an attempt to free the ski. When the ski broke free of the frozen slush, the aft mount strap failed and the aft portion of the ski broke off.

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Preflight

Ensuring that the aircraft is ready to perform is as much the responsibility of the pilot as it is the crew chief and the maintenance personnel. This is particularly important during adverse weather conditions. During preflight checks, crews should look for "hurried" maintenance caused by mechanics rushing to get out of the cold and "forgotten" steps caused by numerous trips to the warming tent.

To ensure aircraft airworthiness, unprotected and even some protected parts require close scrutiny. Icing on aircraft control linkages and surfaces can reduce aircraft performance, alter flight characteristics, and/or restrict control movement. Before flight, check to see that blade and propeller surfaces are free of ice, frost, and snow. Remove ice with heat or deicing fluids. Check the technical manual for your aircraft for correct procedures.

- Scenario. During a UH-60 engine start, the pilot advanced the power control levers to the idle position and a lateral vibration began that increased to a moderate intensity. The crew aborted the start and shut down the aircraft. Inspection revealed some ice buildup near the main rotor blade tips. The crew had failed to anticipate and check for ice buildup during preflight.

Leaks may appear more frequently due to contraction and expansion of metals as a result of temperature extremes. Suspected leaks should be checked before takeoff but after the systems are in operating temperatures and pressures.

Aircraft run-ups take a little longer during cold weather. Oil and lubricant pressure readings tend to indicate higher than normal. And engine instruments driven by tachometers may indicate lower than normal indications on initial engine start. Additional running at engine-idle settings is required until normal readings are attained. Hurried aircraft run-ups can cause water vapor to condense inside components and freeze, which could result in split oil coolers or blocked oil lines.

Post-flight

Don't give in to the desire to hurry up and get in out of the cold; follow the checklist.

- Scenario. While air-taxiing into a tactical parking area, the pilot-in-command (PC) made an improper decision to execute a blowing-snow approach (without a visual, fixed reference point) to a location close to another UH-1 operating at engine idle in its assigned parking point. The main rotor blades of the two aircraft meshed.

Other prudent options were available to the PC that would have assisted him in maintaining proper ground track and clearance from the other aircraft. But he was overconfident in his abilities to execute the blowing-snow approach. And he was anxious to secure the aircraft and move in out of the cold. The crew had just completed cold refueling in subzero temperatures and were extremely uncomfortable.

Even if you are cold and in a hurry to get in, remember to top off fuel tanks at the end of the flight. Don't forget to put blade bags on the blades to assist in preventing ice buildup. And remember that the best time to check oil levels is during post-flight inspection while they are at operating temperatures.

The harsh environment sometimes encountered during the winter season requires that even the most routine aviation missions be well planned and meticulously executed. Winter flying is a difficult task even for the most experienced aviators. But thorough preparation, effective preventive maintenance procedures, proper training, and adequate mission planning will allow units to safely deal with the hazards associated with winter operations.

-then CW4 Adrian Booth, Investigations Division (1993).

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Cold Weather tips

- Allow time to become acclimated to colder temperatures. If you're non-acclimated, you will encounter difficulties at even warmer temperatures above -10 degrees F.
- Wear artic mittens with the leather shell's wool finger insert or the trigger finger mitten wool insert inside the artic mitten to keep hands warmer in temperatures of -20 degrees F and colder. This serves two purposes: hands stay warmer and the wool inserts protect the skin form exposure to cold temperatures, thus preventing cold-weather injuries and direct contact with metal items.
- Don't blow warm breath into mittens or gloves. Air from the lungs contains moisture that will condense on the hands and wet the inside of the gloves, contributing to further hand cooling.
- Think twice before removing mittens or gloves. It doesn't take long to suffer the effects of frostbite.
- Use the buddy system when you're out in the cold. Keep an eye on each other for signs of cold-weather injuries. Remember, not everyone has the same threshold for the cold and its elements.
- Don't forget to do frequent self-checks even though you're using the buddy system.
- Make sure you eat and drink fluids more often than normal to replace what your body is using. Your body burns more energy (calories) in cold weather trying to keep warm. Remember, you can dehydrate in cold temperatures too.
- Expect to take twice as long to complete the job when working outside in extreme cold weather (25 degrees F and below). Allow plenty of extra time in your planning.
- Keep small batteries warm until needed – for example, in your pocket – so you'll have power when needed.
- Concentrate on the mission at hand. Your mind starts to drift when your body gets cold. Stay focused.
- Carry an individual cold-weather survival kit at all times.
- Be prepared for sudden weather changes. Wear clothing appropriate for the coldest weather you expect to encounter.
- Cold-weather clothing protection is based on the principles of insulation, layering, and ventilation. When using cold-weather clothing, remember to keep it clean, avoid overheating, wear it loose in layers, and keep it dry.
- See your flight surgeon if you feel a seasonal "cold" coming on. Don't wait until your "cold" gets too serious and causes prolonged medical downtime from flying.

Aviation Case Study: Delayed Reaction (Icing)

https://www.youtube.com/embed/0JkLR_xgayM

Bad officials are elected by good citizens who do not vote.

Selected Aircraft Mishap Briefs

Information based on preliminary reports of aircraft mishaps reported in September 2015.

Observation helicopters

OH-58

-C Series. Aircraft experienced an engine failure on take-off. Landed hard. (Class C)

Attack helicopters

H-64

-D Series. Aircraft rolled rearward and downslope after touchdown on the LZ and the tail boom subsequently made contact with terrain. (Class B)

Utility helicopters

H-60

-L Series. Lead ship in a flight of two UH-60 aircraft impacted trees approx. .5 NM shy of the intended HLZ. (Class A)

UH-72

-Aircraft experienced a 'hot start' during engine run-up for an MOC. (Class C)

Fixed-wing

C-12

-D Series. During routine training aircraft reportedly landed hard during tough-and-go landing training to the airfield. (Class C)

Unmanned Aircraft Systems

RQ-7B

-Crew experienced RPM fluctuations, followed by a GEN FAIL warning, after entering the TALS Loiter mode for landing. (Class B)

-Crew experienced an engine failure while system was descending for landing. (Class C)

Information based on preliminary reports of aircraft mishaps reported in October 2015

Attack helicopters

H-64

-D Series. Aircraft contacted a ground obstacle during a movement-to-contact maneuver and crew subsequently executed a controlled landing. (Class A)

-D Series. During ILLUM rocket engagement aircraft impacted the ground upright. (Class B)

Utility helicopters

Mi-17V1

-Crew reportedly encountered brown-out conditions during initial approach to land and struck a 40-50' pole. (Class B)

-Aircraft tail rotor made contact with a brick wall during approach to land at the LZ in dusk/near-dark condition. (Class B)

H-60

-M Series. During aircraft HIT check crew heard the sharp reports associated with a compressor stall and immediately shut down the engine. (Class C)

-L Series. While conducting engine run-up crew heard a 'metallic' report and saw flying debris. Inspection revealed a balance washer imbedded into a main rotor blade. (Class C)

H-72

-Crew was conducting an 'engine failure emergency' for hoist-operation training when the hoist and rescue seat became entangled in the skid step during recovery. (Class C)

-#1 Engine hydraulic cover was determined to have opened during flight, resulting in contact with/damage to all 4 MRB. (Class C)

Continued on next page

Selected Aircraft Mishap Briefs

Information based on preliminary reports of aircraft mishaps reported in October 2015 cont..

Observation helicopters

OH-58

-A Series. Aircraft reportedly emitted a loud report, followed by engine and rotor RPM droop, during a VMC approach. Aircraft touched down hard. (Class C)

Aerostat

JLENS

-Control over the aerostat was lost due to a tether cable failure. (Class A)

Information based on preliminary reports of aircraft mishaps reported in November 2015.

Utility Helicopters

H-60

-A Series. After aircraft was reported to have missed its initial checkpoint during a training flight, the wreckage was discovered. Four fatalities. (Class A)

-A Series. Aircraft experienced a lightning strike while in flight. Post-flight inspection revealed damage to antennae and on main rotor blade. (Class B)

Attack helicopters

H-64

-D Series. Aircraft struck wires during NVD training flight and crashed fatally injuring both pilots. (Class A)

Information based on preliminary reports of aircraft mishaps reported in December 2015.

Utility Helicopters

H-60

-A Series. Maintenance crew experienced an 'Intermediate Gearbox' Chip Light indication during test flight and noted high speed vibrations while landing. Crew performed emergency engine shutdown and egressed due to smoke smell and fire emanating from the tail-cone of the aircraft. (Class B)

UH-72A.

Post-landing inspection revealed that three fasteners on the hydraulic access panel we missing and that it had partially opened in flight and made contact with all four MRB. (Class C)

Attack helicopters

H-64

-E Series. Aircraft was lead in flight of two at approx. 1K Ft MSL when the aircraft descended to ground impact, followed by post-crash fire. Both crewmembers were fatally injured. (Class A)

If you have comments, input, or contributions to Flightfax, feel free to contact the Aviation Directorate, U.S. Army Combat Readiness Center at com (334) 255-3530, DSN 558-3530

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Online newsletter of Army aircraft mishap prevention information published by the U.S. Army Combat Readiness Center, Fort Rucker, AL 36322-5363. DSN 558-2660. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Flightfax is approved for public release; distribution is unlimited.