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Flightfax®

Online Report of Army Aircraft Mishaps

Taxi Mishaps – Pay attention, They're Preventable

Want to know how to save nearly four million dollars a year in Army aviation? Stop taxiing into things, that's how. That sounds so basic you would think it is common sense. Unfortunately, it appears common sense is one of our least used senses in this area.

"Aircraft taxied down Mike taxiway, then turned left down Papa taxiway. Due to an aircraft being towed down Papa taxiway in their direction, the decision was made to turn left through an empty parking pad, then turn right and take Oscar taxiway to Lima to get around the towed aircraft. Aircraft made a wide right turn to a avoid a parked CH-47 on the right edge of Lima taxiway, then closed their gap on the front rotor system of the same CH-47 due to a HH-60 being parked at the hanger to their left. Light sets, ASE, and MILVANS were on Lima taxiway to the right side of the hanger forcing the aircraft farther to the right. Aircraft's four main rotor blades contacted a light set on the left side and an emergency engine shutdown was performed." Class C damage.

This crew took the long way around the barn to eventually get to the scene of the accident - and the point of this article – Army aircraft are having mishaps doing a task that should have no mishaps. To be fair, there were plenty of challenges on getting this aircraft to its parking pad but none of them rose to the level of taking a risk in striking an object and causing aircraft damage. In this taxi mishap review we'll look at what is happening, why it is happening, and what could or should be done to prevent it.

Since the beginning of FY 2008 there have been 31 reported Class A thru E taxi mishaps involving object strikes. There were seven class A, seven class B, 11 class C, four class D and two class E. No injuries were reported in these mishaps but the total cost exceeded $23 million. By type aircraft, there were 23 incidents involving UH-60s, four fixed wing aircraft, two CH-47s, one Mi-17 and one OH-58A. Two of the mishaps occurred while hovering (a UH-60 and a OH-58 contacted signs) while the rest were related to ground taxi.

Enough about the numbers – what did we hit? How about five parked aircraft, three running aircraft (two during lead swaps, one trying to park side-by-side as close as possible – you know how it gets at port ops), four hangars, six light poles, one vehicle antenna, two signs, six barrier walls, one fire extinguisher, two runway lights, and one UAV. No partridge in a pear tree.

So we know who hit what, how many times, and what it cost. Why? It is no surprise that they are all human error mishaps. The majority of the mishaps involve individual task errors associated with failure to accurately estimate/judge distances between objects (that means maintain clearance) and failure to scan.

The clinical definitions that would show up in a mishap report would read along the lines: *"Failure to accurately judge distance between objects, rate of closure with objects, or the amount of control input required to properly maneuver aircraft."* In regards to scanning errors: *"Failure to properly direct visual attention inside or outside the aircraft, (for example, too much or too little time on one object/area/activity); scan pattern not thorough or systematic; channelizing/fixating*

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attention, allowing attention to be drawn away from the scanning process so that visual information important to decision making and/or aircraft control is missed and/or not acted upon."

Examples of scan failures include crewmembers not monitoring the taxi due to working other tasks, distractions, inattention, or crewmembers intensely monitoring one area; i.e. the tail clearance, for hazards but not the main rotor, which ultimately strikes something.

Why did these task errors occur?

A great majority of the root causes of the errors are associated with overconfidence/complacency. *Overconfidence is a temporary state of mind that becomes a root cause when an accident is caused by a person's unwarranted reliance on their own ability to perform a task, the ability of someone else to perform a task, the performance capabilities of equipment or other materiel.*

Let's say a crew is taxiing out of parking. The pilot-in-command (PC), not on the controls and using good aircrew coordination, announces to the co-pilot that he/she will be inside programming the navigation system. The co-pilot acknowledges and confirms that he/she will pick up the PC's scan area. The PC exhibited confidence in the co-pilot's ability to continue to taxi in a safe manner while he/she completed the nav update. That the co-pilot then strikes the tail rotor of a parked aircraft while the PC's attention was directed to other areas, has now pushed the PC into the realm of being overconfident in co-pilot's abilities.

In the same vein the co-pilot was probably overconfident in his/her ability to maintain obstacle clearance. To be fair, there could be all sorts of contributing factors. Are the taxiways marked? Are they the appropriate width? Are there obstacles as described in this article's opening example? Is aircraft parking to standard? The list can go on, but critical is the need for the crew to take them into consideration. Would programming the navigation system have the same priority to this PC, if it was night, operating out of an unimproved aircraft parking area? Would or should his/her confidence level be the same in the co-pilot's ability to maintain clearances with one less set of eyes monitoring the activity? It is often these fuzzy areas that increase the risk in very subtle ways. Experience levels can lull you into complacency and overconfidence. Of those reporting crew experience, over half had cockpits with greater than 3000 hours.

So, how do you reduce the numbers?

Back to basics comes to mind. For the aircrews - don't take chances. If, in the course of cockpit communications, key phrases like "it'll be tight/close" or "I think we can make it," - things along that line, then it might be time for the discount double check. The 1000 hour crewchief on the right of your aircraft has a different experience base than the 50 hour door gunner on the left. That's some of the fuzzy math you have to use in making decisions. Has anyone ever really been trained in distance estimation and depth perception to the end of a rotating blade and light pole you're trying to slip past at an unfamiliar municipal airport?

For the safety officers – ensure your aircraft operating environments meet the standards. If they don't, then implement control measures to reduce the risks. Clear the overflow that inhibit clearances on taxiways or close them to aircraft operations. Keep the aircrews informed of the hazards and keep working to meet the standards. Don't have taxi lines? Give them something else to use – bean bags, chem lights, sandbags, painted rocks – whatever improves the crew's situational awareness.

For the leaders - I'm sure it wasn't foreign to your observations that a significant number of

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incidents involved UH-60s (23/31). To be sure, the Black Hawks are exposed to tighter quarters for pickups and drop-offs than the CH-47s. But they also have a smaller footprint to monitor. There probably isn't a single factor you can point at the UH-60 to explain the numbers. My past dealings with Chinook drivers have left me with the impression that they are very cognizant of the size of their rotor system and the effects of their rotor wash. There are always exceptions, but most take great care in how they operate on the ground. You will seldom see a CH-47 parked next to a Cessna 150 on the transient ramp. Significantly, their operators manual gives guidance on ground taxiing stating that when within 75 feet from an obstruction, on an unimproved/unfamiliar airfield, a blade watcher and taxi director shall be utilized. Could a control measure for UH-60s be implemented? Sure, maybe not in an operators manual, but a unit SOP stating clearance criteria could be established. A suggestion might be within 50 feet of the aircraft or maybe 20 feet of the rotor tip.

Would this type of recommendation deter the overconfident crew from 'cutting it close?' That's to be seen. But if the point is raised *"Sir, we have an obstacle within 50' of the aircraft and the SOP states we must deploy a ground guide,"* then at least the discussion is started, and sometimes, just a little discussion is all you need to prevent an accident.

Robert (Jon) Dickinson
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Do you have an aviation related story, information brief, or lesson's learned type event you would like to share with the aviation community? Pass on your experience with an article in Flightfax.

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Automation in the Cockpit

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These are exciting times in Army Aviation as we continue to field new, modernized aircraft across the fleet. Digital systems, glass cockpits, moving maps, auto-pilots and coupled flight; finally the automation to reduce pilot workload and human error! We embrace this technology and welcome its capabilities as we should, but with it comes new challenges as well.

In January, the Federal Aviation Administration issued a safety warning cautioning the commercial industry that flight data reviews show an "increase in manual handling errors" which the FAA blames on pilots' regular reliance on auto-flight systems. Bill Waldock, a safety science professor at Embry-Riddle Aeronautical University, stated, "Automation has reduced certain types of human errors, but in a way it's introduced new ones. You're trusting automation to fly the airplane, and, in a lot of respects, that makes you not pay attention to the plane…"

Recently, the crash of Asiana Flight 214 may prove to be a result of this very phenomenon. Although the cause of this crash is still speculation, the National Transportation Safety Board did release information indicating that while the plane's auto-throttle was set for 157, it was only armed, ready for activation. Perhaps for our fixed wing community that's enough said; a direct line correlation can be drawn and the lesson learned. For our rotary wing community the correlation is not as direct for obvious reasons. Nonetheless, there are scenarios from which similar errors or a computer malfunction could prove just as dangerous; let's examine two.

When we transition to these sophisticated, modernized aircraft, it's imperative we learn to use the systems as they are designed. So, using an ILS approach as an example, time and time again we go through the process. Arm the ILS (in whatever method you're aircraft uses), wait for capture of the localizer – got it – okay, wait for capture of the glide slope – got it – we're done and the computer performs a picture perfect approach, success! The fallacy here, of course, is in the statement "I'm done," yet I'm sure this is going on in many pilots' minds at this point. I'm sure because during check rides when I fail the auto-pilot or simply decouple the aircraft, forcing the pilot to fly the approach, so many spend the next several minutes scanning the glass seeking relevant information for which they haven't developed an habitual cross check required to manually fly the approach. Is that not an increase in manual handling errors?

What about IIMC? In my travels around Army Aviation I've asked hundreds of aviators about this task. Most answer "Transition to the instruments after stating they're IMC and verifying the other pilot is as well, immediately initiate a climb, attitude, heading, torque, airspeed, then comply with the SOP." While there are things to discuss in what's been said already, that's not the intent of this article so I'll drive on. As an ongoing personal experiment over the past 14 years, I continue the IIMC discussion by asking the pilots to visualize going IIMC; place themselves in the cockpit mentally then tell me what altitude and airspeed they were at when they entered IMC. More than 90 percent answer an altitude between 2,000 and 3,000 feet, some answer 1,500 feet, and a handful have stated a much lower altitude described by AGL. Everyone who answers 1,500 feet or

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above states his airspeed is either 90 or 100 KIAS. While such a description is not impossible, especially in low contrast environments, another scenario exists, one which has killed too many crews. Un-forecast weather is encountered; the visibility reduces so we slow down. As the clouds get closer, we descend. Soon we are off our course line dodging the weather, turning this way and that as determined by the direction we can see the furthest. Then it happens, everything goes white.

Not long ago that would lead to a discussion of just what their answer truly means to immediately initiate a climb. Now I'm hearing new ideas from those who are flying automated systems. Overwhelmingly the response is "I'll hit the go-around button," but is that really the right choice? Using the CH-47F as an example, it is likely that since you are no longer on your planned course line and speed, then you are no longer in coupled flight, either. This means that when you hit the go-around button you get cues, the aircraft does nothing automatically, you're "armed." Okay, you're sharp, next you reach down and couple the aircraft. Several issues now confront you. If you were turning when you encountered IMC then when you pressed go-around the computer captured current heading and not the heading you rolled out on by leveling your attitude. Simultaneously the aircraft will begin to attain a 500'/minute rate of climb, certainly not enough for this circumstance. Now you must reach to the CDU, bring up the Flight Director page and increase your vertical speed. Bear in mind that precious seconds are ticking away while all this button pushing is going on, seconds which could critically affect the outcome of this event. Finally, as soon as the aircraft attains a climb rate of 200'/minute it begins to achieve an airspeed of 80 KCAS. If your speed at IMC entry was something less than that, the aircraft will pitch down to achieve the new airspeed; probably not the response you're ready for just yet at low altitudes unable to see terrain and obstacles. The possibility of automation confusion taking hold at this point increases significantly.

One last quote to conclude - Hans Weber, president of aviation consulting firm TECOP International, stated, "One of the consequences of highly automated airplanes and younger pilots, who grew up very computer literate, is that they tend to focus exclusively on the computer, punching buttons and trying to get the airplane to do the right thing, rather than focusing on the fundamental requirement of the pilot…" Don't let yourself get caught in this trap. Constantly prepare, train realistically, maintain technical and tactical expertise and prepare for contingencies. Commanders and trainers, look at your areas of operation and your METL. Develop standard procedures to preclude and/or overcome contingencies which can be reasonably expected to occur, and if it's necessary implement seasonal procedures as well. When you train, make it realistic and address automation confusion and computer failures. Take advantage of these exciting times, don't become a statistic of automation.

Just another day of the Marne Express

Sgt. Anthony Davis, Hunter Army Airfield

Our day began with mission plans and a manifest review, the flight route was briefed and crew actions before and after flight were discussed. With that done, we agreed to meet back at the aircraft after dinner to prepare for the mission from BIAP, Baghdad, Iraq. When we were ready for take-off, the auxiliary power unit gave a thunderous roar and the UH-60 came to life. I climbed through my gunner's window as I had so many times with no real concern for the crew mix of experience in the area of operations.

We received clearance to depart the taxiway and transition via what we called Mike, a direct path to Forward Operating Base Liberty. Upon landing at Liberty, I exited the aircraft and went to pick up passengers from pick-up zone control. With PAX in tow, we boarded the aircraft. As we prepared for take-off, I heard the co-pilot, who doesn't get much flight time because of his staff duties, say 'I have the controls' and the instructor pilot said 'You have the controls' and we took off in a direction which was not familiar to me.

I didn't think much of it at the time when I heard the instructor pilot say "Hey, sir, I think we just flew through a restricted operations zone" and the co-pilot said, "Oh, well, no big deal." Seconds later the aircraft shook violently and began to vibrate. We also heard traffic over Baghdad radio about a PTDS (Persistent Threat Detection System) that had been cut loose, so I began to scan higher than normal. When I realized what happened, I informed the cockpit that we had cut the tether line for the JLENS (Joint Land Attack Cruise Missile Defense Elevated Netted Sensor) balloon.

It turns out that the co-pilot had turned down the radios and was unaware the balloon's tether had been cut. We requested permission to return to the parking area and began the shut down process. Upon exiting the aircraft, I felt the co-pilot acted as if nothing had happened and wasn't acknowledging just how close we came to a serious aircraft accident. I was relieved no one had been injured. With my flight gear still on, I inspected the rotor system and blade and saw the damage to one of the rotor blade tip caps, a tear one half the length of the cap.

When the safety officer arrived, we were told the PTDS had been severed from its tether and we had to provide blood and urine samples as part of the accident investigation. It turned into a long night and I was administratively grounded as I waited for the accident report findings.

The investigation concluded the lack of crew cohesion was the main reason for the crew coordination break down. Other factors included the lack of flight time in the AO for the staff officer and that both pilots failed to respond to the violation of flying through the ROZ. It was a series of crew coordination breakdowns that caused the problem and the destruction of a UH-60L tip cap and over $1M damage to the PTDS.

Know your unmanned aircraft

Puma is a hand launched Small Unmanned Aircraft System designed to directly support organic reconnaissance requirements of battalion and below maneuver elements. The system is man-portable and is operated by 2 trained operators. The Puma provides the ability to automatically track moving targets and to operate in a "follow-me" mode relative to the operator, thus allowing for mobile operations. The sensor is fully gimbaled and simultaneously provides EO, IR, and illuminator capabilities. Puma can operate in a wide range of environments, including rain and salt water conditions.

The Puma All Environment Capable Variant (AECV) is designed for land based and maritime operations. It is capable of landing in fresh or salt water and on land and provides the operator with the flexibility to tailor missions to the specific needs of forward deployed tactical units. The Puma AECV is designed for use in rugged and austere environments, providing a highly reliable, man portable reconnaissance system requiring no auxiliary equipment for launch or recovery operations. The electrically powered system operates autonomously and carries a fully gimbaled sensor system incorporating electro-optical and infrared sensors and an IR Illuminator in one modular, gimbaled payload allowing the operator to keep "eyes on target".

Wing Span	Air Vehicle Weight	Range	Airspeed	Operational Altitude	Max Altitude	Endurance	Payload	GCS/RVT	System Design	Data Link	Flight Modes
9.2 ft	13 lbs	15 km (LOS)	23-52 mph	500 ft AGL	10,500 ft MSL	120 Min	Gimbaled EO (2592x1944), IR (640x480) and Laser Illuminator (25 ft spot at 500ft AGL) and IR camera plus an IR illuminator	Handheld (GCS & RVT are inter-changeable) Combined Weight- 9 lbs (13.9 lbs w/mission planning/ RSTA Laptop)	Modular, Kevlar composite, direct-drive electric motor, Li-Ion rechargeable batteries	Digital Data Link (DDL) using IP based protocol with 95 selectable channels-of which 16 may be used in an ops area-locked to specific air vehicle	Manual, Autono-mous, Follow-Me

Small Unmanned Aircraft Systems
SUAS
Soldiers' Eyes

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The system provides day/night reconnaissance and surveillance capabilities to maneuver battalions, significantly enhancing force protection.

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Class A – C Mishap Tables

Manned Aircraft Class A – C Mishap Table										as of 26 Sep 13
	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	0	7	0
	November	0	1	13	0		0	1	3	0
	December	2	2	6	4		2	1	0	0
2nd Qtr	January	2	0	12	0		0	0	5	0
	February	2	1	6	0		0	0	2	0
	March	1	3	11	0		2	1	5	6
3rd Qtr	April	2	1	6	4		1	1	6	2
	May	1	0	4	0		0	0	4	0
	June	1	0	2	0		1	1	3	0
4th Qtr	July	3	3	10	1		0	0	5	0
	August	2	4	8	0		1	1	6	
	September	1	0	4	2			1		
	Total for Year	19	17	88	12	Year to Date	8	7	46	8

UAS Class A – C Mishap Table									as of 26 Sep 13
	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	5	1	0	6
MQ-5	1		3	4	Hunter	2	0	3	5
RQ-7		5	20	25	Shadow	0	3	10	13
RQ-11					Raven				
RQ-20			4	4	Puma	0	0	6	6
YMQ-18									
SUAV			1	1	SUAV				
Aerostat	2	5		7	Aerostat	1	2	1	4
Total for Year	8	11	28	47	Year to Date	8	6	20	34

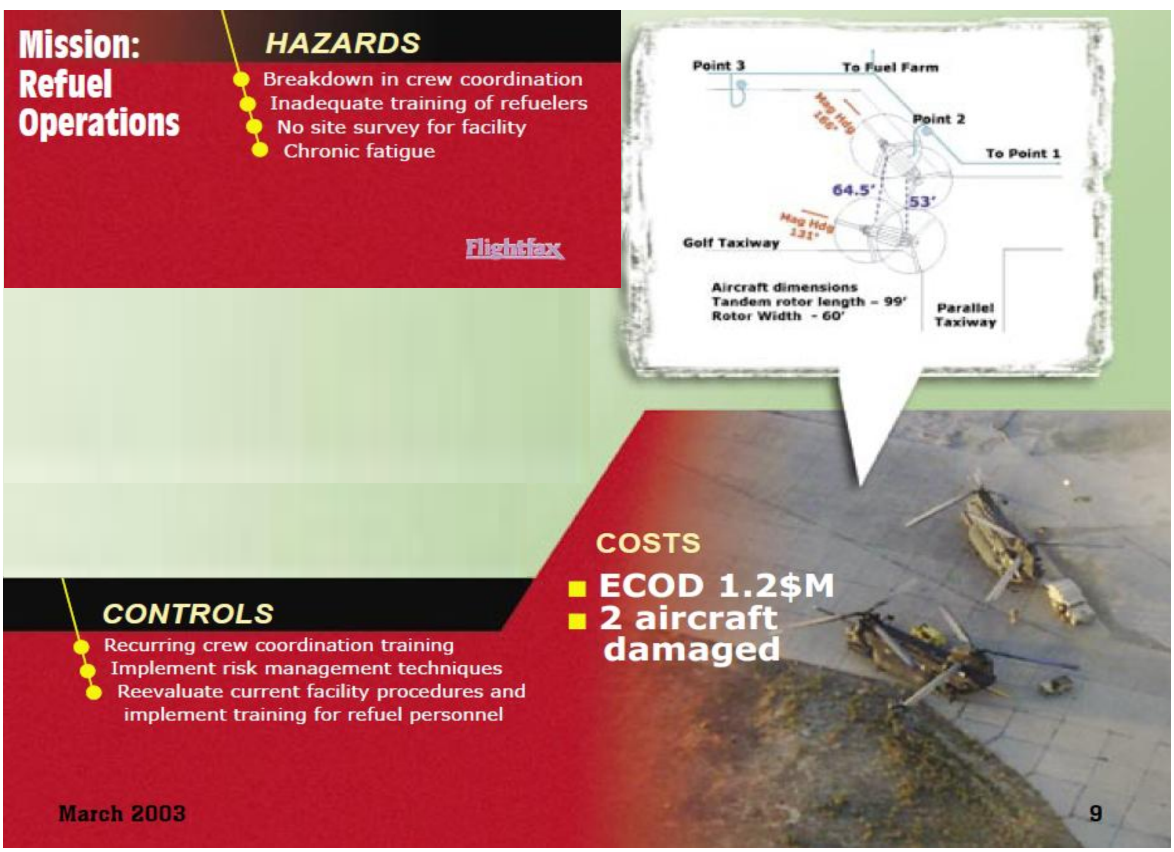
The Danger of the Assumption March 2003 Flightfax

An accident investigated by the U.S. Army Safety Center highlights the consequences of making assumptions about airfield operations and about crew coordination. The following example shows how easily things can go wrong and end up in disaster.

Background

The accident in question involved two MH-47E aircraft at the airfield hot refuel facility. The facility, a four-point forward area refueling equipment system fed by a series of fuel bladders, had been moved to its current location in September 2002 from another location on the airfield. The personnel who initially set up the facility had rotated back to their home stations. The units currently at the airfield assumed that because this was the airfield refuel facility, it had been properly laid out and surveys done to identify the hazards. They also assumed that the personnel running the refuel facility had been properly trained and had procedures for sequencing aircraft through the facility. The reality was quite different.

While the distance between the refueling points was adequate, not having a site survey for the hazards at the location resulted in no one being responsible for the refuel operation. More to the point, no one was aware that there wasn't enough lateral clearance for an H-47 to ground taxi to Points Three or Four if another H-47 was occupying Point Two.



Aircraft receive refueling instructions from ground control personnel who, in turn, receive

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instructions from refueling personnel over handheld radios. Because there weren't any written procedures on sequencing aircraft into the facility, the soldier on the radio determined which point he wanted the aircraft to occupy. In addition, because there were no ground markings at the refuel points showing where an aircraft should stop, over time the refueling point could migrate several feet from its optimum location.

In the diagram on the previous page, the aircraft at Point Two was actively engaged in hot refuel operations when the second aircraft called ground control for refuel instructions. After calling the refuel facility over the radio, ground control cleared the second H-47 to Point Three. The pilot in command (PC) of the aircraft at Point Two then requested that the aircraft be cleared to Point Four so that when finished, he could depart without interfering with the second aircraft. This change was approved and the second aircraft attempted to ground taxi to Point Four.

The PC in the right seat cleared the aircraft on his side, as did crewmembers along the right side of the aircraft. The result was that the aft rotor system of the taxiing aircraft collided with the forward and aft rotor systems of the aircraft at Point Two. Nine rotor blades and three rotor heads were damaged. Both aircraft were shut down without additional damage. Fortunately, there were no injuries.

While the board determined that the pilots and crew are ultimately responsible for obstacle avoidance, the board also determined that support failures existed that directly contributed to this accident. In addition, the Soldiers operating the refuel facility were from three different CONUS installations. While they had a strong background in bulk refuel, there was no SOP and the Soldiers had only minimal training on aircraft refueling operations. Also, they were not familiar with the use of the fire extinguishers present.

Lessons learned

Rotational units deployed to an airfield are essentially tenant organizations, and that includes some inherent responsibilities. When a headquarters establishes or takes over an airfield, people need only look at their home station airfield to see what basic functions and requirements must be accomplished at their deployment airfield. One of these critical functions is airfield operations, and two key positions—the airfield manager and airfield aviation safety officer (ASO)—must be filled. It is critical that personnel in these positions be deployed early in the airflow to ensure the smooth and safe operation of the airfield.

There was no airfield ASO at the time of the accident. During a joint operation, each service must clearly understand the responsibilities of the other services. All aviation organizations must be involved in the airfield operating board and in the monthly safety and standards councils. Procedures covering all aviation-related operations must be established, published, and widely disseminated.

Crew coordination must be done to standard and all crewmembers are responsible for aircraft clearance. If a crewmember sees a dangerous situation developing, that crewmember must speak up immediately and not assume that the pilots are aware of the situation.

Finally, unit ASOs need to periodically get out and "walk the ground" both at their home station and when deployed. Getting out of the aircraft and periodically meeting those personnel who support your operations is the best way to stay abreast of any changes that may be occurring in your AO. It's also a good way to identify hazards that may exist but have been previously missed. Take nothing for granted, assume nothing, and take immediate action to correct deficiencies.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in August 2013.

Utility helicopters

UH-60

-M Series. Aircraft was taxiing on the ramp when the main rotor blades contacted a concrete T wall barrier. (Class A)

-M Series. Aircraft made inadvertent ground contact during a pinnacle landing resulting in damage to the airframe. (Class C)

UH-72A

-At a hover the left-side hydraulic deck cover opened and contacted all four main rotor blades. (Class C)

Attack helicopters

AH-64D

-Tail wheel strut and stabilator damaged during approach to mountainous terrain. (Class C)

Cargo helicopters

CH-47

-D series. Soldier was struck by a pallet blown by rotor wash during a sling-load operation. (Class B)

Observation helicopters

OH-58D

-Aircraft experienced NP/NR exceedance (124%/123%) during FADEC manual throttle training. (Class C)

MH-6M

-Aircraft contacted the ground with the tail rotor during formation landing and sustained damage to the tailboom. (Class C)

Unmanned Aircraft Systems

MQ-1B

-UA crashed following loss of link. System recovered as a total loss. (Class A)

RQ-7B

-UA made ground contact approximately one-half mile from the launch site. (Class B)

“Scan, scan, scan; there’s always something you missed.”

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

U.S. ARMY COMBAT READINESS/SAFETY CENTER

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