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Flightfax®

Online Report of Army Aircraft Mishaps

Army Aviation professionals are starting FY13 very well. Diligence by our Aviation Soldiers and leaders is preserving lives and combat power. At the end of the first quarter of FY13, we have experienced three Class A, one Class B, and nine Class C mishaps, compared to first quarter of FY12 when we recorded five Class A, four Class B, and 25 Class C mishaps.

There are two interesting trends developing for this year. The first is the mishaps are not catastrophic, and we have no fatalities. This gives us the opportunity to glean non-fatal lessons to avoid loss of our greatest resource - Soldiers. The second trend is that the Class A mishaps have all involved object/ground strike with main rotor blades (see Utility Helicopter selected mishap brief on the back page). This gave us pause in the Aviation Directorate, and we conducted some research on Aircraft Taxi Mishaps from FY03 to present. The quick research surprised us in the volume of incidents. The three leading accident events are light poles, barriers, and object/building strikes. We've included the information in this edition to assist in risk identification and mitigation.

Our preliminary assessment of the 13 Class A-C mishaps for the first quarter, 10 will likely be attributed to human error. This represents 77%, which is consistent with the about 80% we've seen over the last decade. In the September 2012 Flightfax, we presented an article by Craig Geis that investigated basic functions of the nervous system to better understand human factors; this article received positive feedback. To enable better understanding of human factors in the aviation environment, we have included an article entitled "Understanding the Relationship between Stress and Performance" this month.

We also conducted a study on OEF accident trends and when a deployed unit is most at risk during a deployment. Specifically, we investigated the validity of the "first and last 90 day high risk period" during a deployment. This article will be published in the Aviation Digest in February, and we will provide it here in Flightfax as well.

Until next month, fly safe!

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Understanding the Relationship between Stress & Performance

By Craig Geis • CraigGeis@CTI-home.com

In Part 1 of this series (Sep 2012 Flightfax) we looked at the basic functions of the nervous system. Can you recall ever hearing this conversation? "Watch your airspeed, check your rate of descent, pay attention to your attitude, oh never mind I have the controls." If you are like me you felt stressed and overwhelmed at the moment.

Part 2 of this series will be presented in Part A and Part B. Part A will introduce you to the relationship between stress and performance and Part B will allow you to look at an aircraft accident and go in depth into the physiological, perceptual, and cognitive effects of the different levels of stress.

Part 2A

Any threat we perceive to our well being, either consciously or unconsciously, evokes a stress response in the nervous system. That threat could be an emergency, weather, personal problems, time constraints, etc. The nervous system's response to stress is an evolutionary design whose purpose it is not only to help us cope with the stress, but to make sure we survive whatever happens during the encounter.

When we think of the word "stress" mental-emotional strain usually comes to mind. Anxiety, fear, emergency situations, fatigue, overload, repetitious tasks, dissatisfaction, and frustration also qualify as stress.

The common identifier that qualifies all of the above as stress is the ability to activate the body's stress response. It doesn't matter if the stress is mental-emotional, physiological, or environmental. The body responds with one response to stress; only the intensity of the response varies depending on how threatening the perception.

Figure 1 tracks the five stage stress cycle.

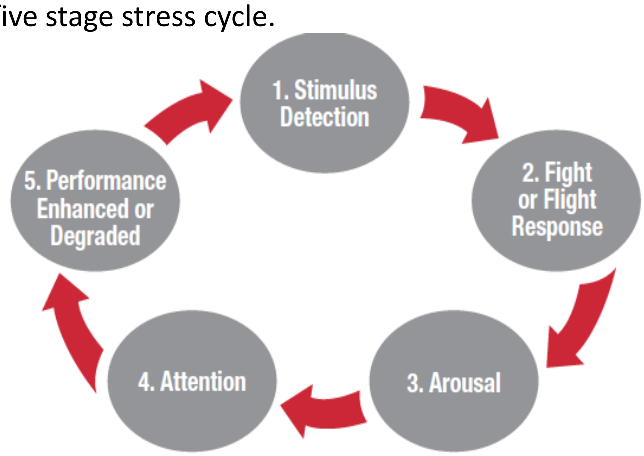

Figure 1: Five Stage Stress Cycle

Stage 1: Stimulus Detection – Incoming stimulus is processed in the brain by a structure in the limbic system called the amygdala, which assesses all incoming stimulus for threat potential. The amygdala deals with memory storage relating to threats with emotional impact. In threatening situations the amygdala gets totally absorbed in managing our response to fear and stress.

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Stage 2: Fight or Flight – This response gives us assistance by releasing stress hormones. The structures involved in the "fight or flight" response include the hypothalamus, pituitary, and adrenal glands.

The level of hormone produced depends on the *perceived* level of stress. It is not the threat/stressor but the individual's perception of the threat that matters. These hormones cause an immediate increase in heart rate.

When we talk about an increased heart rate affecting human performance, either in a positive or negative way, it is critical to understand the cause of the increase in heart rate, because a change in performance comes from the increased heart rate due to stress, *not exercise*.

There are two ways to increase heart rate: through physical exertion or through fear. Physical exertion can take up to 5 minutes to push the heart rate from 60-80 beats per minute (BPM) to 160 BPM. On the other hand, when the nervous system is sufficiently activated through the "fight or flight" response, it is not uncommon for the heart rate to go from 60-80 hormonal beats per minute (HBPM) to 160 HBPM in 1 second, and 200 HBPM in 2 seconds.

Therefore performance changes related to heart rate only occur when the heart rate change is due to stress. **It's not the heart rate that matters but what drives the heart rate that is important.**

Performance is not significantly impacted when the heart rate increases due to exercise. If you don't believe me, imagine yourself on the treadmill, running so hard that you are out of breath and your pulse is pounding. You can still think, plan, and even do math problems in your head! Ever go for a long run just to clear your head and think?

Stage 3: Arousal – Arousal is the impact of stress, and the hormones and neurotransmitters released activate the entire nervous system. Arousal refers to the level of nervous system activation, also known as "the readiness to work." In simple terms, how much of the brain is active and ready at any point in time to deal with a threat?

Arousal is defined and measured by specific elements of our physiology. Those elements are things like mental activity, heart rate, blood pressure, and respiratory rate. The level of arousal is proportional to the level of a person's perceived threat. In other words, the greater the perceived threat, the higher their arousal level will be.

Arousal levels affect a human's physiology which ultimately translates into ability to perform. In Figure 2 we can see that too low or too high a level of arousal will lead to decreased performance.

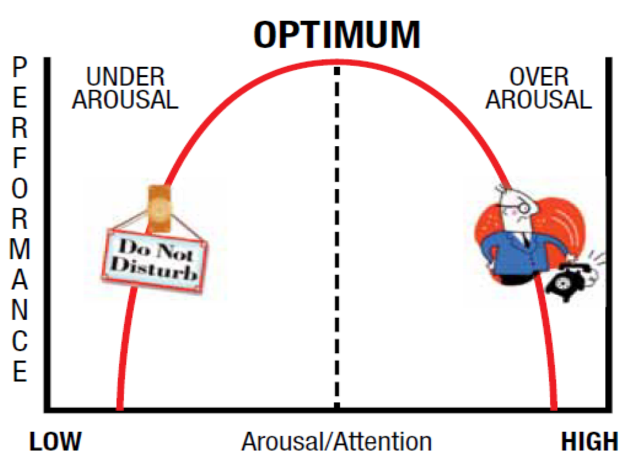

Figure 2: Arousal & Attention

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Stage 4: Attention – Defined as the cognitive process of selectively concentrating on one aspect of the environment while ignoring other aspects. Attention is also referred to as *the allocation of processing resources*. Attention level is determined by our level of arousal. Attention requires mental resources to direct and focus our mental processes. The mental resources available to us are limited; the more attention one task requires, the less attention is available for performing others tasks.

In understanding our limitations it is important that we understand the **basic principles of attention**. We are constantly confronted with more information than we can possibly pay attention to; therefore there are serious limitations in how much we can attend to at any one time. We can respond to some information and perform some tasks with little attention if we have sufficient practice and knowledge. Some repetitious tasks become less and less demanding of our attentional processes.

Attention includes four categories:

1. Inattention
2. Global Attention
3. Selective Attention
4. Hyper-vigilance.

Inattention: At low arousal levels attention really becomes inattention. No perceived threats, we're not paying much attention to anything. The brain shuts down to conserve energy and filters out most of the incoming stimulus. When there are no perceived threats, and arousal levels are low, the brain is essentially running at a low idle. Inattention doesn't mean you are asleep, it just means that you are not effectively filtering the environment for threat signals. This is where complacency occurs.

Global Attention (Vigilance): At our optimal level of arousal we are able to process the maximum amount of information. We also have a heightened ability to concentrate by blocking out elements of information that are not related to the threat. With global attention (vigilance), we are able to process large amounts of sensory input, as long as that information is relatively familiar and not too complicated. In order for this to be the case, we need prior experience or training related to the input. Our capabilities can meet the demands.

Selective Attention: At high arousal levels, when there may be a mismatch between external demand and internal capabilities our arousal increases to cause **selective attention**. Attention under high stress conditions, where arousal is resultantly high, reduces our ability to process information from multiple sources. With selective attention we focus, or attend to the inputs that we perceive to be the greatest threats to survival. The things we don't attend to just get scanned by our senses and often these things are simply not processed by the brain.

Hyper-vigilance (Panic): At the highest levels of arousal the "fight or flight" response gives us a hormone dump. Hyper-vigilance is borderline panic. Under hyper-vigilance a person is constantly shifting attention, from minor to major threats, without discriminating between the threats. This is done in an irrational and frantic attempt to find a way to escape the imminent danger.

Stage 5: Performance Enhanced or Degraded

The Yerkes-Dodson law, originally developed by psychologists Robert M. Yerkes and John Dillingham Dodson in 1908, demonstrates the relationship between arousal and performance. The law dictates that performance increases with arousal, but only up to a point. When levels of

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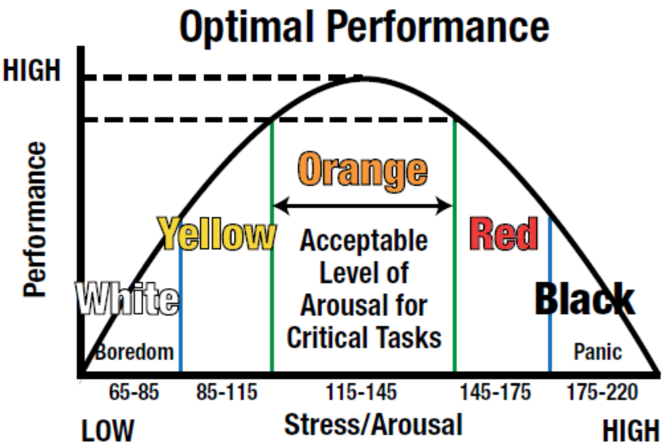
arousal become too high, performance decreases. Figure 3 has been modified significantly to reflect the current science of stress and performance.



Yerkes & Dodson Inverted "U" Graph

On the vertical axis we measure a human's performance level. Performance can relate to physiological, perceptual, and cognitive performance.

On the horizontal axis are the stress/arousal/workload levels from low to high, the heart rate expressed as hormonally induced heart rate, and a color code reference.

Moving from left to right on this curve this is what we see:

• White Zone: 65-85 HBPM. Performance is low here because a person is ***unconsciously*** filtering information. Here there's little threat discrimination.

• Yellow Zone: 85-115 HBPM. Performance is getting better. This is the stage of basic alertness. Here we are starting to be aware of and are discriminating threats around us.

• Orange Zone: 115-145 HBPM. Performance is optimal for most critical tasks. This is the optimal zone of arousal and awareness. Here we are scanning for potential threats rapidly and efficiently.

• Red Zone: 115-145 HBPM. Performance begins to fall off. Things start getting risky because our arousal level is high enough to start inducing selective attention.

• Black Zone: 175-220 HBPM. Performance is low because panic is setting in. In this highest arousal zone our systems begin to shut down and we lose the ability to think rationally.

Key Points to Remember:

1. In high stress events, success depends on a quick, appropriate, trained response.

2. If you are unprepared for an emergency and have no trained response, it will take at least 8–10 seconds under optimal circumstances and much longer under high stress to assess the situation and come up with a plan.

3. Training, planning, and mental rehearsal can reduce the time sequence to 1–2 seconds.

4. If an appropriate response to such an event has been prepared and embedded in the mental database of behavioral plans, then the speed of response can be as fast as 100 milliseconds. *This is an immediate action.* This is the power of habit patterns.

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5. Prepare yourself:

• *Understand Your Limits:* The performance problems discussed in this article are universal.

• *Set Goals:* Constantly setting goals keeps the frontal lobe (thinking part of your brain) active. In emergencies you need to engage in conscious, rational thought. Keeping the frontal lobe engaged will allow you to think clearly and reduce the stress response.

• *Mental Rehearsal:* Works exactly the same in the nervous system as doing the task. Mental rehearsal also creates a memory trace so an unplanned event is not really unplanned.

• *Positive Self Talk – "Can do" vs. "can't do":* We are telling the amygdala that everything is under control and to back off the stress response.

• *Control Breathing:* In high stress situations control you breathing, especially long exhales. This tricks the nervous system into thinking everything is okay.

Craig Geis is Co-Founder of California Training Institute and formerly Geis-Alvarado Associates. He provides instruction for clients worldwide on the subject of Human Factors Threat & Error Management. Mr. Geis was a U.S. Army career pilot, developed the military's Team Resource Management training program to address human error and is a former instructor for the U.S. Military Academy at West Point, Embry Riddle Aeronautical University, University of Maryland, and University of San Francisco. Craig is a Certified Force Science Analyst, and in instructor for CA Police Officers Standards & training. He holds an MA in Psychology from Austin Peay State University, a BA in Management from C.W. Post College in New York, and an MBA in Management from Georgia Southern College.
Additional references and articles are available at www.CTI-home.com. Phone us at (707) 968-5109 or email CraigGeis@CTI-home.com.

Aviation safety depends on commanders. They either push the program or they let it slide.

Unmanned Aircraft Systems (UAS) Standard Operating Procedures

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Since 2007, 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 goal of the UAS Branch is to identify unit deficiencies in the Aircrew Training Program (ATP) and provide mentorship to unit personnel responsible for training and managing the program. In a majority of the unit assessments, unit SOPs are an area found to be problematic.

In a majority of UAS units, Aircraft Commander (AC), Mission Coordinator (MC), and Mission Briefing Officer (MBO) program development, training, and selection; and Academic programs are areas which are usually found deficient. Many times these programs are not addressed in the SOP. During unit assessments, oral and written evaluations are specifically conducted on AC, MC, and MBOs covering SOP requirements and an overwhelming majority of these evaluations are unsatisfactory. When unit SOPs include training programs, most are vague. Many units do not project academic training on the unit training calendar and the training is not being conducted, tracked or regularly tested. The lack of academic training is made evident by the 40% average score on no notice written evaluations which tests basic knowledge.

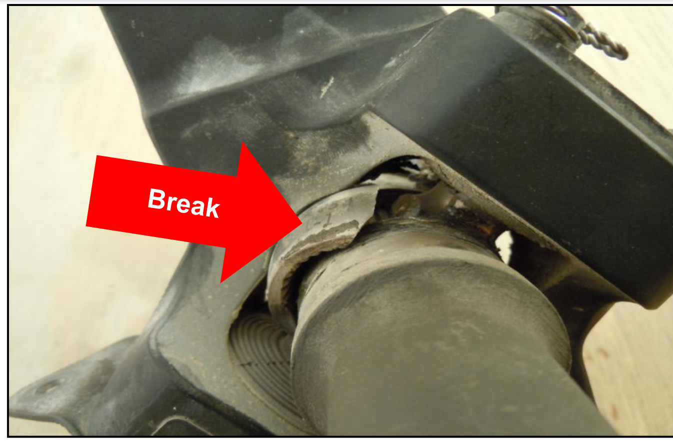
In order to correct deficiencies and increase the effectiveness of the SOP in all areas, the UAS branch recommends reviewing the unit SOP in accordance with the FORSCOM ARMS Checklist, which cites regulatory references and is a great start to developing fundamentally sound and effective programs. When followed, the ARMS checklist will ensure all required ATP and SOP programs are addressed in the unit SOP. The checklist may be found on the DES AKO portal at: https://www.us.army.mil/suite/community/12394047. Leaders should task and delegate sections to the appropriate personnel in the unit to give the unit a simple and efficient method to test the effectiveness of the SOP and required training programs. This checklist should be incorporated as a tool during the unit's Command Inspection Program (CIP) to ensure that assessments are completed effectively and on a regular basis.

A good unit SOP outlines procedures specific to the unit's mission. A majority of SOPs have been copied from other unit's and mostly duplicate information contained in AR 95-23 and the Aircrew Training Manual and do not contain unit specific procedures. Adding current and appropriate references is another recommendation to keep the SOP relevant and current.

Unit leaders are responsible for developing and enforcing the SOP as well in addition to the training and managing of the Aircrew Training Program (ATP). When a majority of unit Soldiers fail to know or understand basic academic or unit operating procedures, a deficient SOP may be at fault. The unit SOP must be fundamentally sound and informative. A deficient unit SOP is not an individual failure but a leadership failure. Leaders must provide Soldier's the tools they need to succeed and a sound SOP and academic program which adheres to the FORSCOM should be the starting point in additional to providing Soldiers the tools they need to succeed.

--CW3 Betsy Sherman, DES UAS Branch Chief, may be contacted at (334) 255-3475, DSN 558.

Mishap Review: OH-58D Loss of TR Thrust



While performing aerial support to troops in contact at an altitude of 538' AGL, the OH-58D experienced a complete loss of tail rotor thrust. The aircraft developed a rapid and uncontrollable right yaw rate with a vertical descent at approximately 4,000 feet/minute just before ground impact. The aircraft was destroyed and both crewmembers fatally injured.

<u>History of flight</u>

The accident aircraft (Gun2) was an OH-58D assigned to a two-ship Scout Weapons Team (SWT). The first of two missions was an armed escort of 2x UH-60s conducting an air movement followed by aerial security/reconnaissance support to ground forces in their AO. The crew's duty day start time was 0400 hours with a daily mission brief conducted at 0500 followed by a 0600 team brief. Crew briefs were conducted at the unit CP followed by aircraft pre-flight and run-up. Weather was clear sky conditions with 9000m visibility and haze. Winds were variable at 06 knots. Temperature was +31C with an altimeter of 29.95.

The SWT launched at 0900 in support of the escort mission. At approximately 1100 hours, after completing the escort mission, the team refueled the aircraft. At approximately 1130 hours the team departed the FARP and began support for friendly forces in contact with the enemy. The aircraft returned for re-arm and re-fuel at approximately 1230.

At 1245 the SWT departed the FARP and continued with support of troops in contact and conducting engagements. At approximately 1320 hours, the accident aircraft was in a high over-watch position covering the movements of the lead aircraft. The accident crew was varying their altitude and airspeed throughout their orbits. While at what appeared to be the apex of one of their orbits at approximately 33 KIAS and 538 feet AGL, the aircraft developed a significant right yaw. The yaw rate rapidly progressed as the flight crew attempted to regain control of the aircraft with a forward application of the cyclic with no corresponding increase in airspeed. Initially the aircraft nose tucked, progressing as far as 50 degrees nose low and the yaw rate progressed from one degree per second to 85 degrees per second. After the initial nose tuck, the crew leveled the aircraft and continued to spin in a relatively level attitude for several seconds followed by a vertical drop building to an approximate descent rate of 4,000 feet per minute before impact with the ground. The aircraft was destroyed and both crewmembers were fatally injured.

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Crewmember experience

The PC, sitting in the right seat, had nearly 1600 hours total flight time, with 1500 in the OH-58D (430 as a PC) and 300 NVD hours and 1100 hours combat time. The PI, flying in the left seat, had more than 1675 hours total time, 1600 OH-58D hours (460 PC) with 350 NVG hours and 1300 hours combat time.

Commentary

The accident board suspects the cause of the accident was a materiel failure of the splined steel trunnion in the tail rotor assembly. The failure resulted in the cross head and pitch change links driving the rotor blades momentarily, with a subsequent overload and fracture at the base of the PC links, resulting in a loss of tail rotor thrust. Further materiel analysis to determine the cause of the splined steel trunnion failure is ongoing. ASAM H-58-13-ASAM-02, Tail Rotor Flapping Bearing was published as a result of this accident.

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Do no disseminate outside DOD without prior approval from the USACRC.
Access the full preliminary report on the CRC RMIS under Accident Overview Preliminary Accident Report
AKO Password and RMIS Permission required

	Aircraft Taxi Class A – C Mishaps			
FY	Class A	Class B	Class C	Cost
2003	0	4	1	2,148,063
2004	0	1	3	539,609
2005	0	1	8	1,122,157
2006	1	3	3	27,714,269
2007	4	0	4	12,901,108
2008	1	2	1	2,319,482
2009	4	1	3	9,918,929
2010	0	1	5	1,206,106
2011	1	0	4	1,500,236
2012	1	2	3	2,900,000
2013	1	0	1	2,050,000
Total	13	15	36	64,319,959

Aircraft Taxi Mishaps FY03 – Present

During the last ten plus Fiscal Years (FY03 – FY13), there were 13 recorded aircraft taxi Class A mishaps, 15 Class B and 36 Class C mishaps. Total cost of these 64 incidents exceeded 64 million dollars. Additionally there were three minor injuries associated with the accidents. Review of the mishaps reveals the following:

100% of the 13 Class A mishaps were caused by human error. All Class B's (15) were human error failures. Of the 36 reported Class C mishaps, 34 (94%) were human error and 2 deer collisions. Fifty-one of the 64 incidents (80%) occurred during daylight conditions with 13 occurring at night. Blackhawks were the predominant airframe with 44 incidents followed by 7 CH-47s, 7 fixed-wing, 3 AH-64Ds, 1 OH-58D, 1 MQ-1C and 1 Mi-17. CONUS accounted for 23 (36%) of the accidents, followed by 22 OIF/OND, 13 OEF and 6 OCONUS.

Leading accident events - 64 Class A – C taxi mishaps (Class A's listed)

- **Light poles**. There were nine accidents associated with the aircraft taxiing into light poles. (1) During ground taxi to a commercial refuel point, the UH-60L's main rotor struck a light pole.
- **Barriers.** There were seven accidents associated with striking barriers while taxiing. (2) UH-60L tail rotor contacted a concrete barrier while taxiing to parking. Tail rotor section was severed. (3) As the UH-60L hovered in the LZ, main rotor blades made contact with a 12 foot concrete barrier wall. (4) UH-60A – while ground taxiing, the main rotor blades struck a concrete barrier.
- **Object/building strikes.** Twenty-five instances of aircraft striking various objects/buildings during taxi. (5) Crew was ground taxiing the UH-60A to a civilian refuel point when the aircraft's main rotor made contact with a hangar. (6) Mi-17 – during ground taxi, the main rotor made contact with the side of a clamshell hangar. (7) During ground taxi following a MEDEVAC mission, the aircraft contacted a stationary hoist with the main rotor blades. (8) While at a hover, metal siding separated from the exterior of a hangar and was ingested into the main rotor system of an AH-64D.
- **Parked aircraft.** Ten accidents involved striking non-operating parked aircraft. (9) During night taxi to parking, a C-12C struck two parked OH-58D aircraft. (10) A CH-47D pulling out of parking contacted the aft rotor of the CH-47D parked directly to his front. Other parked aircraft damaged by flying debris with one minor injury to a passenger.
- **Operating aircraft.** Eleven incidents of two operating aircraft contacting each other during taxi/parking. (11) Flight of three UH-60Ls were taxiing for passenger drop off. Chalk 2's main rotor contacted lead's tail rotor. (12) During ground taxi after passenger drop off under NVGs, one UH-60L's main rotor made contact with the sister aircraft 's main rotor while trying to reposition around the aircraft. (13) Four OH-58Ds were parking when the main rotor blades of #4 made contact with the main rotor blades of a sister ship. Both aircraft sustained significant damage. Flying debris caused one minor civilian injury and damage to an additional aircraft.

Class A – C Mishap Tables

Manned Aircraft Class A – C Mishap Table										
	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1		5	
	November	1	0	13	0			1	4	
	December	2	2	6	4		2			
2nd Qtr	January	2	0	11	0				3	
	February	2	1	6	0					
	March	1	2	11	0					
3rd Qtr	April	2	1	6	4					
	May	1	0	4	0					
	June	1	0	2	0					
4th Qtr	July	4	3	9	1					
	August	2	5	5	0					
	September	2	0	2	2					
	Total for Year	22	16	81	12	Year to Date	3	1	12	0

as of 15 Jan 13

UAS Class A – C Mishap Table									
	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	2			2
MQ-5	1		2	3	Hunter	1		3	4
RQ-7		5	20	25	Shadow		1	5	6
RQ-11			1	1	Raven				
MAV									
YMQ-18	1			1					
SUAV			5	5	SUAV			3	3
Aerostat	2	5		7	Aerostat				
Total for Year	9	11	28	48	Year to Date	3	1	11	15

as of 15 Jan 13

Big problems start with small things 14 May 86 Flightfax

Remember the legendary battle that was lost because of a horseshoe nail? The horse lost its shoe, the rider lost his horse….

Okay, so some guy back in the Middle Ages lost his horse, what's the point? The point is that big problems still start with small things. The following accident started out that way. A form wasn't filled out and because of that a helicopter's gearbox wasn't filled with oil, and an aircraft had an accident.

That's the way it usually starts. Somebody doesn't do something they are supposed to do, somebody else doesn't check to see if they did it, somebody else doesn't notice that it wasn't done, and then it happens – an aircraft is destroyed or, in this case, is heavily damaged. Luckily, there were no major injuries in this accident. All too often that isn't the case.

The crew of the UH-60 had been conducting practice in slingload operations. Previous flights had been uneventful, and so was the first part of this mission. Then, on short final, with the copilot flying the aircraft, both pilots saw the master caution light come on and the chip detector light flickered. But, when the PIC recycled the main module chip detector circuit breaker, both lights went out. The pilots and the crew chief thought it was just fuzz burn, because no more lights came on.

The copilot continued the approach, and the aircraft stabilized in a hover about 5 feet above the slingload. Without any warning, the aircraft began a rapid spin to the right. The copilot attempted to stop the spin by applying full left antitorque pedal. The aircraft didn't respond. It continued to spin. The pilot then increased altitude to about 40 feet, to be sure the aircraft cleared the slingload and the riggers perched on top of the load.

The aircraft spun around about four times as it moved to the left rear of the slingload. The riggers also moved to their left, as far away as they could get from the aircraft and the direction in which it was traveling. The pilot, and the copilot, realized by now that the emergency was a loss of tail rotor control. The PIC, who was in the left seat, began trying to place the power control levers in the fuel cutoff position to stop the spin. But, because of the centrifugal force created by the spin, and his position in the left seat on the outside of the spin, he had difficulty reaching the levers. No. 1 engine was retarded to idle, and then to the fuel cutoff position, before No. 2 engine could be retarded to the fuel cutoff position. The spin lessened as the aircraft, in a left-side-low attitude, hit the ground with great force. The three-member crew and passenger left the aircraft under their own power, although the passenger was later placed on a backboard for evacuation to the hospital when he complained of lower back pain. The aircraft missed the slingload and, fortunately, none of the riggers were injured.

The aircraft had a tail rotor gearbox seizure, resulting in loss of antitorque control, causing the aircraft to yaw right and then go into a spin as the pilot increased power to

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maneuver away from the slingload. A hovering autorotation was made from about 40 feet.

The tail rotor gearbox seizure was caused by excessive heat produced by insufficient lubrication. The lack of lubrication resulted from failure to refill the gearbox with oil, following replacement of an input seal which required the gearbox to be drained.

The mechanic failed to record his work

The procedures in TM 55-1520-237-7 clearly state that the tail rotor gearbox must be serviced when an input seal is replaced. The reason it wasn't done this time was the mechanic failed to keep proper records. The fact that the tail rotor gearbox had been drained was not recorded, and the servicing was overlooked.

The technical inspector didn't do an adequate check

The technical inspector is responsible for ensuring that all work is properly performed and properly documented, but the technical inspector didn't do an adequate inspection after the input seal was replaced, and the aircraft was released for test flight although it had a grounding deficiency.

The omission wasn't found by the aircrew

The aircraft received a preflight inspection by the aviators who had flown it for nearly 16 hours following periodic maintenance. How could an aircraft that had a grounding deficiency be allowed to remain in flyable status?

The sight gauge must be checked visually before each flight to ensure there is oil in the gearbox. But the TM doesn't specify that the gauge must be checked from eye level. The sight gauge was checked during each preflight inspection, but the visual inspection was done from the ground – 12 feet from the site gauge. This fact, together with the size of the sight gauge and its placement within the gearbox cowling gave the illusion that the gearbox was properly serviced when, in fact, it was empty. The internal design of the gauge itself added to the problem. The interior glass is ribbed; lubricant collects within the rib, the glass becomes stained, and that adds to the illusion that there is oil in the gearbox.

It started with a small thing, but it ended with an accident

A horseshoe nail, some oil – it all adds up to the same thing; somebody didn't take care of the little things and pretty soon they became big things. Nobody set out to cause this accident: not the mechanic, not the technical inspector, not the aircraft's crew, but they all had a part in what happened. Let's face it; sometimes the small things are a hassle. For instance - recordkeeping. Nobody really likes it, but it's one of those small things that, if not done right, can lead to a big accident. If the records had been kept right, this accident would never have happened.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in December 2012.

Utility helicopters

UH-60

-M Series. Main rotor blades contacted the upslope of a pinnacle. Crew landed the aircraft. Damage sustained to all four MRB, tail rotor blades, and tail pylon. No reported injuries. (Class A)

-A Series. Crew was ground taxiing to a civilian refuel point when the aircraft's main rotor system made contact with a building. Extensive damage reported to the main rotor system, civilian hangar, and possible damage to aircraft within the hangar. (Class A)

Unmanned Aircraft Systems

RQ-7B

-UA experienced sudden engine failure while system was aloft at 7K MSL. Recovery chute was deployed and system was recovered with damage. (Class C)

-Operators lost computer link with system during flight. System was not recovered. (Class B)

RQ-20A

-UA crashed after crew lost link with the system during flight. (Class C)

-Crew experienced uncommanded input during flight after which the system entered a nose-low dive attitude and impacted the ground. (Class C)

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