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RISK-MANAGEMENT
INFORMATION

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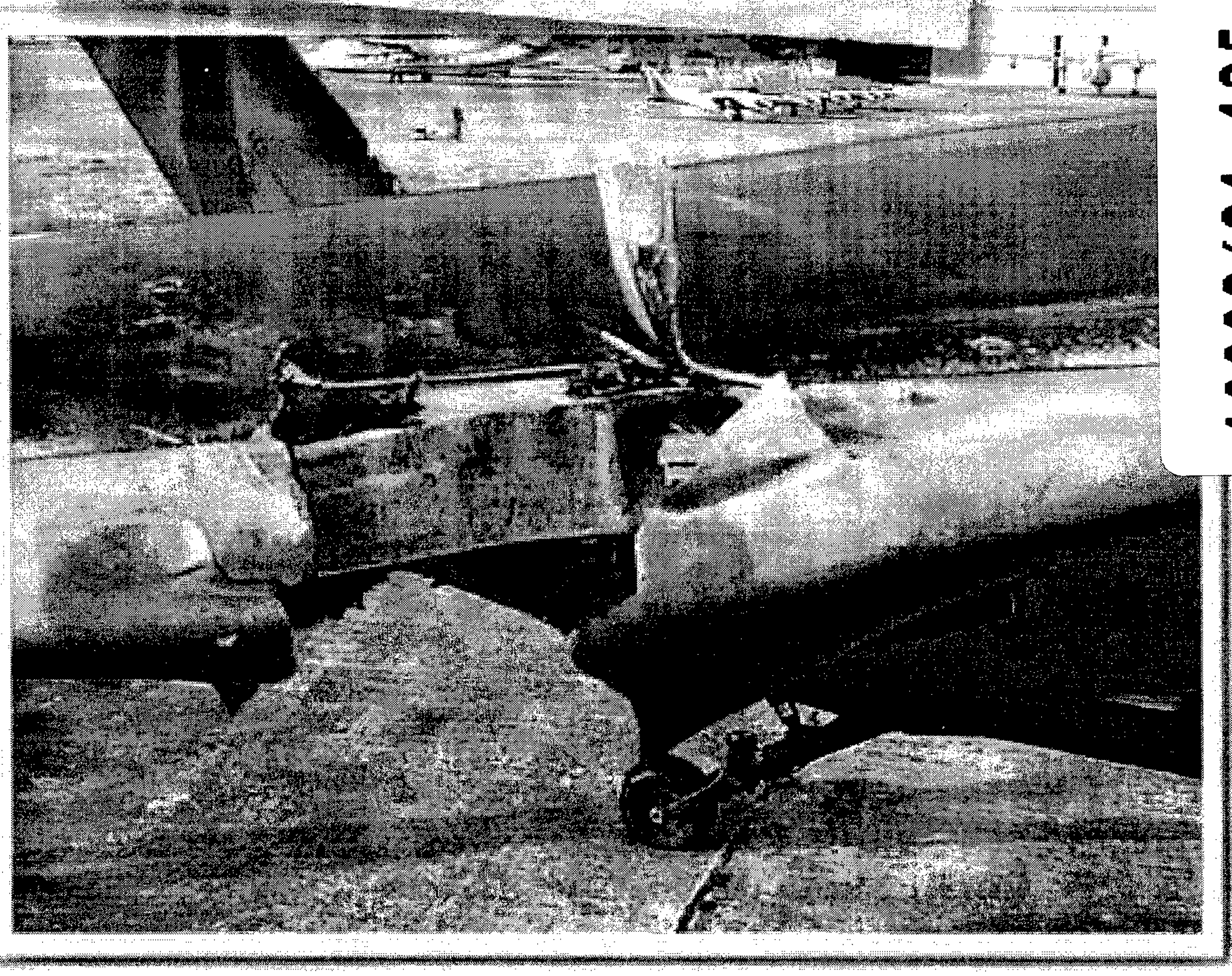
Black Hawk vs. buzzard:
it could have been ugly



This UH-60 was in the traffic pattern at 700 feet agl and 115 knots when its rotor blade met with a buzzard. The crew had entered a right descending turn in an attempt to miss 5 or 6 birds in the flight path. One bird, however, followed the aircraft into the turn. The strike was a little like hitting a ripe tomato with a ball bat and sprayed bird over the entire aircraft. When the crew righted the aircraft, they were pointed toward the runway on a modified final at about ½-mile. With no landing area available below, they continued with a roll-on to the runway and completed an emergency shutdown.

Damage was limited to the blade. And to the bird.

—Thanks to CW4 Kim Randall, ASO, 1-147th Cmd Avn Bn, WI ARNG, randak@wi-arng.ngb.army.mil

Call of the wild: Preventing bird strikes on Army airfields

Blood was everywhere. Bird parts and feathers mixed in with the smell of JP-8 and oil. When all was said and done, the body count was eleven. Eleven dead Canadian geese and nearly $80,000 in damage to an Army C-12 airplane.

A bent prop, a sudden-stoppage engine, a blown tire, and eleven dead geese were the result of a night bird strike at Davison Army Airfield on 6 October 1998. Like all accidents, this one could have been avoided.

factoid:
An adult Canadian goose produces 4 pounds of wet manure a day.

A LITTLE BACKGROUND

When I first took over the job as the Airfield Safety Officer at Davison, I was told that geese on the airfield are protected by the Bird Migratory Act of 1918. I was told that there wasn't anything we could do about the hundreds of geese that made this airfield their home. Those same people told me that the swamp we have on our airfield is a Federally protected wetland. I was told that wetlands are untouchable—just like the geese.

I was comfortable that we had done all we could do. Then we had that night bird strike. We had eleven dead geese, a damaged airplane, and a very upset C-12 crew. It was time to separate the myths from the facts.

MYTH: BIRDS AND ANIMALS THAT ARE PROTECTED BY ENVIRONMENTAL LAWS CAN NEVER BE DISTURBED.

The first step was to see what the law allowed us to do about the bird hazard. I asked the folks who would know and got the same answer as before: "The geese are protected by the Migratory Bird Act of 1918 and cannot be harmed."

Okay. So what could we do about the problem?

With any law, there is often a difference between the letter of the law and the intent of the law. And that's the case here. The laws that protect migratory birds should not be confused with the laws that protect endangered species. The regulators of these laws are also very understanding of the special problems airports have controlling wildlife. But before we loaded up our shotguns, we had some real work to do.

The U.S. Department of Agriculture (USDA), the regulating authority for the Act, requires notification of any bird removal. They were very supportive and gave us a no-cost wildlife assessment and written endorsement of our plan. The USDA representative also informed us that the approval authority to destroy birds had been moved down to state level. In other words, the USDA wanted to know what we intended to do, but the approval authority had been pushed down to the State Game and Inland Fisheries.

MYTH: BIRD STRIKES AREN'T A REAL PROBLEM TO AIRCRAFT; THE AIRCRAFT ARE SO MUCH BIGGER, THE BIRDS ARE THE ONES WHO SUFFER.

In 1995, an Air Force E-3 AWACS aircraft struck a flock of Canadian geese at Elmendorf Air Force Base. The resulting crash killed 24 people and forever changed the way the military and the FAA look at bird strikes. In the Army alone, 185 bird strikes have cost just under $900,000 since October 1993. Thirteen years' worth of bird strikes have cost the Air Force nearly $471 million. And the FAA has published 7 years' losses at $47.9 million for bird-strike damage in civil aviation. These numbers do not reflect lawsuit dollars or insurance claims lost to bird-strike victims. They also do not reflect the bird strikes that are reported as FOD incidents or the ones that are not reported at all because there was no damage to the aircraft.

factoid:
The highest recorded bird strike occurred at 39,000 feet. On 23 October 1991, a DC-862 struck a blue-colored bird with red feet. The bird was never recovered.

MYTH: BIRDS DON'T DO DAMAGE TO ARMY HELICOPTERS.

The vast majority of Army aircraft bird strikes involve helicopters; helicopter-bird collisions also account for most of the cost of Army aviation bird strikes (figure 1).

Figure 1. Army aviation bird strikes (1 Oct 93 – 26 Feb 99)

Type Aircraft	Accident classification A	B	C	D	E	F	Damage Cost	Injury Cost	Total Cost
Fixed wing	0	0	1	11	32	1	$193,217	0	$193,217
Rotary wing	0	0	7	13	116	4	$704,483	$1,680	$706,163
Total	0	0	8	24	148	5	$897,700	$1,680	$899,380

Studies show that more than 90 percent of all recorded bird strikes occur below 1000 feet agl. More than 97 percent of those strikes happen at 500 feet and below. That's the same airspace in which tactical Army helicopters work. The Air Force has seen this as a disturbing low-level problem for them because, like the Army, they also use low-level routes for training. The problem is that birds rely on hearing to avoid predators, but birds don't hear jets until after they have passed over. Our helicopters make plenty of noise; birds hear us and do a better job of avoiding us—most of the time. But when they don't, there's usually trouble. Birds weigh anywhere from a few ounces to several pounds. Imagine an 8-pound bowling ball with wings heading toward your cockpit.

MYTH: THE AIR FORCE'S BIRD AIRCRAFT STRIKE HAZARD (BASH) PROGRAM IS ALL ABOUT SCARING BIRDS.

The BASH program has many elements, and since no two airfields are the same, no two BASH programs will be the same. However, they all involve making airfields unattractive to birds and other wildlife.

All the things we do to make our airfields pleasant to look at also make them pleasant for birds to live and eat on. For example, airfields have plenty of nice short grass, and birds in general—and geese in particular—love short grass. The BASH program makes recommendations about how an airfield can become an unattractive area for birds. These recommendations might include using pyrotechnics and noisemakers to scare off the birds. The problem with noisemakers is that birds hear in the same frequency range as humans. So if they hear the annoying sound, so do we, and that can be very distracting to us. Ultrasonic noisemakers have proven to be ineffective in extensive studies by the USDA.

Another BASH-program recommendation is that grass be allowed to grow to 7 to 14 inches. However, for Army helicopters, this is unacceptable; spatial disorientation can be induced by hovering over tall grass.

The BASH program also recommends removal of all free-standing water within 5000 feet of the runway. The FAA also makes a similar recommendation to not allow ponds, swamps, wetlands, or any other water area that might be a host for birds anywhere near runways.

MYTH: THERE ARE SOME GOOD NONLETHAL MEANS TO PERMANENTLY CONTROL PROBLEM BIRDS.

Here is a breakdown of the vast array of techniques that can be used to control birds at airfields—but only temporarily.

■ **Harassment**. Harassment with pyrotechnics, electrically generated sounds, reflective tape, flags, and propane cannons work to some degree to repel fowl, but the birds grow accustomed to these measures after a while.

■ **Biological control.** Border collies, falcons, or other animals used to control birds are time intensive and expensive. The dogs are one more animal running around the airfield. The falcon is the same—one more flying target in the air. But both of these are effective to a point. However, at best, they are a temporary solution to a permanent problem.

■ **Exclusion**. Using wire, netting, floating balls, or other devices to keep birds away from water sources don't work because the birds often outsmart the device.

■ **Habitat alteration**. Planting grass that the birds don't eat or that is unpalatable to them is another option. This includes planting dense vegetation that prohibits the birds from entering the pond. Although this is an effective technique, it can be difficult for an airfield to execute around the entire base. Planting crabgrass instead of tasty Blue Grass also works well.

factoid: Birds hear in much the same frequency range as humans, so if a noise distracts them, it will distract you.

■ **Repellents**. Taste repellent can be applied to grass, making the grass less desirable to the birds for feeding. The most effective of the repellents is a concentrate made from grape-seed extract. The problem is the cost—upwards of $100 for a gallon of the mixture, which has to be applied frequently. Airfields are big, making the cost of this technique out of reach for most airfield operators.

SO, WHAT'S THE ANSWER?

Population management appears to be the only permanent answer. This technique includes hunting, nest/egg destruction, and euthanasia. Although these are lethal solutions to bird problems, the FAA, the USDA, and most state wildlife managers recommend these techniques for airfields.

The USDA and FAA recommend using shotguns, pellet guns, or air rifles in conjunction with pyrotechnics. By using the two together, the birds learn that pyrotechnics equal death, and the shooting doesn't have to happen as often. A well-placed flare will work as effectively as a shotgun after the two have been used together a few times.

The foundation of the BASH program is to offer coexistence with nature by making our airfields less desirable to birds and to offer the birds suitable habitats elsewhere. The BASH program uses shooting as the last method to control birds and wildlife hazards. First steps include—

- Reducing the attractiveness of airfield to birds. Keep the grass cut a little longer wherever you can. Use loud noises to scare off the birds, and constantly harass the birds as much as you can.
- Steering clear of birds as they fly. Avoid flying under a flock of birds; birds dive for the ground when they are frightened. If a bird-strike appears imminent, pitch up in an attempt to fly above the bird. Use your landing light; birds will avoid you if they see you, and the landing light will help you be seen.
- Avoiding flight over areas that have a high concentration of birds; stay clear of swamps, coastlines, landfills, and ponds.

Summary

According to the FAA, if you hit a two-pound seagull while traveling at 120 mph, the force exerted would be equal to 4,800 pounds. Some anti-aircraft rounds exert less force than that.

We need to learn how to manage our airfields and protect our fleet. As pilots, we need to know how to avoid bird strikes and how to report them when they happen. We can successfully coexist to complete our mission and not interfere with the birds if we learn how to keep the birds away from our training areas and away from our airfields.

We all want to go home at night safe and happy, including the birds.

—CW3 Bob Monroe, Davison Army Airfield Safety Officer, Fort Belvoir, VA, DSN 656-7006 (703-806-7006), robert_l_monroe@belvoir.army.mil

Lesson learned: Using your aircraft to scare away birds is a bad idea

On a cross-country flight with six aircraft, we were asked by ATC to fly down the runway at an Air Force facility to scare away a flock of birds so that a fixed-wing aircraft could take off. I was in the fourth aircraft, and we had a bird strike. Luckily there was no damage to the aircraft.

In those six aircraft were a commander, a few platoon leaders, and warrant officers of every grade. It sounded like a good idea to help our neighbor fliers. It wasn't until after the fact that we all discussed the situation and concurred that it was a stupid thing to do. While in flight, nobody thought it was a good idea, but no one spoke up

Another lesson learned.

—CW3 Chris Gunderson, ASO, N Troop, 4/2 ACR, Fort Polk, LA, DSN 863-6982 (318-531-6982), lilgundy@aol.com

Fyi

For more information on bird strikes and bird control around airfields, visit the following web sites.

- http://www.faa.gov/arp/strkrpt.pdf
- www.airsafe.com/usda/birds.htm
- http://www.acc.af.mil/public/combat-edge/

At Davison AAF, thermal is for the birds

Imagine that you're tasked by your commander to drive an Army vehicle at speeds upward of 110 mph down a 1-mile stretch of road, which is only 90 feet wide, at night. This road is lit only by small blue lights, and there are numerous animals that inhabit the area around the road. You have only one small headlight to light your path.

Would you do it? Would you drive over 100 mph on a narrow stretch of unlit road with animals in the area and without the aid of any night-vision devices? What if your vehicle had only three wheels and was top heavy? Would you do it?

Why not? Army C-12 pilots do it every night.

Every night across the Army, ATC clears airplane and helicopter pilots to land on runways that may or may not have animals on them. A bird or animal strike or near miss is an almost weekly occurrence for these pilots.

At Davison Army Airfield, we're taking a multifaceted approach to eliminating bird strikes on our airfield. At the forefront of the project is the use of thermal-imagery technology to detect all hazards on the airfield. Along with the thermal device, we use a specially trained dog named "Penny" to chase off the geese and pyrotechnics to harass them.

The thermal device is on a 360° mount on a tripod that's placed on top of the tower for maximum observation area. The device is controlled remotely either by a computer for automatic continuous surveillance or by manual override for close-up viewing of targets.

We're presently testing various types of thermal devices. Plans are to use either infrared motion detectors (IMDs) placed around the entire airfield perimeter or a software package known as "Automatic Target Recognition" (ATR).

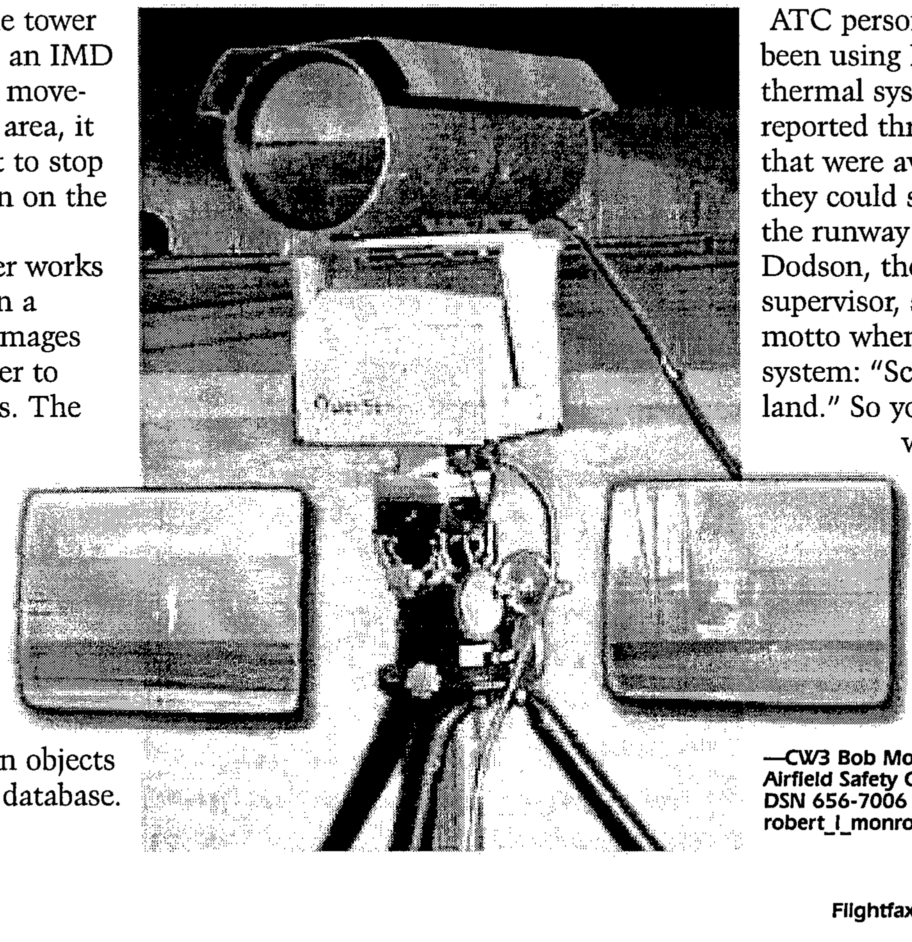
The IMDs are sensors that detect heat and motion within their designated area. They are connected to the main thermal unit on top of the tower by thin cables. When an IMD senses both heat and movement in its scanning area, it tells the thermal unit to stop scanning and zoom in on the area.

The ATR computer works differently. It relies on a database of thermal images stored in the computer to detect airfield hazards. The thermal device continuously scans the airfield and the entire perimeter, feeding the information into the ATR computer. The ATR constantly compares the video information to known objects that are stored in its database. When an object that produces heat is detected by the thermal unit and the ATR, the thermal unit will zoom in. The ATR software then analyzes the object, comparing it to known hazards to determine if the object is a person, a bird, a deer, or other hazard to the airfield.

Both systems rely on human verification to complete the targeting process. Everything the thermal device sees is displayed on remote monitors in offices around the airfield. Once an object is identified as a possible hazard, an automatic alarm goes off in the airfield services office, the tower, and base operations. Once the alarm is sounded, the thermal unit remains focused on the object, allowing the airfield services representative to either reset the alarm due to a false reading or pinpoint the location and get rid of the hazard.

Complete testing will take some time, but preliminary results are well beyond our expectations. As for the future, we're preparing to present the plan to the North American BASH Conference in Vancouver in May and to the FORSCOM Safety Conference in Atlanta in June. In addition, the Air Force is watching our program closely and has offered assistance. The FAA is also interested in the preliminary results and wants a full written report.

What does this type of system cost? Expect to pay $60,000 to $100,000 for the thermal device and between $5,000 and $25,000 for the primary-detection system. Most major airports use airport ground radar anyway, so this could be plugged into the thermal control computer as a primary detector. At Davison, we're looking at using Marine radar (the type used on expensive boats) for primary detection. Such radar will cost $5,000, but it will cover several miles.



ATC personnel who have been using Davison's thermal system have already reported three bird strikes that were avoided because they could see the birds on the runway at night. Mr. Bill Dodson, the tower supervisor, says they have a motto when they use the system: "Scan before you land." So you can know that when a controller at Davison Army Airfield tells you that you are cleared to land, you really ***are*** cleared to land.

—CW3 Bob Monroe, Davison Army Airfield Safety Officer, Fort Belvoir, VA, DSN 656-7006 (703-806-7006), robert_l_monroe@belvoir.army.mil

The A.T. flyaway blues

It was time at last for our attack battalion to depart for annual training (A.T.). The weather was clear as the previous companies departed and was forecast to be good all the way to our destination. If we hit our takeoff time, we should have similar weather.

Starting was normal. The first clue of any problem to come was when I pushed the button to check fuel quantity during run-up. It normally would read about 1750 pounds with a full tank. Being in the back seat, I would hold the button in until it lowered a few hundred pounds, release the button, and ensure the fuel-quantity gauge returned to its starting point. I recited the numbers to the front-seater: "Fuel quantity 1550, bled down to 1000, and returns to 1550." Neither of us paid much attention to the fact that the indication was somewhat less than a full tank as that was not the primary purpose of ***that*** check. It probably just meant that maintenance had completed an engine run-up after the aircraft had been refueled.

Poised for takeoff on the ramp as Chalk 1, we checked "fuel required for mission and transponder up normal." At that point, the fuel quantity gauge indicated 1250 pounds. I usually planned fuel stops for ECAS Cobras at about 175 nautical miles in no-wind conditions; this first leg was only 158 nautical miles. At 120 knots ground speed, we were looking at about an hour and 19 minutes with winds forecast to be light and variable at 3000 feet. We would be flying at 3500 feet and had previously computed fuel required for the flight and VFR reserve at 1080 pounds. So we still had a 170-pound (15-minute) cushion. We concurred that we were "good to go."

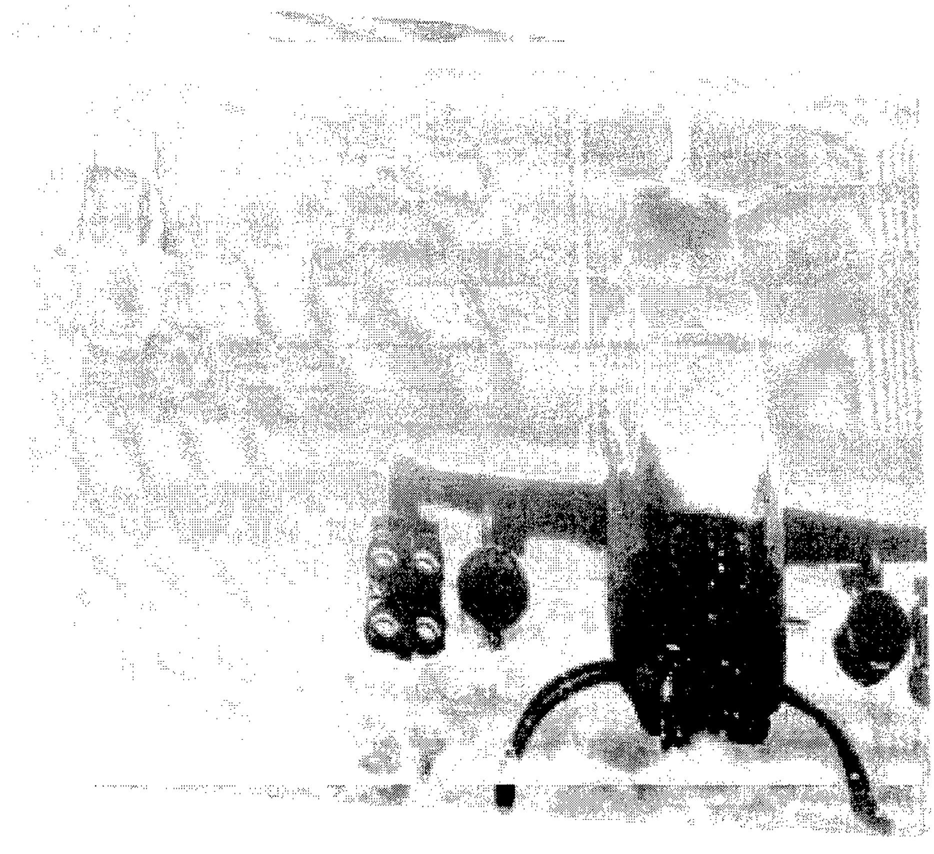
Our takeoff was uneventful. Departing the pattern, I glanced at the fuel gauge. It read about 1100 pounds.

Upon reaching cruise altitude, we started our fuel check. I recited, "Fuel 950 pounds. Fuel 950 pounds?!? We just went through 150 pounds of fuel in less than 5 minutes. That's over 1800 pounds per hour, about three times our usual burn rate. We really ought to have about 1600 gallons in this tank. Somehow we've lost an hour's worth of fuel and it's apparently going down fast!"

We asked the battalion maintenance officer in the trail Cobra to come up to take a look to see if we were losing fuel overboard. After checking, he replied in the negative. One of the other aircraft in the flight suggested that we continue on; there was an airport with fuel about 58 miles from home plate and 18 miles south of our course. He said that if our low-fuel caution light had not come on by the time we reached the airport, we could assume that the fuel gauge was inoperative and just continue on. If it had illuminated we could land, refuel, and decide what to do from there.

I remembered reading somewhere that we were to believe the worst-case indications in the event there was a discrepancy involving fuel quantity. I looked at the fuel gauge and said aloud, "Now indicating 800 pounds." We decided right then to invoke the "most-conservative-response rule."

We passed lead over to Chalk 2, turned around, and headed



back for home plate. We were about 25 miles out (12 to 13 minutes) and immediately called the tower. They said that rain squalls and bad weather were rapidly approaching from the northwest and the wind was increasing and shifting around to the north or northwest. This weather had not previously been of concern to us as we would have easily outrun it on our way to A.T. We now hoped to get back home and get the aircraft in the hangar before the bad weather arrived.

By the time we were about 15 miles out, we were in rain. By 10 miles out, visibility was decreasing in heavy rain. Tower indicated they were not working any other aircraft, and we were issued a special VFR clearance. By 5 miles out, we could see the ground very clearly, but forward visibility was still decreasing. My normal inclination would have been to slow down considerably and prepare to land ASAP if visibility deteriorated too badly. But a glance at the fuel gauge showed 450 pounds and the needle dropping like a rock. By 3 or so miles out, home base was no longer in sight, so we just continued on with our present heading.

After a minute or two, it became clear to both of us that something was wrong. Home base should have been in sight ahead and down, especially since we obviously were so close and could see the ground so clearly. My front-seater commented that the wind must have blown us off course. I agreed. I figured we must be passing south and west around the base, so we should head due north. We both would have liked to slow down, but the fuel gauge was now showing 240 pounds and was still dropping like a rock. Moments after changing our heading to north, home base came into sight and the tower cleared us to land.

We hovered up to the safe line and shut down in the lee of the hangar. The fuel gauge was now indicating 120 pounds. The aircraft could not be fueled in the storm, so we didn't really know how much fuel was in the tank. When maintenance later fueled the aircraft, it took only 350 pounds to fill the tank. Maintenance replaced the fuel gauge, but it still wouldn't indicate properly. They ultimately had to repair the probe.

Lessons learned

What did we do right, what did we do wrong, and what did I learn from this experience?

■ We should have noticed sooner that something was amiss with our fuel quantity. We didn't concern ourselves with it enough initially as we let ourselves become too busy doing other things. Besides, we wrongly felt that we were safe on the ground and could deal with that when it was time to take off.

■ Having the unit maintenance officer check us out in flight to see if there were any obvious amounts of fuel spilling overboard was probably not a bad measure.

■ Our believing the worst case of the fuel discrepancy was the correct thing to do and it was also required. Sure enough, in our unit all-read file, I found requirements to believe the worst case in the event of fuel-quantity discrepancies. Continuing on to see if the low-fuel-warning light would illuminate would certainly not have been the safest action.

■ Returning to home plate was a good initial reaction; it had everything we required, including fuel, maintenance, parts, ground-handling wheels, and a hangar for the aircraft. It was the safest place for all concerned, and we were just minutes away. In fact, at that point, we didn't have enough fuel, on a worst-case indication, to go anywhere other than home base.

■ We could have landed the aircraft in one of the many large, flat farm fields beneath us. We had good visibility down, and an immediate landing would have been the most conservative response to our situation. And that is where we now feel we were in error and should do differently in a like situation.

■ We made a wise initial decision not to continue the flight and instead to return to home plate. But when the storm beat us home and the visibility decreased, we should have landed immediately and let maintenance worry about recovering the aircraft later.

Summary

The overall lesson we learned is that each successive situation we face and each decision we make limit our alternatives. So each and every decision is important—and, often, critical. You can't ever relax and motor on, fat, dumb, and happy, even for a moment, just because things are going well or you have chosen a wise course of action or you're doing the right thing. That's because the next situation surely lies just around some unknown corner and it will require new decisions and actions that are just as important and possibly more critical than the last ones.

One right call doesn't always mean you're out of the woods. It may take a number of astutely correct decisions and actions to get you home safely.

—CW4 Don Thomson, Army Aviation Support Facility #2, MO ARNG,
DSN 555-9330/9347 (573-526-9330/9347),
aasf2@mo-ngmet.army.mil

Along for the ride

When the student pilot made a right pedal turn to align the aircraft with the landing strip, the nose continued to the right, accelerating into the turn. The IP then took the controls and applied full left pedal to arrest the rate of turn. However, the right turn continued, and the aircraft went into an uncommanded right-hand, descending spin. The crew immediately recognized the condition as some sort of tail-rotor malfunction. In fact, the tail rotor drive shaft had actually severed at the forward hanger bearing.

Emergency procedures in the operators manual describe this event and recommend that the crew "accelerate the aircraft into forward flight. If unable to accelerate, initiate a power-on descent with the collective adjusted so that an acceptable compromise between rate of turn and rate of descent is maintained. At approximately 5 to 10 feet above the ground, perform a hovering autorotation by activating the chop collar or pulling both power levers to off."

This complicated procedure assumes you have someplace to go. In this case, the crew was unable to accelerate forward. The aircraft porpoised in its descending spin, and there was little they could do except try to keep the aircraft upright. The major obstacle to getting on the ground was that the emergency

One of the most effective tools we have to prepare aircrews for emergencies is the visual simulator. It helps develop instinctive responses and builds confidence. It reduces reaction times and aids in malfunction recognition. It also does one other thing: It enables aircrews to identify flight envelopes in which the aircraft would be particularly vulnerable in the event of certain malfunctions.

Take the AH-64 Apache for example. The Combat Mission Simulator (CMS) provides us the opportunity to fly the Apache in virtually any profile—tactical, instrument, or emergency. We can practice our tactical procedures on a regular basis, perform instrument tasks as necessary, and even experience emergencies that cannot be performed in the aircraft. Therefore, when we experience the real thing, we instinctively act, without hesitation. In the CMS, only one thing is missing, adrenaline.

A recent AH-64A accident happened during the day, under ideal training conditions, in the traffic pattern, at the proper altitude—at a 400-foot out-of-ground-effect (OGE) hover—with an experienced instructor pilot on the controls. As it did every day, the preflight briefing had included emergency procedures. The CMS and the Combat Weapons and Emergency Procedures Trainer had been used to reinforce those procedures. The crew knew what to do for in-flight emergencies.

The crew had performed numerous contact-type maneuvers that day, including a simulated single-engine failure OGE. They had just flown an abbreviated traffic pattern and were preparing to fly another simulated engine failure OGE. The AH-64 was at a gross weight of 14,500 pounds with 72 percent torque applied.

occurred directly over a stand of 80-foot-tall pine trees.

The aircraft went in vertically. The main-rotor blades disintegrated as they contacted the 10-inch diameter trees, and the tail boom was severed. The fuselage fell vertically approximately 15 feet, landing on its left side. The engines were still running and had to be shut down manually. The student pilot exited the aircraft through the left, broken-out canopy, the IP through his door. There was a residual postcrash fire, which was soon extinguished by crash-rescue personnel. The crew was lucky—neither was seriously injured.

Recreating the circumstances of the accident in the CMS, we made an interesting discovery: In six attempts—and knowing what was going to happen, we made only two successful landings. Add into the equation the 80-foot pine trees over which the emergency occurred, and it was next to impossible for this crew to get on the ground without major damage to the aircraft.

LESSONS LEARNED

What severed the tail-rotor drive shaft? A flange (NSN 3010-01-336-0783) located in the forward hanger-bearing assembly failed due to hydraulic embrittlement. It failed forward of the splined portion of the flange, severing all drive to the tail rotor. The Aviation and Missile Command (AMCOM) is currently reviewing all associated history and maintenance procedures to determine the extent of the problem and corrective actions for the Apache fleet.

What can we do to reduce our risk? Fixing the mechanical problem is the first and most important step in reducing our risk, and that's being expedited through appropriate channels.

The bottom line is that it is truly surprising that there was so little the crew could do once the drive shaft severed. Two 1690-shaft-horsepower engines operating at normal rpm, sustaining an OGE hover for a 14,500-pound aircraft, produce substantial torque forces. Breaking the antitorque drive defeated counter-forces, resulting in the accelerating spin. The natural porpoise of the airframe in the spin eliminated the possibility of accelerating into forward flight. The aircraft was therefore destined to go into the trees.

Recognizing the hazards of operating within certain flight envelopes is a viable step crews can take to mitigate risks. Performing emergency procedures in the CMS can help us react instinctively during emergencies, but reducing our exposure to critical parameters will reduce our risks significantly further.

There are times when we must operate within these parameters, but if we choose a spot above an open area, or reduce our time in that position, we increase our chances for success. Stacking the deck in our favor to give us the best odds should something go awry is just plain smart thinking. We should increase that margin for error whenever possible.

—MAJ Mark Robinson, Aviation Systems & Accident Investigation Division, DSN 558-1253 (334-255-1253), robinsom@safety-emh1.army.mil

Shortfax
Keeping you up to date

Synthetic fabrics and static electricity

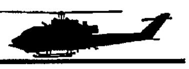
Over the years, concern about electrostatic discharge (ESD) has resulted in various alerts to users of possible static discharge from the camouflage cold weather parka (NSN 8415-01-228-1306 series) and trouser (NSN 8415-01-228-1336 series). These items are worn as the outer garments to the extended cold weather clothing system (ECWCS). Recent research, however, has shown that soldiers wearing ECWCS or other garments made of synthetic fabrics during operations such as conventional ammunition, munitions, or missile handling should not present a hazard. The one possible exception to this concerns 20mm and 30mm rounds containing the ESD-sensitive M52 electric primer. Users of these items and specialty munitions or explosives should always follow the guidelines in appropriate technical and field manuals.

—Mr. Paul G. Angelis, System Safety Engineer, U. S. Army Soldier, Biological, and Chemical Command, DSN 256-5208 (508-233-5208), pangelis@natick-emh2.army.mil

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1



Class E

E series

■ Broken skid cuff on left rear was discovered during hot refueling. Flight was terminated.

■ After entering high-speed simulated engine failure, SP noticed oil temperature fluctuating between 90° and 150°C. He took controls and made precautionary landing. Engine oil temperature fluctuated until shutdown. Maintenance replaced engine wiring harness.

■ Engine oil temperature fluctuated from 90° to 150° while on ground. Aircraft was shut down. Caused by dirty oil temperature transducer cannon plug.

F series

■ Twenty seconds into start sequence, pilot noted initial voltage drop and heard loud whining noise. Start sequence was aborted. Investigation revealed that starter generator shaft had sheared. Starter was replaced.

■ At 1000 feet agl and 100 KIAS during takeoff, master caution and alternator segment panel lights came on. Resetting PR-10 failed to bring alternator on line, and aircraft was landed without further incident. Electrical odor was detected during postflight inspection, which revealed that alternator control unit was defective and showed signs of internal overheating.

AH64

Class A

A series

■ Aircraft crashed into trees during night training flight. Main rotors and tail boom separated, and aircraft came to rest on its side. Investigation is under way.

Class B

D series

■ APU fire light and audio came on at 400 feet agl during final approach. Aircraft landed immediately, and crew extinguished APU fire with onboard agents. APU and cover, sheet metal, and wiring were damaged.

Class C

A series

■ Aircraft was trail in flight of three landing to holding area when it struck wires at approximately 100 feet agl. Wires were crossing river in the vicinity. PC noted tugging, followed by vibration sensation from aircraft and landed without further incident. Two main-rotor blades were damaged.

Class D

A series

■ At 34 feet agl and 18 knots during approach for landing at field site, No. 2 engine shut down. Crew continued descent for landing, applying 126 percent torque on No. 1 engine for 3 seconds. Landing and touchdown were completed without incident. Overtorque inspection revealed elongated bolt hole on No. 1 engine input drive shaft and corresponding coupling. There was no other damage to aircraft or No. 2 engine.

Class E

A series

■ Bird entrails were found on two main-rotor blades after shutdown. Inspection revealed no damage.

■ During day cross-country flight, duck in flock collided with lead aircraft. No unusual control or flight indications were present, and aircraft was safely flown to next scheduled stop. Birdstrike damage to main-rotor blade was discovered during postflight inspection.

■ While at 80-foot OGE hover during two-ship battle-position operations, CPG noticed aircraft was in rapid descent and informed pilot. Pilot arrested the descent at tree-top level, and neither crewmember felt any impact. Aircraft returned to 80-foot OGE hover and continued operations. Postflight inspection revealed several gouges on underside of stabilator.

■ Smoke began entering cockpit during engine start with APU running. Aircraft was immediately shut down, and crew exited without incident. Inspection revealed smoke coming from primary hydraulic pump. Suspect that primary hydraulic pump overheated. Maintenance replaced primary hydraulic pump, manifold, and lines.

■ During ALQ 144 power-up, unusual noise was heard, followed by caution light illumination. ALQ 144 exploded; cause not reported.

■ During in-ground-effect hover during NVS training, crew noticed high-frequency airframe vibration in cockpit floor. Vibration increased with high power settings and decreased with low settings as aircraft was brought to a hover and landed. Cause not reported.

CH47

Class A

D series

■ Crew reported engine overspeed while preparing to land to airfield. Aircraft landed hard off the airfield, sustaining extensive structural damage.

Class C

D series

■ One sling leg broke away from load while aircraft was at hover. Postflight inspection revealed sheet-metal damage to undercarriage due to recoil of sling leg.

Class E

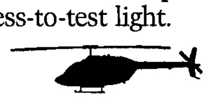
D series

■ Uncommanded flight control inputs in roll axis occurred during cruise flight. Copilot attitude indicator was indicating turn in level flight. Crew executed emergency procedure for VGI failure. After uneventful landing, maintenance replaced vertical gyro.

■ During cruise flight, PC determined that fuel on board and fuel required for mission would be close but sufficient. However, due to headwinds, fuel rate was higher than anticipated, and PC decided to offload external load and continue mission. During takeoff after offloading, left and right fuel-low caution lights came on. Aircraft landed without incident.

■ Smoke began coming out of maintenance panel during runup. Pilot performed normal shutdown procedures without incident. Maintenance replaced aft transmission press-to-test light.

OH58



Class A

D(I) series

■ Uncommanded left roll occurred following pick up to hover. IP lowered collective and applied right cyclic to arrest roll, but aircraft continued to roll left. Aircraft was destroyed upon impact with ground. Crew was treated and released. Investigation continues.

Class C
C series

■ Aircraft rocked on touchdown to sloping terrain, and tail stinger and front lower WSPS contacted ground. Aircraft was shut down without further incident.

D(R) series

■ Computer overtorque reading (132%/1.54 seconds) was discovered during preflight. Incident is under investigation.

Class E
D(I) series

■ During approach to FARP after several running-fire engagements, forward battery-access door came open in flight. Aircraft landed without incident. Only damage was to battery-access door.

■ As aircraft hovered by parked aircraft, unlatched door of parked aircraft blew off. Damage was limited to door hinges.

■ About 1 hour into gunnery mission, crew got a d.c. generator failure caution message. When it didn't come on after they twice performed emergency procedures, crew left it off. Soon after continuing flight, the following caution messages came up: SCAS DISENG, RECT FAIL, AC GEN FAIL, and fuel filter bypass failure. IP immediately landed. After shutting down and smelling smoke, crew discovered that d.c. generator was on fire.

UH1

Class C
H series

■ While aircraft was in holding pattern, portion of greenhouse broke away and blew out, striking main-rotor blade. Aircraft was landed without further incident. Blade required replacement.

Class E
H series

■ During cruise flight as Chalk 3 in four-ship formation, crew heard bang from rear of aircraft. After precautionary landing, inspection found evidence of bird strike on main-rotor blade.

■ During entry to traffic pattern, transmission oil pressure was noted at zero; no other segment lights or master caution light illuminated. Caused by failure of transmission pressure transmitter, which was replaced.

V series

■ During contour flight, smoke began venting from battery and acidic odor was noted. Crew immediately diverted to nearby landing zone and completed emergency procedures. Smoke continued to vent from both vents for some time after landing. Battery was replaced.

■ Aircraft was at 250-foot hover, reseating a rescue hoist. As 250-pound block was being raised, it began to swing fore and aft. As it was raised closer to aircraft, it hit front right crosstube and underside of aircraft. Crosstube and hoist cable were replaced.

UH60

Class C
A series

■ Avionics (nose) door opened during autorotational check portion of flight. Contact with windshield resulted in damage to numerous components.

L series

■ During landing to unimproved landing zone, crew maneuvered aircraft to avoid obstruction. After touchdown, crew noted lack of imagery on FLIR screens. Inspection revealed damage to FLIR turret ball, searchlight motor, and PLS antenna.

■ Routine maintenance inspection revealed gouge marks on all four main-rotor blades as a result of contact with uppermost screws of ALQ-144. Further inspection revealed damage to main-rotor hub and spindles, possibly requiring replacement. Final determination pending.

■ While being positioned for parking, aircraft's rotor blades contacted AH-64 parked on adjacent pad. UH-60 sustained damage to two blades and three blade tip caps; AH-64 sustained damage to one blade.

Class D
A series

■ During taxi from runway to parking, PC noticed M130 cover next to runway and placed aircraft in decelerating attitude to land and recover M130 cover. When he felt slight bump, PC thought tail wheel had contacted ground. However, postflight inspection revealed damage to stabilator trailing edge and sheet metal damage to central trailing edge.

■ Crew had windshield anti-ice on during entire flight. While taxiing to parking, pilots saw spark on left edge of center windscreen and turned off anti-ice. Windshield required replacement due to 6- to 8-inch crack beginning at origin of spark.

■ While at 20 KIAS and 70 feet agl supporting insertion to confined area, crew detected change in rotor noise and landed. Postflight inspection revealed damage to two tip caps.

■ Main-rotor blades struck tree during NOE flight over creek bed. One tip cap required replacement.

■ When test pilot increased collective for power recovery, nose compartment door came open, striking and breaking left and right windshield panels. Aircraft was landed without further incident.

■ When No. 1 engine fuel system selector was placed in crossfeed during runup, it sprang back to first detent then froze in place. Maintenance determined that shroud covering cable shredded, causing selector to stick. Fraying was caused by force applied to sticking valve.

C12

Class E
F series

■ Pedals felt sloppy during taxi for takeoff, and aircraft was difficult to steer, especially to left. Crew taxied back to hangar, where it was discovered that tube in front wheel well was bent and about to break. Mission was canceled.

■ While in climbing turn just after leaving icing conditions, aircraft encountered onset of stall condition. Aircraft began to shudder, and roll increased. Pilot assumed manual control and recovered aircraft.

N series

■ After release of brakes, crew noted severe vibration in nose gear. Inspection revealed that nose wheel tire was flat.

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

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

CH-47-99-ASAM-01, 081929Z Feb 99, maintenance mandatory

Investigation of cracked rod ends on blade lag dampeners with elastomeric bearings revealed that the rod ends had been adjusted to the length applicable to the older Teflon rod-end bearings. This improper adjustment increases fatigue stresses, which can cause the banjo portion of the rod-end assembly to crack.

The purpose of this message is to require a one-time inspection of lag dampeners with elastomeric bearings for proper adjustment and to emphasize correct rod-end adjustment during maintenance of all dampeners.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (256-842-8632), brock-rd@redstone.army.mil

CH-47-99-ASAM-02, 161228Z Feb 99, maintenance mandatory

Investigation of incidents of uncommanded maneuvers or flight-control lockup in flight have identified factors that may have contributed. These factors include contamination of hydraulic fluid, internal parts out of tolerance, corrosion on internal parts, high barium content in preservative hydraulic fluids, hands-off flying, and internal FOD created by wear of aluminum parts. Flight simulators demonstrated that when such factors are present and actual hands-on flying is not being observed, aircraft may perform uncommanded movements with a slow degradation in flight capabilities. However, computer simulation is not sophisticated enough at this time to produce the exact maneuvers of the incident aircraft; therefore, no absolute cause-and-effect relationship has been established.

The purpose of this message is to eliminate known deficiencies that have been identified as suspect causes of uncommanded maneuvers or flight-control lockups.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (256-842-8632), brock-rd@redstone.army.mil

CH-47-99-ASAM-03, 241820Z Feb 99, maintenance mandatory

Investigations have discovered hoist/cargo panels with chaffed wires and corrosion on the terminal plugs. These conditions could cause electrical shorting and inadvertent jettison of external cargo.

The purpose of this message is to require a one-time inspection of the hoist-cargo control panel for corrosion, wire routing, and wire positioning on terminal lugs. An inspection for water intrusion will also be performed. In addition, the message establishes a 200/300-hour recurring inspection during phase.

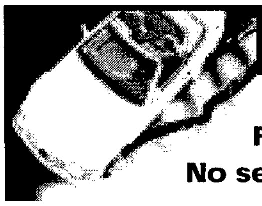
AMCOM contact: Mr. Robert Brock, DSN 788-8632 (256-842-8632), brock-rd@redstone.army.mil

OH-58-99-ASAM-02, 162018Z Feb 99, maintenance mandatory

Tail-rotor gearbox support assemblies are being damaged by putting improper length (too long) screws through the top three holes of the gearbox support during installation.

The purpose of this message is to require a one-time inspection for damage and repair of the tail-rotor-gearbox support by drilling three holes in the area of contact. In addition, the three holes will be drilled in all tail-rotor gearbox supports to eliminate future damage.

AMCOM contact: Mr. Ron Price, DSN 788-8636 (256-842-8636), price-sf@redstone.army.mil



Speed ⊙
Fatigue ⊙
No seatbelt ⊙

No new causes, just new victims

FY98	FY99
51	53

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Class A Accidents through February

		Class A Flight Accidents		Army Military Fatalities	
		98	99	98	99
1ST QTR	October	2	1	0	0
	November	1	1	0	2
	December	2	1	2	0
2D QTR	January	1	1	0	0
	February	1	4	0	2
	March	1		0	
3D QTR	April	0		0	
	May	1		0	
	June	2		4	
4TH QTR	July	1		0	
	August	0		0	
	September	0		0	
	TOTAL	12	8	6	4

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Charles M. Burke
Brigadier General, USA
Commanding