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Report of Army Aircraft Mishaps

Report on FY 85 aircraft accidents

Ten Class A aircraft mishaps occurred during the fourth quarter of FY 85. Three of these mishaps resulted in four fatalities. These 10 mishaps bring the total number of Class A mishaps for FY 85 to 46. Thirty-one Army personnel were killed in these 46 mishaps.

The Class A accident rate for fiscal 85 was 3.00, which is higher than the rate for the past 2 years.

Forty-one of the 46 accidents involved rotary wing aircraft. Two helicopters, the UH-1 and OH-58, accounted for 26 of the accidents. UH-60 helicopters were involved in 15 percent (6) of the Class A rotary wing mishaps for fiscal 85, although they logged only 7 percent of the flying hours.

Human error

Human error was a factor in 8 of the 10 mishaps for the fourth quarter. Overall for FY 85, 88 percent of the Class A mishaps involved human error, and 31 percent involved materiel factors. Some accidents involved materiel and human factors. While willful violation of rules and/or established operating procedures accounted for about 40 percent of the human-error accidents for the previous 4 years, this percentage dropped to 31 for fiscal 85.

Following are synopses of some of the human-error mishaps for the fourth quarter.

• An AH-1 pilot was demonstrating the capabilities of the aircraft. While making diving maneuvers and pulling out close to the ground, the pilot misjudged clearance. The AH-1 hit the ground left side low, rebounded into the air, and began to spin to the right. During the uncontrolled spins, the main rotor blades hit and severed the tail boom. The helicopter crashed inverted, killing the pilot and injuring the passenger.

• A UH-1 crew was on a training mission. While flying 25 to 30 feet above the ground at 40 to 50 knots, the pilot placed the aircraft into a slight left bank. The left retreating main rotor blade hit a rock outcropping. Eight to ten feet of the blade separated and the aircraft crashed. Three of the four people on board were injured.

• Another UH-1 pilot flew his helicopter into a lake during a night vision goggle currency training flight. The aircraft hit the water at about 80 knots and sank inverted. The two crewmembers sustained minor injuries and suffered hypothermia from being in the water 4 hours before they were rescued.

• An OV-1 IP gave the pilot a simulated engine failure of the No. 1 engine 200 feet above the ground. As the pilot started to do the emergency procedures, he felt the aircraft slowing down. The IP took control and advanced the No. 1 engine throttle all the way. When he did this, the engine feathered due to improper autofeather procedures, and the aircraft started to roll to the left. The pilot ejected, followed immediately by the IP. The pilot's ejection was successful, but the IP was killed. His parachute did not deploy fully before he hit the ground. The accident was caused by improper procedures in allowing a reduction in airspeed to the point that continued flight was not possible.

• A UH-1 pilot exceeded available torque during an approach to a site at 6,500 feet. Control was lost when the aircraft began an uncommanded turn to the right. The UH-1 crashed on the side of the hill. Neither the pilot nor the copilot was mountain qualified in accordance with the garrison SOP, and the PPC was improperly interpreted. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - Crew smelled smoke during runup. Pilot's windshield wiper motor had shorted out, causing resistors to burn.

H series - About 6 minutes after takeoff, slingload jettisoned without manual or electrical input. Caused by malfunction of cargo hook.

H series - Master caution light came on and transmission oil pressure dropped to zero. IP began power-on approach to open field. During the approach, smoke from transmission area impaired the IP's vision. Aircraft landed hard on 10-degree slope. Landing gear and underside of aircraft were damaged.

UH-1 Class E mishaps

H series - When cyclic control was moved during hover, severe vibration was felt. Main rotor mast assembly was replaced.

H series - Crew noticed unusual smell and landed. Crew chief found evidence of oil leaking in transmission area. Caused by crack in transmission casing between internal transmission filter and tail rotor output quill.

H series - Engine quit during landing. Internal pin within quick disconnect fuel assembly to fuel filter became misaligned, causing valve to close and cut off fuel to engine.

V series - Transmission oil hot light came on. Caused by failure of master caution box.

UH-60 Class D mishaps

A series - While hooking up jeep and trailer, ground guide directed crew down onto antenna mount of jeep. Hookup person was crouched down instead of standing up on the load.

A series - Bird hit copilot's windshield and became lodged underneath windshield wiper. No. 1 cowling was broken.

UH-60 Class E mishaps

A series - Crew heard loud bang shortly after takeoff. No. 1 engine cowling was open. Crew did not ensure cowling was secure before takeoff.

A series - No. 1 engine tgt fluctuated wildly and tail rotor gearbox light came on. Caused by malfunction of engine cable assembly.

Attack helicopters

AH-1 Class D mishap

S series - Tail rotor blades hit tree during hover.

AH-1 Class E mishap

S series - Engine oil pressure light came on. Caused by failure of oil pressure switch.

AH-64 Class D mishap

A series - Left forward avionics bay door came off during flight. Suspect hinge pin vibrated out of hinge, allowing ram/air to enter behind avionics bay door and forcing door off aircraft.

AH-64 Class E mishaps

A series - Oil psi accessory pump light came on during descent. Oil was added to main rotor transmission.

A series - Intermediate gearbox light came on. Caused by failure of thermistor probe on gearbox.

A series - No. 1 nose gearbox oil light came on. All oil had been pumped out of gearbox. Caused by failure of oil seal.

Cargo helicopters

CH-47 Class C mishap

D series - Crew heard loud bang during external load resupply mission. Load was released about 1 foot from the ground, and aircraft was landed. Vertical hinge pin that attaches yellow rotor blade to forward rotor head assembly was cracked and main rotor blade was damaged.

CH-47 Class E mishaps

C series - Master caution and No. 1 hydraulic boost off lights came on. Caused by failure of pressure switch.

C series - Transmission chip detector light came on. Caused by failure of aft vertical shaft thrust bearing.

B series - No. 2 engine oil temperature rose during flight. Caused by short in wiring harness.

C series - Crew chief saw smoke in aft pylon area and heavy hydraulic leak. Caused by failure of utility pump.

CH-54 Class C mishap

A series - No. 2 engine ingested bird during flight. Engine was damaged extensively.

Observation helicopters

OH-58 Class A mishap

C series - Two OH-58 helicopters collided about 50 feet above the ground during training mission. One crewmember was killed and three were injured. 8605

OH-58 Class C mishap

A series - Main rotor blade hit tree during hover, damaging tip cap.

OH-58 Class D mishap

C series - Aircraft was running up on unimproved surface. Two Cobras took off from right rear of OH-58. Rocks flew up and damaged tail rotor blade.

OH-58 Class E mishap

C series - Master caution and d.c. generator lights came on. Caused by failure of d.c. generator.

Fixed wing

OV-1 Class E mishap

D series - Pilot felt vibration and heard popping noise. No. 1 engine egt went to 820° C. Single-engine landing was made. Caused by internal failure of engine.

U-21 Class B mishap

A series - As aircraft was touching down on runway, left main gear collapsed, followed by right main gear. Both wing tips, propellers, and lower stabilizer fan under fuselage were damaged. Tentative cause is materiel failure. 8606

Maintenance

OV-1 Class E mishap

D series - Crew saw liquid coming from No. 2 engine during shutdown. Caused by incorrect installation of preformed packing.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time and recurring inspections of alternator wire bundle at fuselage station 133 (SOF-UH-1-85-10, 121700Z Nov 85). Summary: Several EIRs have been received concerning chafing of the alternator wire bundle on the forward transmission fairing mounting bracket located on the roof of the helicopter at fuselage station 133. This message calls for an inspection of all EH-1 series aircraft for chafing of the alternator wire bundle and reposition or reinsulation of any wire or wire bundle found defective. A design fix is being developed for this problem. Contact: Emmett Ratliff, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time and recurring inspections of vertical hinge pins in CH-47B, C, and D rotary wing heads (CH-47-85-19, 141800Z Nov 85). Summary: A cracked vertical hinge pin has been identified on a CH-47D. The cracked pin was discovered after shutdown following in-flight noise and vibration. A second cracked pin has also been identified. The cracked pins are presently under laboratory investigation to determine specific cause and corrective actions. Initial examination indicated that the cracks could have been induced during manufacture and that they existed on the inside surface of the hollow pin for a considerable time before discovery. The same vertical hinge pin is used on CH-47B, C, and D models. A different pin is used on the CH-47A and it is not suspect. The purpose of the inspection is to identify and remove from service vertical hinge pins that are cracked. This inspection will be repeated before the first flight of each day. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

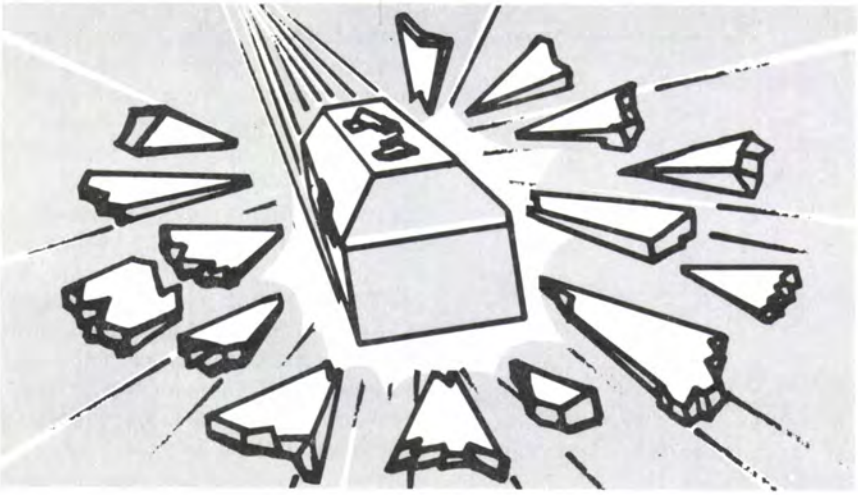
• Safety-of-flight maintenance mandatory message concerning one-time inspection of AH-1 tail rotor hub/blade assemblies for cracked washers (AH-1-85-08, 061600Z Nov 85). Summary: Recent field reports have indicated cracked washers on tail rotor hub/blade assemblies. Engineering investigation has determined that cracking is caused by incorrectly manufactured washers under the bolt head of P/N NAS 1308-34 or P/N 1308-27D bolt. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	1-27Nov	**2**	**1**
	December	5	5			
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**5**	**1**

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

Toolbox becomes missile



A UH-1 on a training mission crashed when its main rotor blades hit a 20-foot rock outcropping on a ridgeline. All four occupants of the aircraft were injured. It could not be determined whether the mechanic's toolbox, which was torn free during the crash, hit anyone, but the potential for serious injury was present.

The crew chief had secured the toolbox by placing it between the two jump seats with a strap across the center and through the handle. This placed the narrow alignment of the box in the direction of flight. During the sudden deceleration, the box slipped under the strap, requiring the handle to sustain the load. The handle was ripped from its mounting points, and the toolbox became a missile, coming to rest in the rubble of what was once the cockpit.

Securing the toolbox this way is a common practice in many units, but it's the wrong way. Chapter 3 of TC 1-201 contains procedures for properly securing equipment. This chapter classifies cargo into two categories: prepared and miscellaneous. Toolboxes fall in the miscellaneous category. The handle is not considered a tiedown point. This type cargo must be secured by a cargo net, as described in the operator's manual and TC 1-201, or by tiedown devices, the number of which should be calculated by using the formula in chapter 3 of TC 1-201. ■

PRAM information

Units submitting PRAMS on AH-1 aircraft are requested to indicate the type rotor blades (K747 or B540) installed on the mishap aircraft in block 16g of the PRAM. If the aircraft has K747 blades, specify the series; i.e., -205, -209, -303, etc. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

A few feet from disaster

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Two teams of OH-58s and an AH-1 flew to a forward area refueling point. Team 2 refueled first, flew to an assembly area, and found it already occupied by another unit. The team flew to another site, landed, and waited at flight idle for team 1 and the troop commander. Team 1 then landed. The troop commander told the two teams to reposition to another area.

The OH-58s took off first, followed by the team 1 AH-1. The team 2 AH-1 then took off in a westerly direction. The pilot circled back toward the east, looking for the troop commander's OH-58. At this time, he was told that an OH-58 would come back and get him, so he decided to land at the assembly area he had just left and wait.

Still heading east and flying parallel to the assembly area, the pilot saw a 2½-ton truck on a nearby road. The altitude of the aircraft at this time was 150 to 200 feet above ground level, and airspeed was 70 to 80 knots. When the aircraft was about 250 meters from the truck, the pilot began a diving 180-degree left turn toward the truck. The AH-1 lost altitude rapidly during the turn and dive. The pilot leveled the aircraft and tried to recover by pulling the nose up and adding power. The pilot was unable to recover, and the aircraft hit the ground, in front of the truck, left skid first and slightly nose high at an estimated airspeed of 30 to 40 knots. The right skid then touched down, and the aircraft slid 78 feet, rocking fore and aft.

The aircraft became airborne at the end of the ground run. The pilot hovered the aircraft until ground personnel could examine the landing gear. The skids were spread but intact, and the aircraft was landed.

This accident resulted in Class C damage to the aircraft, but it could have easily resulted in fatalities, injuries, and a destroyed aircraft. The aircraft hit the ground 48 feet from the truck. Three children were standing 38 feet from the point of impact.

Lack of flight discipline on the part of the pilot caused this accident. Task 2069 of FC 1-213, AH-1 Aircrew Training Manual, requires that high-speed dives be performed in an approved training area with an instructor pilot on board. Task 2069 standards require an entry altitude of 2,500 feet agl, entry airspeed of 100 knots for a normal dive angle of 12 to 15 degrees, and 50 knots for a steep dive angle of 30 to 40 degrees. Recovery altitude is specified as no lower than 1,000 feet above the ground.

The pilot did not tell the copilot he was going to dive at the truck. The copilot was surprised when the pilot began the diving turn. The copilot felt they were too low and would not pull out in time. About halfway through the maneuver, he assumed the crash position. He did not say anything to the pilot, but as the whole maneuver took only a few seconds, it is doubtful a warning would have made much difference. Had the copilot been told of the maneuver beforehand, he might have been able to dissuade the pilot from doing it. However, on previous flights the copilot had felt uncomfortable with some of the pilot's maneuvers and had not said anything to the pilot, safety officer, or chain of command. He felt that as a new, inexperienced pilot he should not question the maneuvers and, with experience, would get used to flying that way.

The copilot should have earlier voiced his misgivings about the pilot's actions. When one aviator feels uncomfortable flying with another, something is usually wrong which might be corrected with more training or supervision.

Investigation of another AH-1 accident involving diving flight revealed there was no instructor pilot on board, which is in noncompliance with the Aircrew Training Manual. A third diving accident resulted in a fatality when the maneuver was initiated at low altitude and recovery was begun too low to prevent the aircraft from hitting the ground.

Willful violation of rules and/or established operating procedures accounts for a large part of the human error problem each year. The real professional knows what rules are made for and he respects them. He follows them to the letter every time, knowing that his own safety and that of a considerable number of other people are dependent on conscientious compliance with regulations and established procedures.

There can be no deviations from sound and prescribed operating procedures in Army aviation. Commanders must take immediate and positive action at the first sign of a breach of flight discipline. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - Aircraft entered whiteout condition during landing on slope. Pilot applied collective pitch to level aircraft and initiated go-around. Crew heard thumping sound during recovery. Isolation mount bolts and straps which secure skis to skid tubes were broken.

UH-1 Class E mishaps

H series - Rotor tachometer failed during takeoff. Caused by sheared tachometer shaft.

H series - Stiff cyclic during hover was caused by failure of magnetic brake.

H series - Pilot applied excessive collective during takeoff. Torque gauge increased to 55 psi.

H series - IP gave pilot simulated engine failure. When throttle was rolled off, engine and rotor needles did not split. Caused by failure of sprag clutch to disengage.

H series - Master caution and left boost pump lights came on, with fuel pressure indicating zero. Main fuel manifold was clogged with foreign object.

UH-60 Class C mishap

A series - Tail and tail wheel assembly hit large rock during landing at night. Crew was wearing night vision goggles. Desert floor vegetation was hard to distinguish from rocks.

UH-60 Class D mishaps

A series - Postflight inspection revealed dent in leading edge of tail rotor blade and hole in right stabilator. Marks on blade indicated damage was caused by a screw. A screw was missing from a nut plate attaching the right main rotor pylon cover in the area of station 341 to 366 on the fuselage. The nut plate was cracked and the threads were stripped. This area attaches composite material and metal cowling to the aircraft. Someone stepped on the area at some time, causing the nut plate to crack and the screw threads to strip.

A series - Copilot misjudged clearance between main rotor system and a pole during ground taxi. Rotor blade tip caps were damaged.

UH-60 Class E mishaps

A series - Transmission oil temperature rose, and No. 1 generator and stabilator lights came on. Caused by failure of No. 1 input module.

A series - Fuel gauge fluctuated during hot refueling operation, and No. 1 engine lost power. More than 5 gallons of water had been pumped into aircraft.

A series - Fire was seen coming from APU stack during runup. Caused by defective APU igniter plug.

Attack helicopters

AH-1 Class D mishap

S series - Helmet bag in ammo bay blew out of aircraft during runup and was drawn into main rotor blade. Blade was damaged. Bag was not secured correctly.

AH-1 Class E mishaps

S series - No. 2 hydraulic pump cavitated and caution light came on. Caused by failure of hydraulic pump and pressure light.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	1-4 Dec	**0**	**0**
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**8**	**1**

S series - Pilot's cyclic was stiff during flight. Maintenance found that when vent knob was pushed in, it caused ECU duct insulation to bubble up into cyclic control tubes. Insulation was glued back to ECU duct.

AH-64 Class E mishaps

A series - Oil low utility hydraulic light came on during approach. Caused by failure of ammo drive carrier assembly.

A series - No. 1 engine fuel bypass light came on. Caused by failure of fuel filter.

Observation helicopters

OH-58 Class A mishap

A series - Engine failed as aircraft was on recon mission 50 to 70 feet above trees. Pilot autorotated aircraft into the trees. One occupant was injured. 8607

OH-58 Class E mishaps

A series - Rotor blades hit top of tree during NOE flight. Blades were not damaged.

C series - Medium frequency vibration was felt through airframe during landing. Caused by failure of No. 1 hanger bearing.

A series - Paper object exited aircraft and hit tail rotor during flight. Suspect the object was a map which was not properly secured.

A series - Master caution and d.c. generator lights came on. Caused by failure of starter generator.

A series - Transmission oil pressure light came on. Small hydraulic label had been sucked into oil cooler blower, restricting airflow through transmission oil cooler.

Cargo helicopters

CH-47 Class D mishap

D series - Aircraft was on final approach to landing site with external load. Load was a scrapped truck used for training purposes. On short final, flight engineer called load down to 20 feet agl. Load hit 10-foot-high fence 100 meters short of landing area. Load was jettisoned. Overcast conditions and sloping terrain contributed to inability to detect depth perception.

CH-47 Class E mishaps

D series - No. 1 engine developed high-side governor failure during flight. Caused by failure of N2 actuator.

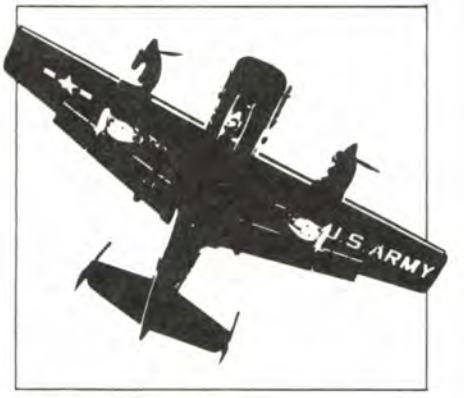
D series - As aircraft was brought to a hover, surges in vertical axis were felt. Yaw control pedals froze and could not be moved. Caused by malfunction of aft dual swiveling actuator.

C series - Aircraft vibrated during flight. Caused by failure of shock absorber on aft rotor head.

Fixed wing

OV-1 Class C mishap

D series - Two birds were ingested into engine during takeoff from a high elevation surrounded by mountainous terrain. Aircraft was 40 feet above the ground and fully loaded. Engine failed and propeller autofeathered. Pilot jettisoned wing tanks, completed emergency procedures, and landed with no further damage. Well done to the pilot for his actions.



OV-1 Class E mishap

D series - Pilot saw sparks coming from No. 1 engine cowling openings. Master caution and anti-ice generator lights came on. Caused by failure of anti-ice generator.

U-21 Class E mishap

H series - Small flock of doves flew into aircraft as it lifted off the runway.

T-42 Class C mishap

A series - Aircraft touched down 686 feet short of runway threshold. Pilot applied power, and aircraft rebounded into the air, striking strobe light with left flap. Nose gear then hit another strobe light and collapsed. Aircraft landed on main gear and slid down the runway. Suspect pilot error.

C-12 Class D mishap

C series - Aircraft was following a "follow-me" truck. Left propeller blade hit a taxi light. Neither the ground guide nor the pilot saw the light.

Maintenance

UH-1 Class D mishap

H series - Compressor stalled during engine response check. K-flex drive shaft bolts contacted plates. Bleed band was out of adjustment.

UH-1 Class E mishaps

H series - Smoke filled cockpit during runup. Several oil leaks were noted in engine compartment. Caused by incorrect installation of No. 2 engine bearing. (continued on back page)

What you should know about Nomex

Nomex is an uncomplicated material, but it has been the subject of many questions, misconceptions, abuses, and just plain untruths. Hopefully, this article will answer any questions you may have and tell you what you should know about your Nomex uniform.

The material

Nomex is a unique man-made material that is permanently fire retardant. It is a type of nylon that will not melt and stick to the skin as other types of synthetic fibers do. Because other synthetics such as nylon and dacron melt at about 300° F., they should not be worn next to the skin while flying. Female aircrewmembers particularly should remember that heat transfer through Nomex could be high enough to melt synthetic undergarments.

Nomex is resistant to temperatures up to about 700° F. and then begins to char and form a dry, brittle residue that can be brushed away when the heat source is removed. Nomex will not support combustion as other natural and man-made materials will. For example, if a flame is placed directly on cotton, nylon, dacron, etc., the material will burn and continue to burn when the heat source is removed. In contrast, Nomex will char as long as the heat source is applied directly to the fabric but will not char or burn when the heat source is taken away. Nomex will burn if contaminated with flammable substances such as petroleum products or household starch. If your Nomex does become contaminated with any flammable product, simply launder or dryclean and the material will be restored to its original fire retardant state.

At this time, there is no wear-out criteria established for Nomex in Army TMs or FMs. According to the U.S. Army Natick Research and Development Command, even thin Nomex provides protection.

Uniform fit

The Nomex uniform was designed to be worn rather loosely to provide an airspace between the fabric and the skin. This airspace acts as insulation from heat sources. Do not alter your Nomex uniform because snugly fitted Nomex negates the effectiveness of the airspace.

For those of you who may require special measurement uniforms for a proper fit, refer to AR 32-4 and AR 700-84. These regulations authorize uniforms for individuals who cannot be fitted with readily available sizes.

Static electricity

Tests for static electricity buildup were conducted at Wright-Patterson AFB on a variety of materials, including Nomex. There were no significant differences in the generation of static electricity among the materials tested. One of the most important safety procedures in preventing an accident caused by static electricity during refueling or rearming is proper grounding of the aircraft. Another equally important safety procedure is plugging in the bonding wire from the fuel nozzle to the aircraft before the fuel cap is removed. Replace the fuel cap before unplugging the bonding wire.

If your Nomex becomes saturated with fuel, the saturated area should be thoroughly soaked or deluged in water before removal of the uniform to prevent static electricity from igniting the fumes. One crewmember received first- and second-degree burns to the legs when his fuel-soaked clothing was ignited by static electricity as he tried to remove them without first washing the saturated area with water.

Cleaning

Nomex can be drycleaned safely without altering its fire retardant qualities. Any drycleaning solvent remaining in the garment is soon dissipated into the air, thus eliminating any fire hazard. Nomex can also be laundered as many times as necessary and still be fire retardant. Since it is an easily cleaned synthetic fiber, you probably won't need a full wash cycle. Simply set the washing machine on a short cycle, e.g., "delicate" or "wash and wear," and use a good brand of detergent. "Spray and wash" can be used for removing spots. Close the zippers to prevent damage and fasten the velcro to avoid picking up lint.

The water temperature you use to wash your Nomex and how you dry it is strictly up to you. Home hot water heaters and dryers do not get hot enough to harm the material. Remember, Nomex is high-temperature-resistant and has even been boiled without damage. However, to conserve energy, we suggest a warm wash and cold rinse.

When you remove your uniform from the washer or dryer, hang it up so the wrinkles will fall out. You can even iron your Nomex if you want to.

If Nomex is tumble dried separately from other materials, an antistatic strip probably will not be required to get rid of static electricity. The rubbing together of dissimilar materials causes the buildup of static electricity. If you live in a cold, dry climate and static

What you should know about Nomex

electricity is a nuisance, you can use a good brand of fabric softener in the wash or a strip in the dryer.

Detergents, fabric softeners, and antistatic strips leave a residue which accumulates on Nomex. This affects the fabric's "wickability," i.e., the ability to transport water (sweat) to aid in evaporation and cooling. You can test your uniform's "wickability" by placing a drop of water on a clean uniform. If the water soaks in within 10 to 20 seconds, fine. If it takes 30 seconds or longer for the water to soak in, or it simply beads on the material, your Nomex needs to be drycleaned to remove the residue. If you have ever wondered why it was so difficult to dry yourself with a towel from a hotel or motel, it's because they use strong detergents and softeners which greatly decrease the ability to absorb water.

Potpourri

Whether patches, name tags, insignia, rank, etc., are worn on your Nomex depends on your commander. If they must be worn, the best choices are those made from natural fibers rather than synthetic materials. However, patches, etc., made from synthetics are not necessarily forbidden as most synthetics do not melt before reaching about 300° F. This temperature is considerably higher than the human skin can stand without damage. With heat intense enough to melt a synthetic patch, the victim will already be in a nonsurvivable situation.

Commanders of certain installations require the Nomex uniform to be tucked or bloused inside the leather boot. This is the commander's prerogative, but it should be remembered that neither the flight suit nor the leather boot was designed to be worn in this manner. During flight, the uniform should be fastened over the boot. Sleeves should be down, zipper zipped to the top, and collar turned up. Of course, Nomex gloves should be worn. Wear the gloves under the sleeve cuff to prevent accidental snagging of the center console switches. In several instances, the governor switch has been caught by the edge of the glove and switched from the automatic position to the emergency position.

Many of you have complained because the turned-up collar of the Nomex uniform does not completely cover the neck. This is no longer considered a significant safety factor for two reasons—the low incidence of thermal injuries to the throat and neck area and the high success rate of the crashworthy fuel system which has virtually eliminated the fireball accidents.

The unprotected neck area comprises less than 1 percent of the total skin area. In contrast, the skin of the face makes up about 5 percent of the total skin area and is not protected by Nomex. The unprotected face has not received the consideration and publicity the neck has and yet covers five times the skin area of the unprotected neck area. The helmet visor offers the upper portion of the face only limited protection in a flash fire or full-fledged, raging inferno. Some enterprising individuals have fabricated scarves and dickeys from Direct Exchange Nomex for neck protection at practically no cost.

Nomex is Nomex regardless of the weave, color, or article of clothing. Take care of it and it will take care of you when you need it most.

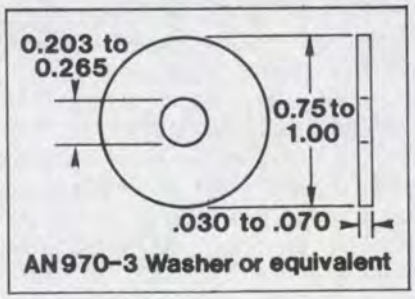
Point of contact at the Safety Center is Laurel Sand, AUTOVON 558-2947/6510, commercial 205-255-2947/6510.

Helmet chin straps

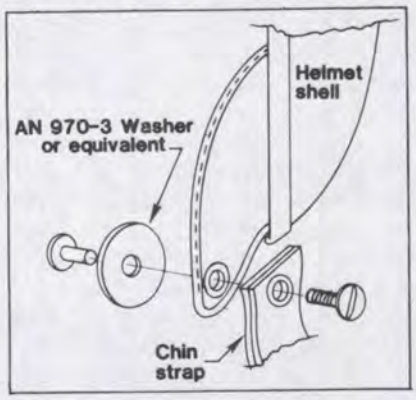
Several people have asked if a washer should be added to the inside of the SPH-4 helmet that has the new split-end chin strap. The answer is "No." The only retention systems requiring a washer are those on SPH-4 helmets with lot numbers before DLA 100-83-C-4207. These helmets normally have the single-point chin strap retention system.

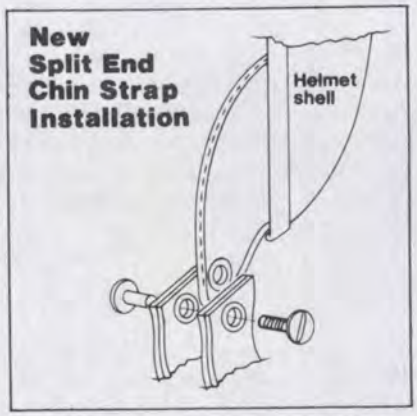
If you have a helmet that requires a washer, comply with the following:

Insert the post/screw assembly through the harness and washer and secure the threads with a lock-tight type of adhesive to prevent loosening of the screw. The washer may be steel, brass, or aluminum and should conform to the specifications below:



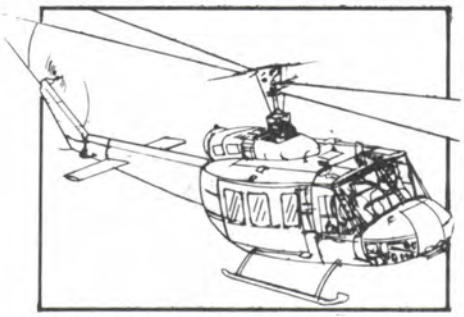
The washer should be installed as shown below:





For more information, call Mr. Joe Haley, Aeromedical Research Laboratory, Fort Rucker, AUTOVON 558-3001/4408. ■

Mishap briefs



H series - Master caution and hydraulic pressure lights came on after landing. Pressure line to right irreversible valve was chafed through, causing loss of fluid.

V series - Master caution and transmission oil hot lights came on. Wires on transmission oil thermostatic switch were loose.

UH-60 Class E mishap

A series - No. 1 and No. 2 tgt indications went full scale, and digits shut off during landing. No. 1 engine oil temperature caution light came on. Caused by chafed wiring harness on left aft side of transmission.

AH-1 Class D mishap

S series - Inspection after maintenance operational check revealed damage to fairing directly behind turret, which was caused by turret slot covers. Turret was installed incorrectly.

AH-1 Class E mishap

S series - Master caution and No. 1 hydraulic pressure lights came on. Loud noise was heard from transmission area, and pilot could not lower collective. IP assisted pilot, and aircraft was landed. Inspection revealed roll and yaw SCAS had disengaged and No. 1 system was dry. Suspect loose fitting on hydraulic line to No. 1 system.

CH-47 Class D mishap

C series - After aircraft was landed, aft pylon work platform and No. 1 engine tail cone were found damaged. Suspect crew chief did not secure platform after preflight.

U-21 Class E mishaps

D series - Crew smelled fuel during takeoff. Nut on fuel control return line was not tightened sufficiently. Nut vibrated loose, causing fuel control return line to separate from fuel control.

A series - No. 2 engine would not reduce below 84° N1/680 pounds of torque. Caused by high idle pickup arm sticking.

C-12 Class E mishaps

D series - Right main landing gear green light did not come on when gear was lowered. Gear-down lock switch was out of adjustment.

C series - No. 1 prop would not respond to prop lever inputs. Cotter pin was not installed on nut in primary governor mechanical linkage, allowing nut to back off and disconnect linkage to primary governor.

A series - Left bleed air light came on during climbout. Tubing leading to left flow pack was disconnected. Tubing had been worked on the night before.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

Followups

Additional information on mishap briefs previously published

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Utility helicopters

UH-1 Class A mishap in 21 Nov 84 issue (8506) ■ Engine failure occurred while aircraft was at 150-foot out-of-ground-effect hover during NOE training flight. IP entered autorotation. Aircraft hit on a steep incline right rear skid first and slid 6 feet before coming to rest upright. Depot analysis revealed engine failure was caused by an unidentified foreign material on the fuel control drive shaft which clogged the four oil passages of the accessory gearbox drive gear. This caused a lack of lubrication to the splines and premature failure. Because the fuel control was not being driven, the fuel supply to the engine was cut off, causing the engine to stop due to fuel starvation. The presence of the foreign object on the drive shaft was the result of improper maintenance procedures when the shaft was installed.

UH-60 Class A mishap in 23 Jan 85 issue (8515) ■ Two UH-60 helicopters were taxiing at night from their parking spots. The crews of both aircraft were wearing night vision goggles. The pilot of one aircraft saw that the other aircraft had begun to taxi and was on a collision course with his aircraft. The pilot stopped his aircraft. The copilot of the other aircraft did not see the stopped aircraft and continued to taxi. The main rotor blades of both aircraft meshed, and both aircraft came to rest on their right sides. Flying debris heavily damaged one other UH-60 and lightly damaged six UH-60s.

UH-60 Class A mishap in 13 Feb 85 issue (8519) ■ As the pilot of the No. 3 aircraft in a flight of five was landing on sloping, snow-covered terrain in downwind conditions, an excessive rate of closure developed. The pilot encountered whiteout, and the aircraft landed hard and rolled onto its left side. The pilot knew he was landing to a slope but chose to continue. Lack of recent experience and training in snow operations contributed to the accident. The flight leader made an incorrect decision to take the flight downwind into an area which had sloping, dry-powdered, snow-covered terrain without first telling the remainder of the flight about the terrain and prevailing weather.

Attack helicopters

AH-1 Class A mishap in 6 Mar 85 issue (8520) ■ Aircraft crashed during training flight. Swashplate bearing failed because of contact stress fatigue (spalling). The spalling of the bearing races and the bearings caused the bearing assembly to overheat, seize, and displace upward. This displacement allowed the upper swashplate to displace downward, and the drive links attached to the upper swashplate came in contact with the inner swashplate horns. This contact generated a very high friction heat which started to melt all three swashplate horns and also acted in a machining action on them. This action continued until the lateral cyclic control horn failed from overstress fatigue. The aircraft lost lateral cyclic control, and moments later the pitch change tubes failed from bending and tensile overstress from the upper swashplate slowing down, causing loss of control and resulting in the crash.

(continued on back page)

Last Flightfax this year

This is the last issue of **Flightfax** you will receive this year. The next issue will be dated 8 January 1986. The personnel of the Army Safety Center wish you a Merry Christmas and a Safe and Happy New Year. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps

H series - No. 2 aircraft in flight of two encountered snowshowers. During right turn, aircraft descended, hit the ground, and rolled over. 8608

H series - Aircraft was in cruise flight when crew smelled smoke. Within moments there was an unusual noise and aircraft yawed to right. No. 1 section of tail rotor drive shaft had failed due to contact with tail rotor tunnel cover. Crew did not identify the tail rotor failure and tried to complete a normal landing. At approximately 100 feet, aircraft began to rotate to right. Aircraft crashed and came to rest on left side. One occupant was seriously injured. Cause of drive shaft and tunnel contact is under investigation. 8609

UH-1 Class D mishaps

H series - Uncommanded release of slingload occurred. Fuel drum was destroyed.

H series - Bird hit and broke left chin bubble.

UH-1 Class E mishaps

V series - When maintenance test pilot turned hydraulic control switch off, cyclic came aft and left. Caused by failure of servo irreversible valve.

H series - Pilot placed vest in empty seat because it was not needed for runup. IP decided to climb into aircraft. In doing so, he handed vest to pilot. Pilot failed to notice that vest had caught on emergency governor switch. As rpm increased, both pilots reduced throttle. Inspection revealed no damage.

H series - Crew was flying NOE route in mountainous terrain. Pilot was at the controls and IP was navigating. Crew saw fog bank in the vicinity of the mountain pass along route of flight. Crew continued flight along NOE route to determine if pass was clear. Airspeed was 50 knots and altitude was 100 to 200 feet agl. As aircraft approached mountain pass, IMC was encountered. IP was reading map when entry into IMC occurred. Crew initiated inadvertent IMC recovery procedures. IP made poor decision when he continued flight into marginal weather conditions. Pilot failed to reduce airspeed commensurate with the weather conditions.

H series - Master caution and transmission oil hot lights came on. Caused by malfunction of transmission oil temperature thermostatic switch.

Attack helicopters

AH-1 Class E mishaps

S series - Test pilot pulled forward boost pump CB and then pulled aft boost pump CB during runup. Engine quit immediately. Aft fuel cell internal fuel line permitted air to enter line, causing pump to cavitate fuel system. Internal rubber hose split and collapsed.

S series - Rotor blade started pitching up and down during flight. Pilot released SCAS and landed. Caused by failure of SCAS amplifier unit.

S series - Pilot smelled smoke, and master caution and alternator lights came on. Caused by failure of generator alternator.

AH-64 Class D mishap

A series - No. 1 engine door came open in flight. Pilots did not ensure door fasteners were latched during preflight.

AH-64 Class E mishaps

A series - Preflight inspection revealed fuel leaking from refuel port. Fuel service manifold was replaced.

A series - Oil psi accessory pump light came on. Caused by malfunction of pressure switch.

Cargo helicopters

CH-47 Class D mishaps

C series - Slingload was stabilized about 10 feet over a concrete pad. Cargo hook was inadvertently opened, and load was jettisoned.

C series - Vibration was felt during landing. Upper drag link failed, damaging shock strut.

C series - Aircraft was slingloading a conex full of equipment. Conex door opened and some of the equipment dropped to the ground. Cargo strap secured around the conex stretched, allowing the door to open.

Observation helicopters

OH-58 Class D mishap

A series - Pilot tried to go between two pine trees during takeoff. Main rotor blade tip hit tree on right side of aircraft.

OH-58 Class E mishaps

A series - Aircraft developed vibration through pedals and airframe after takeoff. It had rained several hours earlier and temperature was -2° C. Moisture may have frozen on some component, causing vibration.

C series - TOT rose rapidly during start. Caused by weak battery.

Fixed wing

C-12 Class D mishap

D series - Gear handle warning lights did not extinguish when gear was retracted. When flight was terminated, pilot noticed that part of dipole antenna was missing. Antenna had failed at mounting base, hitting and denting wing. Gear microswitch was out of adjustment.

C-12 Class E mishap

A series - Pilot found oil leak on No. 1 engine before takeoff. Propeller shaft seal had a small cut.

OV-1 Class E mishaps

D series - Pilot saw hydraulic fluid on cockpit floor during flight. Windshield wiper motor was leaking fluid.

D series - Master caution and fuel pump lights came on during takeoff. Caused by failure of fuel boost pump.

D series - Power levers would not go into reverse during taxi. Power lever dust covers were worn, causing binding in controls.

U-21 Class E mishap

A series - When attempt was made to move power levers out of reverse after landing, No. 2 engine would not go forward and remained lodged in beta range. Caused by broken helical springs in propeller spinner.

Maintenance

UH-1 Class E mishaps

V series - Crew noticed vertical vibration during flight. Failure of main rotor grip grease fitting caused blade grip to lose all of its grease. Incorrect grease gun tip was used to purge and service main rotor grip, causing spring and ball bearing in fitting to displace.

H series - Crew chief saw smoke in engine compartment during engine runup. No. 2 forward seal was incorrectly installed, prohibiting oil flow. Oil backup caused turbine blades to overheat and scrape or drag on nozzle.

V series - Excessive left cyclic was necessary to maintain level attitude during hover. Caused by incorrectly rigged cyclic controls.

UH-60 Class E mishap

A series - Aircraft yawed to right during hover, and No. 2 tail rotor servo light came on. Screwdriver which had been left near tail rotor gearbox had jammed the controls.

AH-1 Class E mishap

S series - Output line to No. 1 hydraulic pump was leaking fluid during runup. Hydraulic line was not torqued correctly.

AH-64 Class E mishap

A series - During No. 1 engine start, start light would not go out after engine reached idle. Caused by loose pressurized air system line and clamp.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time contractor team inspection of vertical hinge pins in CH-47B, C, and D rotary wing heads (CH-47-85-20, 230020Z Nov 85). Summary: An eddy current inspection procedure has been developed which enables a contractor team to perform a one-time inspection that will positively identify any defective hinge pins. Inspection by this team will eliminate the imposed requirement for a visual inspection that is now required before the first flight each day. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning wire harness inspection (AH-64-85-06, 251330Z Nov 85). Summary: A wire harness was made with an excess length of wire in the bundle. During installation on some aircraft, a loop was formed to take care of the excess slack. This allowed the wire harness to chafe and caused failure of an automatic flight control system. This message requires a one-time inspection of the wire harness assembly. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning revision to one-time inspection of UH-1 connecting links (UH-1-85-12, 261400Z Nov 85). Summary: SOF message UH-1-85-11 directed removal of connecting links. The message identified a serviceable link as one having a data plate permanently bonded to the tube with the part number and FSCM, the NSN, and a serial number. This information is in error. The data plate is an adhesive-backed metal foil tag and the data does not include the NSN. Contact: Ken Luber, AUTOVON 693-1675, commercial 314-263-1675.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	1-11 Dec	**1**	**1**
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**9**	**2**

Followups

AH-1 Class B mishap in 27 Mar 85 issue (8526) ☐ Aircraft was completing a 180-degree turn while flying low level at night. During the maneuver, the crew failed to recognize that the aircraft was descending. The tail rotor hit a tree 16 feet above the ground, causing the tail rotor driveshaft to twist and shear. The loss of tail rotor thrust caused the aircraft to begin an uncontrolled spin to the right. During the spin, main rotor and tail rotor blades hit several trees. The aircraft settled through the trees and landed upright. The crew failed to recognize they were descending because of lack of training and inadequate night experience. Before this flight, the pilot had not flown at night in more than 3 months, and the copilot had not flown tactically at night in more than 45 days.

AH-1 Class B mishap in 29 May 85 issue (8539) ☐ Postflight inspection revealed dents in main rotor blades. Aircraft had been on an NOE flight, but pilots had not felt any unusual vibrations or heard any noises. Suspect main rotor blades hit tree during flight.

Observation helicopters

OH-58 Class A mishap in 10 Apr 85 issue (8533) ☐ While flying NOE down the middle of a valley, aircraft hit power cables and crashed. Crew did not see the poles and cables because of inadequate experience and caution in performing NOE flight in an environment with a high density of wire hazards, most of which were unmarked and uncharted.

Fixed wing

C-7 Class B mishap in 15 May 85 issue (8537) ☐ Downgraded to Class C mishap. Aircraft was in cruise flight when crankshaft of left engine failed. The No. 9 connecting rod separated from the crankshaft and was bent as the engine continued to rotate. The bending of the connecting rod caused the No. 9 cylinder to be broken from the engine crankshaft, allowing oil to spill into the engine cowling. The oil ignited, resulting in an in-flight fire. The fire was suppressed with the engine fire bottles, and the aircraft landed. ■

Flight line fire extinguisher requirements

AR 420-90: Fire Protection is being revised. HQDA is revising par. 7-11 to clarify requirements for the 150-pound Halon wheeled fire extinguishers on flight lines. All inquiries regarding fire extinguisher distribution should be directed to HQDA (DAEN-ZCF-B), Washington, DC 20314-1000. POC is Mr. Bruce Park, AUTOVON 285-0866, commercial 202-272-0866. ■

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Colonel, Aviation
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Snow claims Black Hawk

The mission called for two flights of five UH-60 helicopters to insert troops in unimproved landing areas following false insertion landings en route. The aircraft were preflighted, and the troops loaded. During runup, one of the aircraft developed mechanical problems. The troops were moved to the standby aircraft, which became No. 3 in the second flight. The pilot of this aircraft was the unit operations officer.

While the passengers were loading, the crew chief, not wanting to delay the flight, gave the pilots a signal that all personnel were secured when, in fact, they were not. Some of the passengers were not wearing lapbelts.

The 10 helicopters took off. The mission progressed normally with 7 miles visibility and 1,000-foot ceilings outside scattered snowshowers. The two flights then separated and began a series of false insertions. The second flight made one successful landing and encountered some light blowing snow on top of a packed layer of snow.

En route to the next landing zone for the second false insertion, the flight used a loose staggered trail formation. The selected LZ was found to be unsuitable because of fencing and fog, so flight lead selected an alternate site in the same general area. The approach was begun in a snowshower with visibility about 1 mile. The LZ was a large, open snow-covered field with an apparent upslope in the direction of landing.

The crew of the No. 3 aircraft saw a large amount of snow circulate through the rotor systems of the No. 1 and 2 aircraft. The pilot of the No. 3 aircraft, flying from the right seat, selected a touchdown point downslope and to the left rear of the lead aircraft. During the approach, the copilot told the pilot to move a little to the left for aircraft spacing. On short final, the crew chief told the pilot to slow the rate of closure.

Using the upslope aircraft and distant tree lines as visual references, the pilot continued the approach. A snow cloud enveloped the cockpit as effective translational lift was lost about 20 feet above the ground, with a left quartering tailwind of 15 to 25 knots. The pilot decided to continue the approach without outside references and reduced power to put the aircraft on the anticipated upslope terrain.

The UH-60 touched down hard in a complete whiteout condition on a combination upslope to the front and downslope to the left. The helicopter rolled left and came to rest on its left side. Three passengers, who were ejected from the aircraft through the separated left cargo door, were pinned to the ground by the aircraft. Because of the snow and irregularities in the ground surface, the three passengers sustained only minor bruises and abrasions.

At the point of touchdown, none of the 10 passengers had their restraint systems fastened. Some of them had never restrained themselves, and some had unbuckled in flight.

The seven passengers remaining in the aircraft were displaced to the low side of the passenger compartment as the aircraft rolled on its side. The mechanic's toolbox, three cold weather survival kits, weapons, and other items of cargo and equipment, which were also unrestrained, were displaced. The passengers were not injured, other than bruises and abrasions, mainly because they were wearing Kevlar helmets with chin straps in place. The pilot, copilot, and crew chief also sustained bruises and abrasions.

The pilot, although he had less than 700 flight hours, had more than 250 hours in the UH-60. However, he had only 8 hours in the past 60 days and 17 hours in the past 4 months. His flying time had been sharply curtailed because of his duties as unit operations officer.

The pilot was unable to attend mandatory snow operations training conducted within 60 days before the accident. He also did not attend remedial classes or engage in hands-on snow landing operations. These classes reviewed correct snow landing techniques and the procedures in FM 1-202.

Several of the crewmembers in the other aircraft in the flight felt that the insertion at the crash site was probably their most difficult landing in snow-covered terrain. They were landing downwind to an upslope; they were landing during a snowshower to very loose, dry snow; they were landing to a left sloping hill; and they had limited stationary visual cues. Individually, these factors would not be taxing, but collectively their effect would be demanding for the most experienced crew.

The pilot had to monitor two slopes

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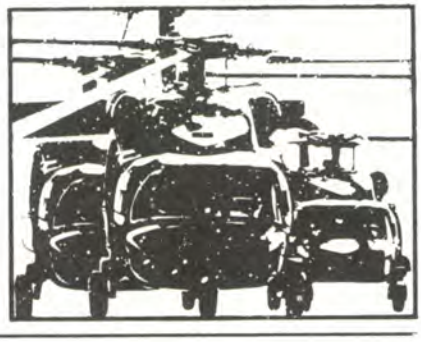


Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - When battery was turned on, sparks and smoke were seen coming from VIP console. Power cable, manufactured without insulation on head of connector, shorted out on connector retaining screw.

H series - Dzus fastener sheared and embedded in leading edge of tail rotor blade.

V series - Rivets securing bolt plate brackets failed, allowing tail rotor control chain cover to separate from aircraft.

H series - Aircraft was landed on pinnacle helipad. Winds were gusting up the side of the mountain. As main rotor rpm slowed down, sudden gust of wind caused main rotor blade to flex up. The opposite blade flexed down and hit tail boom.

H series - Aircraft hit bird during night flight. Bottom side of chin bubble was broken.

UH-1 Class E mishaps

H series - Aircraft was flying at 55 knots and 150 feet agl in a valley. As pilot began a climb to clear a ridgeline, copilot yelled "wires!" Pilot increased collective. Wire hit chin bubble and was cut by wire strike protection system. Aircraft was landed without damage. The powerline pole on the north side of the valley was concealed by trees, and the wires did not follow the valley floor but climbed steeply at an unusual angle. The distance between the poles was about 700 meters. Fog and haze limited visibility.

H series - Pilot felt stiffness in controls, and master caution and hydraulic lights came on. Loss of hydraulic fluid was caused by ruptured input line to hydraulic filter.

H series - IP smelled smoke, followed by rumbling noise. Caused by failure of main generator.

UH-60 Class A mishap

A series - UH-60 crew led a CH-47 with MPs as passengers to the site of a downed aircraft. UH-60 left the site and was en route to the airfield when tower personnel asked UH-60 crew to relay a message to the CH-47 crew. Unable to contact the CH-47 on the radio, UH-60 returned to the site. UH-60 descended in a circular pattern to 300 feet agl and proceeded up a valley at 10 to 20 knots. UH-60 hit a set of wires strung across the valley, climbed into another set of wires which cut off the main rotor blades, and crashed. The wires were shown on the pilot's hazard map and marked at 400 feet. One crewmember was killed and three were injured. 8610

UH-60 Class D mishaps

A series - Postflight inspection revealed that antiflap assembly on red main rotor blade had cracked and broken off. Assembly had frozen in up position. When aircraft was placed in hangar and warmed up, tear was found in yellow main rotor blade. Crew failed to properly deice antiflap restrainers before flight.

A series - Pilot landed in grassy area and set aircraft down on tree stump. Lower fuselage was damaged.

Attack helicopters

AH-1 Class C mishaps

S series - About 1,000 feet above the ground during simulated forced landing, IP told pilot to join the needles and terminate with power. Pilot joined the needles by 500 feet agl. During deceleration phase at 15 feet, pilot leveled aircraft to terminate with power and establish a go-around. As power was applied with collective, low rpm audio sounded and engine and rotor needles dropped to 80 percent and continued down. Pilot maintained collective and cyclic position as IP joined him on the controls. IP and pilot cushioned landing with remaining collective, but rotor rpm was too low to prevent hard landing. Both cross tubes were damaged and front wire cutter was torn off.

S series - Crew, wearing night vision goggles, lost visual cues during landing at night to confined area. About 10 feet above the ground, crew realized aircraft was in a high sink rate and applied collective pitch as aircraft hit the ground. Aircraft bounced back into the air and stabilized. Crew flew aircraft to airfield. Damage included bent skids.

AH-1 Class D mishaps

S series - Main rotor blades hit top of tree during landing. Pilot misjudged clearance on approach path.

S series - Postflight inspection after NOE flight revealed damage to main rotor blade.

AH-1 Class E mishaps

S series - Aircraft hit two wires during NOE flight. Aircraft was landed without damage.

S series - Weather deteriorated during hot refueling operation and aircraft was shut down. Main rotor blades had one-fourth inch of rime ice.

AH-64 Class C mishap

A series - As tail wheel touched down, IP noticed slight shudder. IP took controls and landed. Tail wheel strut had collapsed and aft tail boom bulkhead was cracked.

AH-64 Class D mishaps

A series - Damage to tail rotor blades was discovered on postflight. Damage was caused by tree strike.

A series - Range sweep was made and aircraft was landed at rearm pad. The 30mm gun failed to upload properly. IP decided to cancel the live fire table but continue the training mission with laser operations and dry fire only. IP proceeded to various firing positions on the range and laser failed to fire. While aircraft was on final approach to rearm point, tower told IP there was damage to the aircraft. Both inboard tail rotor blades and stabilator were damaged. Neither crewmember knew when damage occurred.

AH-64 Class E mishaps

A series - During hover firing maneuver, ammunition feeder of 30mm gun malfunctioned and gun stopped firing. Caused by failure of transfer housing assembly.

A series - Crew felt vertical vibration during flight. Main rotor blade was replaced.

Cargo helicopters

CH-47 Class B mishap

C series - Aircraft hit wire at 200 feet agl during night vision goggles training flight. Part of main rotor blade was cut off. Aircraft landed with power. 8611

CH-47 Class D mishaps

C series - No. 1 engine cowling fell from aircraft during flight.

D series - Severe vibration was felt through controls during flight. No. 3 pocket of aft green blade had become unbonded and peeled back.

CH-47 Class E mishaps

D series - When pilot tried to restart No. 1 engine after shutdown, he did not start APU before starting engine, resulting in hot start.

D series - Pilot noticed rotor rpm down to 98 percent during flight. Normal engine beep trim did not bring engine torque up. Caused by failure of electromechanical actuator.

A series - No. 2 engine had high-side beep failure during takeoff. Caused by malfunction of N2 control box.

C series - Copilot felt binding in right lateral movement of cyclic during hover. Caused by failure of roll centering spring.

B series - No. 2 engine fire light came on during takeoff. Caused by cracked sensing element.

A series - No. 1 engine oil low light came on. A piece of the housing on the oil filter assembly broke off and allowed oil pressure to force filter assembly out of position enough for engine oil to escape overboard.

Observation helicopters

OH-58 Class C mishap

C series - Main rotor blades hit tree during NOE flight.

OH-58 Class E mishaps

A series - Aircraft was landed on a ridgeline. While aircraft was at flight idle, crew felt it settle. Crew opened the doors and checked the skids but saw nothing abnormal. Mission was continued. As aircraft was on short final to field location, IP on the ground, noticing that forward cross tube was broken, waved aircraft off. Camouflage net bags were stacked and aircraft was landed on them.

C series - Severe lateral vibration developed during runup. Ice inside one main rotor blade had broken loose and was forced to the blade tip, causing out-of-balance condition.

C series - Pedals jammed and would not move during flight. Pilot electrically disengaged the primary tail rotor control system, with no effect. Running landing was made at airfield. Caused by failure of aft tail rotor control cable.

A series - Aircraft yawed right, and N2 and rotor rpm increased. Caused by failure of fuel control.

A series - When pilot tried to shut down aircraft, engine would not respond to throttle changes. Caused by broken throttle cable under pilot's seat.

C series - One-half-inch-wide strip of mud was found in refueling receptacle. Outer ring had dirt, grit, and grass on the sides and top. Aircraft had last been refueled at a tactical refueling point. Refueling personnel allowed nozzle to become contaminated and did not clear it before refueling aircraft.

Fixed wing

C-12 Class B mishap

C series - Right main landing gear collapsed during landing roll. Right wing hit runway lights, pulling aircraft off the runway. Left main landing gear was torn free as aircraft crossed a small ditch. Nose gear remained extended and locked. All indications were normal during approach and touchdown. 8612

Mishap briefs

C-12 Class E mishap

C series - No. 1 engine instruments fluctuated at high power settings during takeoff. Caused by malfunction of fuel control.

OV-1 Class D mishaps

C series - Right main wheel seized during landing. Screws failed, allowing key disc drive to damage brake cylinder, rotors, and wheel.

C series - Master caution light came on during takeoff roll. Pilot aborted takeoff and applied excessive brake pressure. Tires skidded and blew out. Pilot was not used to new type brake pucks.

U-8 Class D mishap

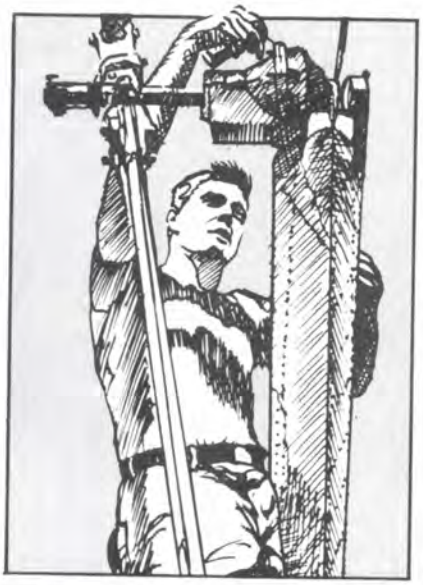
F series - Total power failure occurred after gear retraction on takeoff. Pilot climbed to 3,000 feet and noticed that both alternator switches were not on line. Manual gear extension was attempted. After about 20 strokes, pump handle broke free. Attempt to regain electrical power was successful. Gear indicator showed all three wheels down and locked. Battery charge monitor light remained on. Pilot returned to airfield and landed. Emergency gear jack shaft rib was cracked. With the addition of the excalibur engines to the U-8F, the engines must now be started with the alternators off. While using the checklist, pilot overlooked the "alternator switches on" check.

U-21 Class D mishap

H series - Pilot noticed right engine cowling was open during takeoff roll. Engine nacelle and cowling were damaged. After taking an oil sample, pilot turned away from aircraft and did not secure cowling. When he turned back to aircraft, he saw copilot near engine nacelle. He thought copilot had secured cowlings, but he had not.

U-21 Class E mishap

J series - Loud noise was heard during descent. Inboard deice boot separated at bottom leading edge. Suspect poor adhesive quality of glue used to bond boot to wing.



Maintenance

UH-1 Class E mishap

H series - Control movement decreased in fore and aft directions during flight. Caused by incorrectly shimmed sync-elevator horn.

UH-60 Class D mishap

A series - Stabilator was removed from aircraft during 100-hour inspection and placed 40 feet from taxiway in grassy area. As another aircraft was taxiing to parking spot, loose stabilator was blown into fence surrounding airfield. Stabilator was placed in an area not secured or visible from taxiway.

AH-1 Class E mishap

S series - Loud bang was heard during test flight. Postflight inspection revealed left ammo bay door was open. Door had been noted to open with pressure from the inside and had not been adjusted before flight.

OH-58 Class E mishaps

A series - Noise was heard, and master caution and hydraulic pressure lights came on. Control feedback was felt. After aircraft was landed, oil was found on transmission deck and all over aircraft. Preformed packing was not installed between quick disconnect fitting and hydraulic filter housing assembly.

C series - Pilot felt binding in tail rotor pedals and landed. Mechanics had used flashlights to install tail rotor pitch change tube at a field site at night. The slider caught a roller bearing from the pitch change housing between the brass keeper and the tail rotor end of the slider slot, limiting tail rotor pedal travel to the left.

OV-1 Class C mishap

D series - During maintenance operational check for engine replacement and rigging, right engine lower cowling dislodged as maximum reverse thrust check was being made. Cowling was struck by propeller. Propeller, cowling, hatch, and fuselage were damaged.

OV-1 Class E mishap

D series - Takeoff was aborted when pilot could not get required takeoff power on both engines. Fuel control rigging was not adjusted correctly.

C-12 Class E mishaps

C series - In-transit light in gear handle remained on after takeoff. Uplock switch was out of adjustment.

C series - Fuel was seen siphoning from left main fuel cap after takeoff. Civilian refueling personnel installed fuel cap incorrectly.

U-21 Class E mishaps

A series - Fuel was seen siphoning from left nacelle fuel cap on climbout. Fuel cap seat was bent. Adapter assembly had been worked on the previous day.

A series - Gear handle safety switch did not activate on liftoff. Switch was out of adjustment.

A series - Crew detected fuel vapors during climb. O-ring located in straight adaptor on automatic dump valve was pinched during installation the previous day.

T-42 Class E mishap

A series - Right engine fuel pressure began dropping after takeoff. Engine ran rough during downwind for landing. Postflight inspection revealed engine starting fuel manifold return line fitting had backed off.

Safety messages

• Safety-of-flight technical message concerning one-time and recurring inspection of CH-47D flight control mounting pallets (CH-47-85-21, 121400Z Dec 85). Summary: Several instances recently occurred where secondary flight control components bolted to threaded inserts in the thrust and yaw pallet became loose or disengaged because inserts pulled out of the pallet. When this occurs, the pilot's workload can increase significantly because control system brakes may not hold and system "feel" may be altered. The pitch and roll pallet is also susceptible to the same problem because it is of similar construction and is manufactured by the same vendors. Defective pallets are under investigation to determine specific cause, extent of problem, and corrective actions. Initial examination indicates the inserts may have been improperly bonded during manufacture. Pallets will be inspected to ensure threaded inserts are tight. This inspection shall be repeated at each progressive phase maintenance interval until further notice. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning correction to revision to one-time inspection of AH-1/TH-1/TAH-1 and UH-1M main rotor hub for proper clearances between the extension assembly and grip assembly (AH-1-85-10, 181500Z Dec 85). Summary: AVSCOM message 121400Z Dec 85 (UH-1-85-13, AH-1-85-08) was incorrectly assigned AH-1-85-08 and is in error. The correct message number is AH-1-85-09. The UH-1 control number is correct. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning revision to reporting downtime on DA Form 1352 (UH-60A-85-27, 181900Z Dec 85). Summary: AVSCOM message 101501Z Jun 85 (UH-60A-85-18) specified that aircraft downtime for inspection and modification would be reported against depot maintenance. Some aircraft are still on red X status and the downtime is still being charged against depot maintenance on DA Form 1352 reports. This gives an impression that operational readiness is better than it actually is. Effective with receipt of this message, units will prepare DA Form 1352 in accordance with AR 95-33. Contact: Robert Lawyer, AUTOVON 693-3300, commerical 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning inspection of the T63-A-700 turbine engine compressor on all OH-58A and OH-6A helicopters (OH-58A-85-05, OH-6A-85-03, 261930Z Dec 85). Summary: Review of EIRs shows a significant increase in the number of T63-A-700 engine compressor-related problems. A trend in delamination of the compressor case plastic liner has been noted. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-use message concerning one-time inspection and operational changes of Black Hawk main rotor blade clamp assembly (SOU-UH-60A-85-02, 191430Z Dec 85). Summary: Several recent incidents have occurred where the UH-60 blade clamp assembly has allowed the main rotor blade to drop, causing damage and creating a hazard to personnel. This message directs a one-time inspection of the blade clamp and revises operational procedures for using the clamp. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	1-8 Jan	**0**	**0**
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**9**	**2**

CY 85 Flightfax index

A few feet from disaster (AH-1 accident) - 4 Dec
A few words on the word "safety" (words to describe safety) - 21 Aug
AH-1 impulse cartridges (position on) - 24 Jul
Aircraft accident review (Cobra hits wires along highway at night) - 3 Jul
Aircraft accident review (engine failure caused by corrosion) - 26 Jun
Aircraft accident review (flight into IMC) - 30 Jan
Aircraft accident review (Huey hits road sign) - 9 Jan
Aircraft accident review (Huey hits wire over river) - 12 Jun
Aircraft accident review (inattention to airspeed) - 6 Feb
Aircraft accident review (OH-58 flies into mountain) - 24 Jul
Aircraft accident review (OH-6 hits wires during search mission) - 8 May
Aircraft accident review (overcontrol results in crash) - 5 Jun
Aircraft accident review (two helicopters collide in midair) - 1 May
Aircraft accident review (UH-1 crashes when engine fails from fuel exhaustion) - 14 Aug
Aircraft accident review (UH-1 hits wires while flying in instrument conditions) - 31 Jul
Aircraft accident review (UH-60 enters trees in dense fog) - 17 Jul
Aircraft accident review (unauthorized low-level flight) - 3 Apr
"All I saw was a single strand of wire" (wire strike accidents) - 21 Aug
An idea about weather mishaps (from a Chinook pilot) - 22 May
An IP's thoughts on proficiency - 29 May
A position you can live with (crash position) - 6 Nov
ATM corrections - 3 Apr
Aviation safety courses (for FY 86) - 4 Sep
Broken Wing Award, fourteen receive (recipients for October 84 through March 85) - 22 May
Broken Wing Award, sixteen receive (recipients for April through June 85) - 17 Jul
Broken Wing Award, thirteen receive (recipients for July through October 85) - 13 Nov
CCAD teardown analysis control numbers (Army Safety Center has numbers) - 22 May
Check your helmet modifications (NVG modifications) - 17 Apr
Christmas card art (near-accident in snow) - 23 Oct
Cobra hits wires along highway at night (accident review) - 3 Jul
Coping with the cold (what to do) - 30 Oct
Could this happen to you? (account of a near accident) - 9 Oct
CY 84 Flightfax index -16 Jan
Did you know? (info on instrument approaches) - 11 Sep
EIR/QDR initiation (importance of) - 18 Sep
Engine failure caused by corrosion (accident review) - 26 Jun
Fatal distraction (OH-58 accident) - 18 Sep
Field-conducted aircraft accident investigation (better reports needed) - 18 Sep
Flight into IMC (accident review) - 30 Jan
Flight line fire extinguisher requirements - 11 Dec
Flying with a cold (dangers of) - 6 Mar
FM 1-506 published - 27 Feb
Followups (of mishaps previously published) - 27 Feb, 13 Mar, 20 Mar, 19 Jun, 28 Aug, 13 Nov, 11 Dec
Fuel leaks (from equipment hauled in aircraft) - 6 Nov
Fuel sample sent in rusty can - 29 May
FY 86 USASC aviation safety courses -4 Sep
He had gotten away with it before (weather accident) - 4 Sep
Helicopter icing (hazards of in-flight icing) - 6 Nov
Helmet modifications (check your NVG modifications) - 17 Apr
Huey hits road sign (accident review) - 9 Jan
Huey hits wire over river (accident review) - 12 Jun
Image intensifiers possibly defective (MX-9916/U) - 27 Mar
Inattention to airspeed (accident review) - 6 Feb
Last **Flightfax** this year - 11 Dec
Little things lead to disaster (OH-58 wire strike) - 27 Mar
Loss of tail rotor effectiveness . . . when it is and when it isn't (accident cases) - 25 Sep
Materiel failure PRAMs received without part numbers (part numbers needed) - 23 Jan
More on OH-58 LTE problem (what LTE is and how to avoid it) - 22 May
More time to think (OH-58 accident) - 2 Oct
New eyeglasses available for use with night vision goggles - 17 Apr
New film released ("How to Survive in Water - Prepare to Ditch") - 16 Jan
Night vision goggles (new eyeglasses available) - 17 Apr
Nomex neglect is a no-no (keep Nomex clean) - 31 Jul
Notice to all aviators who wear corrective lenses and use night vision goggles (polycarbonate lenses available) - 21 Aug
OH-58 flies into mountain (accident review) - 24 Jul
OH-58 LTE problem (what LTE is and how to avoid it) - 22 May
OH-6 hits wires during search mission (accident review) - 8 May
Overcontrol results in crash (accident review) - 5 Jun
Overreaction not the answer (blade strikes) - 29 May
PRAM information (need info on K747 blades) - 18 Sep, 27 Nov
PRAMs addressed to NSC (should be addressed to Naval Safety Center) - 13 Nov
Pubs patter (know the line item number of your equipment) - 9 Jan
Quick thinking saves airplane (pilot saves OV-1) - 14 Aug
Recap of AVSCOM messages (from 1 Oct through 31 Dec 84) - 13 Mar
Recap of AVSCOM messages (from 1 Jan through 31 Mar 85) - 22 May
Recap of AVSCOM messages (from 1 Apr through 30 Jun 85) - 4 Sep
Report of first quarter FY 85 Class A mishaps - 23 Jan
Report on first half FY 85 aircraft

CY 85 Flightfax index

accidents - 15 May
Report on FY 85 aircraft accidents - 27 Nov
Report on OTC drugs (dangers of over-the-counter drugs) - 16 Jan
Report on third quarter FY 85 aircraft accidents - 7 Aug
Safety-of-flight messages
- AH-1 and UH-1 main rotor hub - 20 Nov
- AH-1 canopy removal system - 9 Jan
- AH-1 K747 main rotor blades - 25 Sep
- AH-1 main rotor blade erosion guards - 7 Aug
- AH-1 swashplate bearing - 13 Mar, 20 Mar
- AH-1 tail rotor hub/blade assemblies - 20 Nov
- AH-64 backup control system - 10 Jul
- AH-64 cotter pins - 21 Aug
- AH-64 drive shaft couplings - 7 Aug
- AH-64 engines - 22 May
- AH-64 inspection of aircraft records - 9 Oct
- AH-64 wire harness inspection - 11 Dec
- CH-54 main gearbox chip detector assembly - 5 Jun
- CH-54 main rotor blades - 9 Jan, 29 May
- CH-54 rotor hub torque tube assembly bracket - 3 Jul
- CH-54 tail rotor servo links - 13 Mar
- CH-47 fiberglass rotor blades - 6 Mar, 12 Jun
- CH-47 flare dispensing switches - 12 Jun
- CH-47 forward and aft transmissions - 3 Jul
- CH-47 grounding - 22 May, 3 Jul
- CH-47 pitch link connecting bolts - 3 Jul
- CH-47 safety inspection - 23 Oct
- CH-47 short-term storage procedures - 12 Jun
- CH-47 spiral bevel gear in forward and aft transmissions - 23 Oct, 30 Oct
- CH-47 vertical hinge pins - 11 Dec
- C-12 stall strips - 26 Jun
- Gas generator rotors - 9 Jan
- H-6 series antenna matching modules - 16 Oct
- H-6 series tail rotor blade tip caps - 2 Oct
- OH-58 main rotor hub pillow block hardware - 16 Oct
- OH-58 main rotor hubs - 16 Oct
- OH-58 main rotor pitch link assemblies - 1 May
- OH-58 right cyclic control stick - 7 Aug
- OH-58 tail rotor drive shaft covers - 9 Jan
- OV-1 generators - 6 Feb
- T-42 stall strips - 26 Jun
- U-8 engine mounts - 31 Jul
- U-8 stall strips - 26 Jun, 10 Jul
- UH-1 and AH-1 tension torsion straps - 10 Jul, 16 Oct
- UH-1 clevis - 23 Jan
- UH-1 collective lever assemblies - 18 Sep
- UH-1 connecting links - 11 Dec
- UH-1 elevator assemblies - 1 May
- UH-1 swashplate bearing - 24 Apr
- UH-1 turnbuckles - 20 Mar
- UH-1 universal control levers - 9 Oct
- UH-60 autorotation rpm limits - 13 Mar
- UH-60 ECU lockout flight training - 3 Apr
- UH-60 engine output shaft - 26 Jun
- UH-60 engines - 22 May
- UH-60 flight controls - 17 Apr
- UH-60 flight restrictions - 24 Jul
- UH-60 grounding - 1 May, 8 May, 26 Jun
- UH-60 main gearbox dowel pins - 9 Jan
- UH-60 main rotor hub - 12 Jun, 19 Jun
- UH-60 main rotor pitch horn attachment bolts - 20 Nov
- UH-60 main rotor shaft - 12 Jun
- UH-60 main rotor spindle and tie rod - 24 Jul
- UH-60 main rotor spindles - 15 May, 10 Jul
- UH-60 stabilator amplifiers - 27 Feb, 13 Mar, 20 Mar
- UH-60 storage procedures - 29 May
- UH-60 tail rotor drive shaft bearings - 7 Aug, 14 Aug
- U-21 stall strips - 3 Jul
- UV-18 wing fuselage attachment fittings - 2 Oct

Snow alert (accidents in snow) - 16 Oct
STACOM - 16 Jan, 13 Feb, 20 Mar, 24 Apr, 12 Jun, 17 Jul, 18 Sep, 9 Oct, 20 Nov
Supervisors mold attitudes - 6 Feb
Ten commandments of good crew coordination - 17 Jul
Ten tactics for better aviation operations - 10 Apr
Toolbox becomes missile (during accident sequence) - 27 Nov
Two helicopters collide in midair (accident review) - 1 May
UH-1 crashes when engine fails from fuel exhaustion (accident review) - 14 Aug
UH-1 descends into trees (accident review) - 10 Jul
UH-1 hits wires while flying in instrument conditions (accident review) - 31 Jul
UH-60 enters trees in dense fog (accident review) - 17 Jul
Unauthorized low-level flight (accident review) - 3 Apr
What could have been done? (CH-47 accident) - 24 Apr
What you should know about Nomex (info on the material, cleaning, etc.) - 4 Dec
Why pilot reports (important to weather forecasts) - 10 Apr
Wrenchturners need rest, too (importance of quality rest for maintenance personnel) - 11 Sep■

Snow claims Black Hawk

and his position simultaneously, which is a difficult task, especially for a pilot with limited recent snow experience. The aircraft hit the ground at 11 to 17 knots ground speed and in a descent of 1,600 feet per minute, excessively fast even for an approach to level terrain. FM 1-202 states that "an approach to the ground should not be allowed in dry-powdered snow unless the touchdown area is known to be level and free of obstructions." In this case, the pilot was aware of both the slope and the looseness of the snow. However, he was not aware of his downwind condition.

The pilot did not make a go-around because he felt he could handle the situation. He was warned of his high rate of closure by his crew, but he continued his approach with little modification.

The UH-60 is an extremely complex aircraft. Maintaining PIC proficiency in the UH-60 is a full-time responsibility. The position of operations officer competed for the time the pilot needed to maintain his proficiency. Commanders should evaluate key positions and identify those personnel whose duties compete and interfere with the task of maintaining UH-60 PIC status.

When the flight lead chose an alternate site for the landing, he did not pass to the rest of the flight terrain data based on his map reconnaissance or any anticipated course. It is true that the other crews should also have been looking at their maps. However, during marginal VFR conditions and an aborted approach, it is not unreasonable for both pilots to have their heads up, relying on flight lead for some last-minute guidance about an area only he knows about. In this case, no data was passed, and the flight was brought into a hilly landing zone, downwind, with winds forecast to be 25 to 30 knots.

Although no serious injuries resulted from the crash, the potential for injury was high. AR 95-1 is clear in its requirement for the PIC to ensure personnel are restrained. However, in the UH-60, responsibility for ensuring personnel are restrained is shared with the crew chief. Unlike the UH-1, Black Hawk layout does not allow the pilots to visually check their passengers. Thus, pilots are dependent on the word of the crew chief for passenger status.

In this case, the crew chief told the pilots the passengers were secured when they were not. He saw that several of the passengers were unrestrained but took no action. The unit SOP required that all passengers be properly restrained. Although the unit to which the crew chief had been previously assigned did not use restraining devices in the UH-60 the crew chief had been with his present unit long enough to know what was expected of him.■

Aviation expertise needed

The United States Army Aeromedical Research Laboratory (USAARL) is working hand in hand with the Safety Center for the safety and well-being of future Army aviators. USAARL needs your flying expertise and aviation knowledge for its many ongoing projects. You must be an Army aviator and possess a current physical and up-slip.

For more information, please call USAARL at AUTOVON 558-6864/6865, commercial 205-255-6864/6865, and ask for the research aviator representative.■

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Followups

Additional information on mishap briefs previously published

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Utility helicopters

UH-1 Class A mishap in 5 Jan 85 issue (8541) □ Helicopter and civilian airplane collided in midair. Civilian airplane crashed, killing the pilot. UH-1, with a damaged main rotor system, was landed with no injuries. Both aircraft were being operated under visual flight rules in visual meteorological conditions. In accordance with Federal Aviation Regulation Part 91, the pilots of both aircraft were responsible for seeing and avoiding other aircraft.

UH-1 Class A mishap in 6 Feb 85 issue (8517) □ Aircraft was on parachute drop mission. As aircraft was descending for landing, a large, locally manufactured pad used to protect the cargo door and side of aircraft from static lines broke loose and went through the tail rotor. The tail rotor and 90-degree gearbox separated, and the aircraft crashed. The pad had been manufactured about 5 years before this accident. There were no written procedures for installation and inspection of the pad. Rigging procedures had been passed on verbally over the years. Three strands of nylon cord were usually used at each grommet to tie the pads to the aircraft. This time, however, the jumpmaster had cut the triple strands of cord. When he found he did not have any replacement cord, he used pieces of the original cord to secure the upper corner of the pad to the helicopter bulkhead. This resulted in the load being carried by a single strand of cord, which broke.

UH-1 Class A mishap in 9 Jan 85 issue (8509) □ Just after takeoff for night vision goggles training flight, pilot noticed that he had not turned on his radar altimeter. Directing his attention inside the cockpit to turn on the altimeter, the pilot lost his visual reference to the ground. The helicopter crashed and came to rest inverted.

UH-1 Class A mishap in 10 Apr 85 issue (8531) □ Aircraft was in a climb following takeoff, when explosions were heard from the area of the engine compartment. The IP made a left turn to the heliport but had to decelerate into trees because of the loss of rpm. Teardown analysis revealed that the interstage bleed actuator would not operate properly because of failure of the rubber diaphragm installed in the bleed actuator. The diaphragm failed because of deterioration. Currently, there is no inspection performed on this part unless deterioration of another component results in an engine being returned to the depot for rebuild.

UH-60 Class A mishap in 27 Mar 85 issue (8524) □ Aircraft was in cruise flight at 140 feet agl when it nosed over in excess of 45 degrees and crashed. The suspected cause is jamming of a link assembly within the bellcrank in the forward longitudinal input channel of the mixer assembly. As a result, the pilot lost cyclic and collective control of the aircraft with the controls locked in forward cyclic and high collective input. It was concluded that jamming can only occur when the required upper bolt, an impedance-type self-rotating bolt, is not present. The crew did not discover the bolt was missing because the instructions in TM 55-1520-237-PMS-1 and TM 55-1520-237-CL lack the detail to ensure adequate inspection of the mixer assembly. It was also concluded that the angle of the bellcrank throat will allow a jam to occur.

UH-60 Class A mishap in 13 Mar 85 issue (8522) □ During a training mission, the IP announced to the pilot that they had a simulated torque split. The pilot identified the No. 1 engine power condition lever (PCL) and proceeded to take manual control of the engine. As the PCL was advanced to the electronic control unit (ECU) lockout operation, the engine began to cycle against the overspeed limit. As the No. 1 engine PCL was retarded, the No. 2 engine flamed out. The No. 1 engine then flamed out. The IP took control and tried to regain rotor rpm. He was unable to regain enough rpm for a successful autorotation, and the aircraft crashed. The reason both engines flamed out has not been determined. It is suspected there is an interaction between engine control components when one of the engine's electronic control units is locked out, which causes engine flameout.

Attack helicopters

AH-1 Class A mishap in 21 Aug 85 issue (8552) □ Two AH-1 helicopters were on an orientation flight. The pilot of the No. 2 aircraft had made two low passes down to approximately 30 feet agl. The pilot of the No. 2 aircraft warned him he was descending too low. The No. 1 pilot acknowledged the

Followups

warning, but within 60 seconds the AH-1 made another dive and hit the ground at 80 to 100 knots. The aircraft bounced into the air and crashed inverted, killing the pilot and injuring the passenger. The pilot violated an imposed minimum altitude restriction of 100 feet agl. He was overconfident in his abilities and the aircraft's capabilities, and it is suspected he was trying to impress the orientation passenger.

AH-1 Class A mishap in 12 Jun 85 issue (8543) □ Downgraded to Class B. Aircraft began to settle during NOE flight. Pilot increased collective pitch, but aircraft continued to settle. Pilot picked out a landing area, but he was not able to make it because of main rotor rpm decay. Aircraft settled into trees and came to rest upright. Suspect pilot inadvertently reduced throttle during flight.

Cargo helicopters

CH-47 Class A mishap in 7 Aug 85 issue (8550) □ Aircraft, at ground operating rpm, was sitting on the refueling pad. When the pilot tried to place the condition levers in flight position, the aircraft developed a severe vibration and droop stop pounding. This resulted in shearing of the retention bolts of the droop stop blocks of the aft yellow and red rotor blades. The pilot shut the engines off. As the rotor system decreased rpm with the droop stop blocks missing, the aft blades hit the fuselage. The droop stop pounding was caused by misadjustment of the copilot's directional control pedals. The left pedal was adjusted to the third notch and the right pedal to the fourth notch.

Observation helicopters

OH-58 Class A mishap in 11 Sep 85 issue (8554) □ Aircraft was flying 500 to 600 feet above the ground when engine power decayed. The pilot entered autorotation and maneuvered aircraft to a small clearing in heavily wooded terrain. Control was lost when rotor blades hit trees. Aircraft came to rest on its left side and was consumed by a postcrash fire. Cause of power loss was not determined because of the fire. However, based on available evidence and historical data, it is suspected the cause was a defective bleed air valve.

OH-58 Class A mishap in 3 Apr 85 issue (8530) □ While unmasking from level flight at 60 knots, pilot started a 60-degree left bank and 30-degree dive from an altitude of 150 feet agl to remask and reverse course. The maneuver was too extreme for the altitude available. The helicopter hit the ground in a near-level attitude, bounced, skidded 200 feet, came to rest on its right side, and burned.

OH-58 Class A mishap in 20 Mar 85 issue (8523) □ As aircraft was taking off from a field site at dawn, the main rotor blades hit an antenna and became tangled in the nylon supporting ropes. The ropes restricted the pilot's control inputs, and the aircraft crashed. The pilot took off over the highest obstacles/terrain and failed to maintain a constant angle of climb until clear of the obstacles. The pilot was extremely apprehensive about the loss of tail rotor effectiveness and always took off into the wind as his solution to avoiding loss of tail rotor effectiveness. Taking off into the wind in this case put him directly over the antenna and upsloping terrain. The pilot did not communicate with his copilot concerning crew coordination or any requirement for the copilot to help him maintain terrain/obstacle clearance.

Fixed wing

OV-1 Class A mishap in 9 Jan 85 issue (8514) □ As pilot leveled out after a climb, he heard a loud explosion. Aircraft entered uncommanded right roll. Application of full left control stick failed to slow or correct the roll. Crew ejected and aircraft crashed. The spring pins, P/N 1-300-268-01, which retain the compressor blades failed as a result of stress corrosion, allowing the blades to contact the stators at high rpm and resulting in massive compressor failure. This spring pin has had a history of stress corrosion failure and is no longer used in compressor overhaul. The compressor assembly in this aircraft was last overhauled/repaired in 1977 before the use of the new spring pin. ■

OH-58 IP Course

Some confusion exists about the prerequisites for the OH-58 Instructor Pilot Course and what records/equipment students need when reporting to Fort Rucker. The following prerequisites are required:

Prerequisites

1. Current instrument ticket.
2. Current flight physical.
3. 500 hours rotary wing flight, of which 200 hours must be as pilot or copilot in the OH-58.
4. Current in the OH-58.
5. Must have in possession the following:
   - Current DA Form 2.
   - Flight records or latest DA Form 759 closeout.
   - SF 88 medical records.

This course of instruction is taught in the OH-58A model and **prestudy is a must.** Additional information may be obtained by calling Captain Johnson or CW4 Grantham at AUTOVON 558-3580/6509, ext 34; commercial 205-255-3580/6509, ext 34. ■

U.S. ARMY SAFETY CENTER

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Terence M. Henry
Colonel, Aviation
Commander, Army Safety Center

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - Unsecured left transmission access panel fell off aircraft during flight. As crew descended for precautionary landing, unsecured right transmission access panel fell off aircraft. Crew chief did not secure panels after maintenance operational check, and pilots did not ensure panels were secured.

H series - As aircraft was climbing through 100 feet agl over an open area, pilot encountered inadvertent IMC. Pilot lowered collective to return to landing area. Aircraft touched down hard, bending skid tube. Copilot was preoccupied with map and radios.

UH-1 Class E mishaps

H series - Crew heard noise from transmission area during hover. As skids touched the ground, master caution and hydraulic lights came on. Caused by failure of hydraulic line.

H series - Master caution and engine fuel pump lights came on. Caused by defective fuel pressure differential switch.

H series - Vibration was felt in airframe and noise was heard during approach. Crew smelled smoke. Caused by failure of muff heater bearing assembly.

H series - Master caution and transmission oil pressure lights came on. Transmission oil pressure gauge dropped to zero. Caused by failure of oil filter seal.

H series - IP smelled smoke and heard rumbling noise. Fire warning light came on. Caused by failure of main generator.

UH-60 Class D mishap

A series - Aircraft was landed to snow-covered landing zone. As aircraft settled in snow, an object punctured bottom of fuselage.

UH-60 Class E mishaps

A series - When APU start was attempted, crew chief saw fire in APU exhaust hole. Fire was extinguished. Fuel had accumulated in combustion section, causing hot start.

A series - Aircraft vibrated during takeoff. Inspection revealed cam lug mount bracket on main rotor antiflap assembly was cracked. Crew failed to inspect ice and ensure antiflap cam freedom during preflight.

Attack helicopters

AH-1 Class E mishaps

S series - Transmission oil pressure gauge indicated 100 psi during runup. Caused by inoperative oil pressure transducer.

S series - Master caution and transmission oil hot lights came on during flight. Suspect frozen moisture on cannon plug.

S series - Rpm audio and warning light activated. Caused by failure of rpm warning box.

Cargo helicopters

CH-47 Class E mishap

C series - Transmission chip detector light came on during climb. Caused by failure of transmission.

Observation helicopters

OH-58 Class D mishap

A series - IP initiated simulated engine failure at 3-foot hover on lighted taxiway at night. Pilot allowed aircraft to drift left and to the rear. Pitch pull was late and aircraft landed on heels of

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	1-15 Jan	**0**	**0**
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**9**	**2**

Mishap briefs

skids. Pilot overcorrected with forward cyclic and collective. Aircraft rocked forward, striking the pavement. IP was late with corrective action. Suspect darkness and lack of visual cues contributed to mishap.

OH-58 Class E mishaps

A series - Master caution and tail rotor chip detector lights came on during landing. Caused by broken electrical connector.

A series - Pilot landed and reduced throttle to engine idle. There was no immediate response from N1, N2, or rotor tachometer. Pilot lowered collective and reduced throttle to engine idle for shutdown. It took 2 minutes and 43 seconds for N2 and rotor to reach engine idle. Deteriorated rubber boot caused throttle linkage to bind.

Fixed wing

U-21 Class C mishap

H series - During climbout, both power levers were reduced and props adjusted to 2000 rpm. No. 1 torque gauge appeared to be reading in excess of 1500 pounds. Both power levers were reduced and egt checked. Egt gauges were constant at 630° C. Suspect overtorque of both engines.

OV-1 Class E mishap

D series - Left prop exceeded 2000 rpm for more than 2 seconds during takeoff roll. Overspeed inspection revealed that prop control governor failed internally.

Maintenance

UH-1 Class E mishap

H series - Loud banging sounds were heard during takeoff. Diffuser section was improperly tooled.

UH-60 Class E mishap

A series - No. 1 engine tgt fluctuated when collective was increased during HIT check. Pin in cannon plug was damaged because of incorrect installation.

AH-1 Class D mishap

S series - During engine flush, nozzle on flush kit came off and went into compressor section of engine while engine was being motored for rinse. Compressor blades, stator vanes, and inlet guide vane were bent. Improper nozzle was used. Loose clamp caused nozzle to come off hose.

C-7 Class E mishap

A series - Pilot was told by tower personnel during takeoff that No. 1 engine was trailing white smoke. No. 13 cylinder lower baffle stud had backed out of cylinder, creating oil leak.

T-42 Class E mishap

A series - Left engine fuel pressure fluctuated during landing. Tube assembly fuel strainer drain was loose, allowing fuel to leak from tube.

OV-1 Class E mishap

D series - No. 2 engine gauges indicated insufficient takeoff power. Caused by dirty torque gauge couplings.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

Flight line fire extinguisher requirements

AR 420-90: Fire Protection is being revised. HQDA is revising par. 7-11 to clarify requirements for the 150-pound Halon wheeled fire extinguishers on flight lines. All inquiries regarding fire extinguisher distribution should be directed to HQDA (DAEN-ZCF-B), Washington, DC 20314-1000. POC is Mr. Bruce Park, AUTOVON 285-0866, commercial 202-272-0866. ■

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Army Safety Center
Fort Rucker, Alabama 36362-5363

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Report of Army Aircraft Mishaps

Correspondence course for aviation safety officers

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The United States Army Reserves and National Guard have long needed an alternative to resident instruction as the only training and certification program for aviation safety officers. I am extremely pleased to announce the pending Aviation Safety Officers Correspondence Course (ASOCC). This two-phase program is designed to meet the needs of reservists and guardsmen more effectively.

Phase I consists of 23 corresponding subcourse studies to be administered through the Army Correspondence Course Program (ACCP). The second phase will consist of 2 weeks' resident instruction administered by the Army Safety Center.

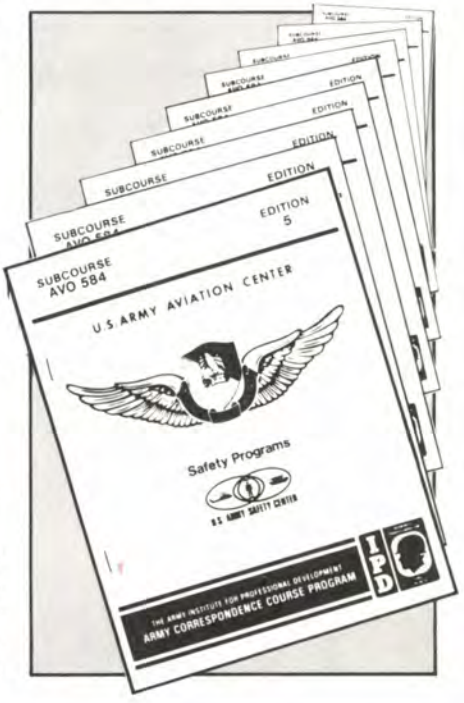
Although ASOCC will not be listed in the next ACCP catalog (Feb 86), several ASOCC subcourses which are ready for enrollment will be listed. These subcourses are:

- AV 534 - Human Factors in Aviation Accident Prevention
- AV 550 - Aviation POL/Maintenance Safety
- AV 569 - Crash Safety Concepts
- AV 573 - Aircraft Structures
- AV 574 - Aircraft Investigations and Reports
- AV 584 - Safety Programs
- AV 586 - Accident Prevention Management Process
- AV 979 - Aerodynamics
- AV 1090 - Performance Planning
- AV 1099 - Aviation Life Support Equipment

Aviators desiring to enroll in the ASOCC should write to Commander, U.S. Army Safety Center, ATTN: PESC-PD (Fran Souders), Fort Rucker, AL 36362-5363, before requesting the subcourses through ACCP. Include certificate of completion for any subcourses previously taken. Additional subcourses will be advertised in **Flightfax** as they become available through ACCP.

The initial resident instruction is tentatively planned for the third or fourth quarter of FY 87, with the exact dates to be based on the enrollment response during FY 86. I encourage participation in the program and believe it is a first step in resolving the shortage of trained aviation safety officers within the Reserves and Guard. ■

—Colonel Terence M. Henry
Commander, U.S. Army Safety Center



Incorrect maintenance on the UH-60

Two potentially hazardous incidents were caused recently by incorrect maintenance on the UH-60. In the first incident, the mechanic installed the self-retaining bolt for a limiter roller in the mixer assembly without also inserting the bolt through the link assembly. When installing the limiter roller, for either the rear longitudinal bellcrank or lateral output lever, mechanics must ensure the self-retaining bolt passes through both the limiter roller **and** the large "dog-bone" link. Failure to ensure proper installation could result in limited control authority or an in-flight control jam.

In the second incident, the tail rotor control cable was routed over the cable guard on the No. 2 pulley during installation. When installing the tail rotor control cable, mechanics should remove the No. 1 and No. 2 pulleys and reinstall them with the cable already threaded between the pulley and pulley guard. **Do not** thread the cable between the pulley and pulley guard while the pulley is installed in the cabin brackets. After installation, ensure the cable rides in the pulley groove. Failure to ensure proper cable routing will cause the cable to break and result in loss of tail rotor directional control.

Incidents of this type have been addressed many times during the past 12 months through safety-of-flight messages, but they continue to occur. Maintenance personnel **must** use by-the-book procedures on every job. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps

H series - IP entered autorotation to approved area and noticed N1 decreasing rapidly. Engine flamed out. IP continued autorotation to touchdown. Caused by combination of worn power lever stop and weak electrical solenoid.

V series - During simulated forced landing, pilot entered left turn, then abruptly turned to right, allowing rotor rpm to increase to 342. Aircraft was landed without further incident. Pilot overcontrolled aircraft and IP failed to take corrective action in time to prevent overspeed.

V series - Loud bang was heard from engine compartment during hover. Aircraft yawed 20 degrees to left. Clogged particle separator caused airflow restriction, resulting in compressor stall.

H series - Crew smelled smoke during flight. Caused by failure of muff heater bearing.

H series - Master caution and right fuel boost pump lights came on. Caused by failure of boost pump.

UH-60 Class E mishaps

A series - Pilot noticed slight cyclic vibration during hover. Vibration increased during takeoff. Preflight inspection revealed yellow antiflap stop was broken and jammed in upright position. Caused by failure of antiflap stop.

A series - Crew felt severe lateral and vertical vibrations during hover. Caused by failure of bushing on nose-mounted vibration absorber.

A series - As airspeed increased during takeoff, lateral vibration increased. Tip caps of three main rotor blades contained ice, causing imbalance.

Attack helicopters

AH-1 Class E mishaps

S series - Engine oil temperature rose to 100° C. and pressure went to 75 psi during landing. Caused by failure of oil cooler fan.

S series - Transmission oil pressure light came on, followed by loss of pressure. Postflight showed no oil in transmission and oil coming from oil cooler compartment. Oil cooler drain valve was cracked at inlet fitting of valve.

AH-64 Class E mishap

A series - All four wing stores jettisoned during shutdown. Crew said they did not initiate the jettison. Cause unknown.

Cargo helicopters

CH-47 Class E mishaps

C series - Engine oil low light came on during downwind for landing. Cannon plug was corroded.

C series - Fuel transfer check valves failed during runup, allowing fuel to transfer into right aft fuel tank. Caused by failure of fuel transfer check valves.

C series - Flight engineer discovered hydraulic leak and told pilots to land. Caused by failure of hydraulic pump.

C series - Hydraulic fluid was seen spraying from utility hydraulic cooler fan during runup. Caused by cracked utility hydraulic line fitting.

Observation helicopters

OH-58 Class E mishaps

A series - Vibration was felt from floorboard of cockpit during runup. Lateral play between cyclic tube and support lever caused vibration. Washer was installed between tube and lever to eliminate play.

A series - N1 gauge froze at 16 percent during engine start. Caused by faulty wiring in start circuit.

A series - Pilot felt unusual vibration during flight. Swashplate had excessive internal play.

A series - Master caution and tail rotor chip detector lights came on during landing. Caused by broken chip light electrical connector.

A series - Master caution and fuel filter lights came on during ground run. Caused by failure of pressure switch.

Fixed wing

C-12 Class D mishap

C series - Aircraft took off from snow-

covered runway. When aircraft was landed at another field, two right main tires blew out. Inspection revealed right shutoff valve for brake deice was inoperative. Right gear was iced over enough to lock wheels in place and cause tires to blow out.

U-21 Class E mishaps

H series - Clutch disengage lever would not disengage following manual gear extension. Tower personnel said gear appeared to be down and locked. Landing was made without incident. Caused by malfunction of landing gear clutch.

A series - Crew noticed left inboard flap in full down position after takeoff. All other flap panels were up. Failure of pin flap actuator T-drive caused split flap.

Maintenance

UH-1 Class E mishap

H series - Pilot felt binding in cyclic during right turns and in left forward quadrant. Caused by incorrectly installed irreversible valve O-ring.

AH-1 Class D mishap

S series - Four compressor stalls occurred during hover to takeoff. Screw head was found in compressor section of engine.

OH-58 Class E mishaps

A series - N2 drooped as power was applied during flight. Caused by loose pneumatic line on governor.

C series - Engine chip detector light came on during landing. Lower engine chip detector cannon plug had been installed with a pair of pliers and overtorqued.

C-7 Class E mishap

B series - Gear warning light remained on after landing gear was raised. Gear was lowered, three green lights came on, and warning light went out. Landing was uneventful. Caused by lack of lubrication in left main gear capsule.

U-21 Class E mishap

A series - Right main indicator light would not illuminate and gear unsafe lights in gear lever handle remained on. Gear was pumped down manually. Down-limit switch was out of adjustment.

OV-1 Class E mishap

D series - Engine fire light came on. Caused by fire detection sensing element chafing against airframe.

Safety messages

• Safety-of-flight maintenance mandatory message concerning revision to inspection of the T63-A-700 turbine engine compressor on all OH-58A and OH-6A helicopters (OH-58A-86-01, OH-6A-86-01, 110300Z Jan 86). Summary: Response to AVSCOM message 261930Z Dec 85 (OH-58A-85-05, OH-6A-85-03) has shown that a number of compressors have failed to pass the required inspection. Review of the data reveals that the predominant reason for failure is in the compressor case. Therefore, units should discontinue removing the entire compressor assembly and replace only the compressor case. Units should continue to inspect compressors in accordance with message 261930Z Dec 85 but should follow the disposition and reporting instructions of this message. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300. ■

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	1-22 Jan	**2**	**1**
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**11**	**3**

To be . . . or not to be . . .seen: That is the question

Regional representatives of the Army Air Traffic Control Activity have received complaints that Army helicopters are operating at night in civil airspace in violation of AR 95-1 and Federal Aviation Regulations (sections 91.73(a)(b)). The problem is that some helicopters have been operating near airports at night with their position lights in the dim mode position or turned off.

Operation at night without position lights is in violation of regulations cited above except when it is in accord with the Grant of Exemption issued to the Army by the FAA for night vision goggle training. Operating with position lights in the dim mode does not violate regulations, but it may not be the prudent thing for night flying in the general aviation environment.

This problem appears to be caused by flight crew absentmindedness or bad habit transfers from the practice of conducting night operations' detection avoidance in tactical operations. Transitioning to nontactical or civil operations requires the crew to remember to check for the appropriate response during the following:

Preflight - lights - on; check (check position lights working, lens condition and clear), then off.

Before starting engine - overhead circuit breakers and switches (includes position lights on for night operations) - set.

Before takeoff - systems (includes lights as appropriate for night operations) - check.

Our civilian counterparts are finding it hard to see our helicopters at night. The question of when to be seen or not to be seen must be answered with the appropriate light switches. ■

Aviation expertise needed

The United States Army Aeromedical Research Laboratory (USAARL) is working hand in hand with the Safety Center for the safety and well-being of future Army aviators. USAARL needs your flying expertise and aviation knowledge for its many ongoing projects. You must be an Army aviator and possess a current physical and up-slip.

For more information, please call USAARL at AUTOVON 558-6864/6865, commercial 205-255-6864/6865, and ask for the research aviator representative.■

U.S. ARMY SAFETY CENTER

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Terence M. Henry
Colonel, Aviation
Commander, Army Safety Center

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29 January 1986

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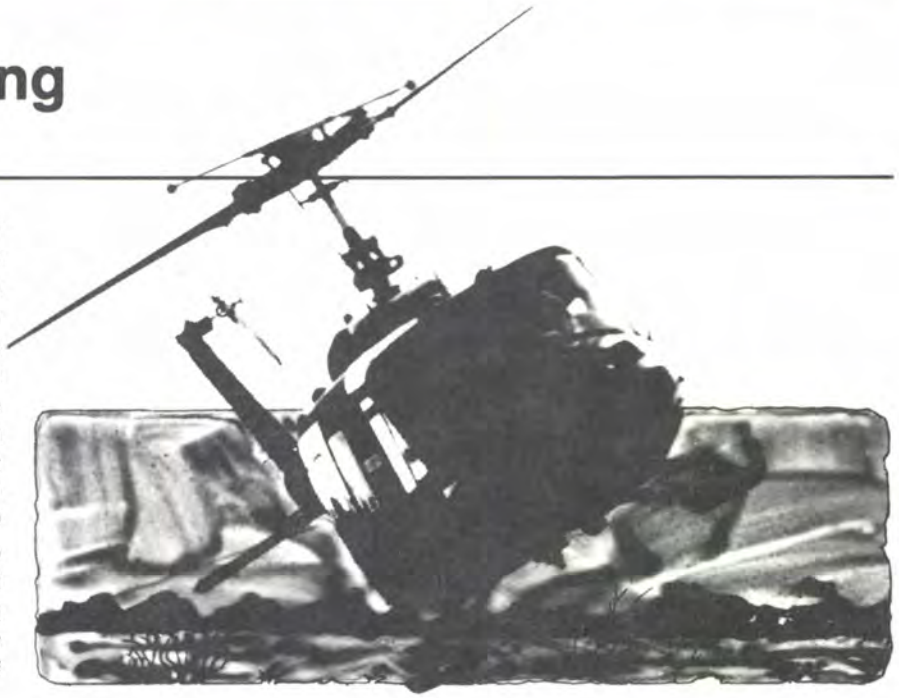
Report of Army Aircraft Mishaps

Maintenance lubricates wrong fuel control



A UH-1 instructor pilot and two rated student pilots were scheduled for a nap-of-the-earth (NOE) training mission. The IP coordinated with another IP who was going to be training in the same area, and they decided to use the "buddy system" during the training. There was a delay in starting the mission because of a helmet problem. After this was corrected and the aircraft was running, the UH-1 IP noticed that the required survival radio was not in the aircraft. Since there had already been a delay and the training was to be conducted using the buddy system, the IP decided to take off without the radio.

The first hour of training was uneventful, and a student change was made at a landing zone in the training area. About 15 minutes later, the lead aircraft came to an out-of-ground-effect hover. The pilot of the No. 2 aircraft, seeing that the lead aircraft had stopped, brought his Huey to a hover 150 feet above the ground. The lead aircraft then proceeded over a ridgeline on the NOE route.

Just as the lead aircraft continued forward, the pilot of the No. 2 aircraft noticed he was losing engine rpm. The IP immediately took control and lowered collective pitch to try to regain rotor rpm. The UH-1 yawed left 180 degrees as it descended to the ground. Just before contact with the dense growth of bushes on the steep incline, the IP applied collective pitch to cushion the aircraft. The UH-1 hit the slope with the rear skid first and slid down the slope, sustaining extensive structural damage. The three occupants got out of the aircraft and walked up the slope to a clearing.

The IP of the lead aircraft noticed the absence of the trail aircraft and tried several times to establish radio contact. Failing to establish contact, the IP alerted operations to begin a search of the surrounding facilities to determine if the trail aircraft had gone to refuel. The lead aircraft then returned to home base to refuel.

Base operations could not find the UH-1, so they notified a search and rescue unit and also launched an aircraft to search for the missing Huey. The downed crew was located 2½ hours after the crash.

Rescue time could have been decreased considerably had the crew taken a survival radio with them on the flight. They could have contacted the lead aircraft before it left the training area. Also, rescue time might have been shortened had the crew of the lead aircraft notified the search and rescue unit by radio instead of electing to return to home base to refuel and then go back to search for the downed aircraft.

Cause

The engine failed due to lack of lubrication to the splines of the fuel control drive shaft which caused premature failure of the splines. The lack of lubrication was caused by incorrect lubrication procedures when the gearbox was installed. Older model fuel controls required that a lubricant be applied to the drive shaft splines during installation. The fuel control on this aircraft was a TA model fuel control installed with accessory gearboxes which are designed to receive spline lubrication from the engine oil systems. Application of the lubricant to the newer model drive shaft caused the four oil passages of the accessory gearbox drive gear to become clogged. This caused a lack of lubrication to the drive shaft splines. As a result of the fuel control not being driven, the fuel supply to the engine was cut off, causing the engine to fail. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - Lead aircraft in flight of four on night mission struck a large bird. Copilot's chin bubble was shattered.

V series - Aircraft was landing to pick up injured jumper. When aircraft was about 1 foot above the ground, a VS17 marker panel was sucked into the main rotors and then blown back down. The panels, used to mark the landing spot, were secured to the ground with strings and what looked like rocks but were in reality chunks of wood. The main rotor blades were damaged.

UH-1 Class E mishaps

H series - While positioning for takeoff, crew heard loud bang from the engine and aircraft yawed. Suspect ice ingestion by the engine caused noise and power droop.

H series - After aircraft landed at field site, crew chief noticed pool of oil on engine deck, tail boom, and vertical fin. Transmission input seal failed, causing loss of 6 quarts of fluid.

H series - Cyclic hydraulic servo leaked during flight. Irreversible valve on cyclic servo failed.

H series - Takeoff was aborted because of a nine-drop-per-minute leak from the engine external oil bypass valve. Caused by deterioration of pressure relief valve packing.

V series - Engine oil pressure rose to 105 psi during flight. Pilot smelled smoke after landing. A bearing failed and the main inverter had overheated.

UH-60 Class D mishaps

A series - Aircraft landed at unimproved landing zone. A few seconds after aircraft was at flat pitch, tailwheel broke through snow and ice covering a rut. Stabilator was damaged.

A series - On short final, a passenger jettisoned both cargo door windows on the left cargo door. One window broke when it hit the ground.

UH-60 Class E mishaps

A series - After about 1.7 hours of flight, crew heard a cracking noise. Left cowling for the step had come open.

A series - Aircraft hovered out into the wind to complete HIT check. Both engines failed check because of high tgt. Engine anti-ice valves were stuck open.

A series - Intermediate gearbox light came on and off, then stayed on about 25 seconds. Caused by moisture on P613 connector.

Attack helicopters

AH-1 Class A mishap

S series - A flight of six aircraft was flying VFR on a daytime mission. An AH-1 and an OH-58C collided in midair. Two persons were killed and two others were injured. 8613

AH-1 Class B mishap

S series - During a MOC the engine oversped to 109 percent. There was no intent to fly. 8614

AH-1 Class C mishap

S series - Engine oil bypass light came on during flight. Engine oil temperature and pressure were

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	1-29 Jan	**3**	**4**
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**12**	**6**

checked and both were normal. Master caution was reset and segment light went out. Pilot decided it was an electrical short in the system since the oil cooler had just been worked on by maintenance. Fifteen minutes later, caution light came on again. Engine oil temperature started to rise but stayed within normal limits. Crew was unable to land aircraft because they were over a swampy area. They continued to fly to a civilian airport. On final approach and landing, engine oil bypass switch was turned to auto and engine oil temperature increased to 150+ degrees Centigrade. Maintenance investigation revealed that engine oil reservoir float switch had failed, causing engine oil bypass light to illuminate. Engine oil reservoir float switch was found closed. The normal position is open. Engine oil reservoir float switch was found to be oil soaked and binding.

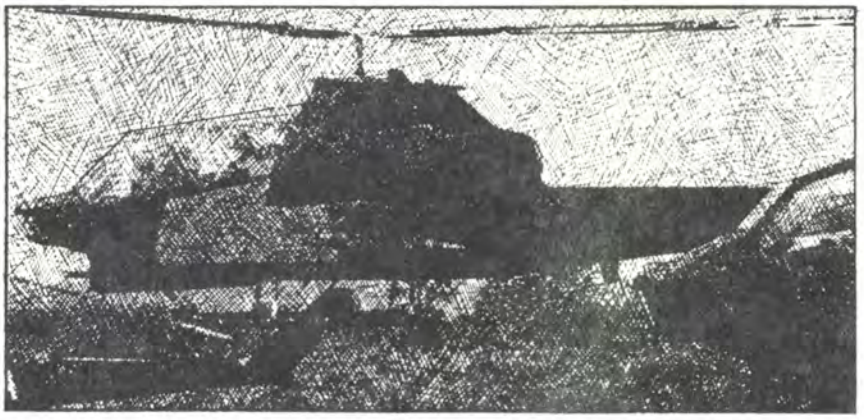
AH-1 Class D mishaps

S series - During standard, straight-in, night autorotation, IP misjudged altitude and was late with deceleration and initial pitch pull. Aircraft landed hard, nose high. It bounced, then hit the ground nose low, sliding about 285 feet before coming to rest upright. Tail skid, fore and aft crosstubes, and UHF antenna were damaged.

S series - During runup, at 750 degrees tgt, ignition solenoid circuit breaker was pulled. Starter trigger was released. Throttle, fuel, and battery were turned off, but starter continued to motor. Tgt was 920 degrees. Crew chief disconnected battery. Tgt had risen to 940 degrees. When power was removed, blades stopped turning. Then turbines started winding up, blades began turning, and the engine started. Pilot increased throttle to maintain tgt below 950 degrees and stabilize N1 at 70 percent. Pilot stayed at controls for the 1 to 2 minutes it took to use all fuel in the lines. Engine stopped, fuel and battery were still off. Cause is being investigated.

AH-1 Class E mishap

S series - During low-level training, at about 70 feet agl and 100 knots, master caution light came on. IP reset it and saw that the forward and aft fuel boost lights were on. Pilot noticed N1 and N2 had begun deteriorating and the fuel boost lights had gone out. As he began reducing collective, the master caution rpm came on and he heard the low rpm audio. Pilot told copilot engine had failed and called, "Mayday." He tried to cut airspeed, but could only decelerate about 5 degrees before hitting cyclic static stops. (Sixty-two-pound tail weights weren't installed. Aircraft was within CG constraints.) During landing in a wet, muddy plowed field, pilot used remaining rotor rpm to prevent skids from digging into mud. Aircraft skidded about 80 feet, coming to rest almost up to its belly in mud. The 20mm gun was buried in the mud. **Aircraft was not damaged.**



AH-64 Class E mishap

A series - Postflight inspection revealed collapsed tail wheel strut. Aircraft had been doing contact training and four autorotations had been performed.

Cargo helicopters

CH-47 Class E mishaps

C series - During takeoff, crew chief noticed hydraulic leak in forward transmission area. Upper pivoting flight control actuator fitting had backed off.

C series - No. 2 engine failed as external load was brought to a hover. Quick disconnect on No. 2 fuel line wasn't seated and vibrated loose.

C series - Transmission chip detector light came on during landing. Caused by electrical short in the transmission wiring harness.

Observation helicopters

OH-58 Class E mishaps

A series - High frequency vibration was felt when aircraft was run from idle to 103 percent N2 on the ground. At a hover, vibration was still felt. After landing, loud violent vibration was heard and felt throughout aircraft. Cause unknown pending further investigation.

A series - About 20 minutes into flight, master caution and fuel filter lights came on momentarily. Lights went out during descent, then came on and off three times during landing. Caused by failure of fuel differential pressure switch.

Fixed wing

C-7 Class E mishaps

A series - Aircraft was at cruise flight, when right engine fire warning light came on. Left side low resistance loop in right wheel well was changed.

A series - There was not enough amperage to start No. 1 engine with No. 2 engine running. Spline insert for drive shaft failed in No. 2 engine generator.

OV-1 Class E mishap

C series - There was smoke in the cockpit during prop governor check.

Mishap briefs

Suspect oil seepage from seals in engine heat exchange area.

Maintenance

UH-1 Class E mishap

H series - Loose tool in tail rotor drive shaft compartment tore skin of aircraft, tail rotor drive shaft cover, and tail boom. Damage was discovered by crew chief during postflight.

UH-60 Class E mishap

A series - No. 2 engine oil pressure dropped to 20 psi during cruise flight and master caution light came on. Crew chief failed to properly secure oil cap after servicing engine.

CH-47 Class D mishap

C series - Aircraft was away from home station. During change of the aircraft engine and shock mounts, drive shaft covers were opened and FOD screens were placed on or near the covers. A dzus fastener from the engine cowling FOD screen fell into the drive shaft tunnel near the No. 6 shaft and went undetected. During a fuel stop, the crew discovered scoring damage to the drive shaft.

OH-58 Class E mishap

A series - Battery failed to come on line during normal runup procedures. Battery switch had been left on by crew chief during daily inspection.

C-12 Class E mishaps

C series - Crew smelled fumes, like burning insulation or rubber, coming from overhead air duct during climb-out. Odor was caused by a small amount of oil in the flow pack.

D series - Gear would not retract after takeoff. Lock had loosened, allowing a wire to come loose from the up limit switch.

OV-1 Class C mishap

D series - Maintenance crew noticed top cap bolt on diamond nose plate was missing after plate had been removed during troubleshooting for high prop rpm on No. 1 engine. First-stage turbine blades were damaged by a bolt ingested during ground run.

OV-1 Class E mishap

D series - When power levers were reduced to level off, loud pop was heard from No. 1 engine and aircraft yawed. Caused by out-of-rig VIGV.

U-21 Class E mishaps

F series - Gear handle lights wouldn't go out when gear handle was put in up position. Switch was out of adjustment.

H series - Avionics compartment door came open during flight. It had not been secured. ■

For more information on selected mishap briefs, call AUTOVON 558-4198/4200.

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Report of Army Aircraft Mishaps

Report on first quarter FY 86 Class A aircraft accidents

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Nine Class A aircraft accidents occurred during the first quarter of this fiscal year, compared to 12 for the first quarter of FY 85. Two of the nine accidents resulted in two fatalities. Five of the nine involved human error, three involved materiel, and one was classified.

The Class A accident rate at the end of the first quarter was 2.47, compared to 3.25 for the same period last year. All of the Class A accidents involved rotary wing aircraft, five of which were UH-1s.

Following are synopses of the five human-error accidents.

• A UH-1 crashed during a maintenance test flight. Engine failure was caused by fuel starvation. The fuel line had been installed incorrectly.

• As the pilot of a UH-1 was flying about 100 feet above the highest obstacle, he made a descending 270-degree right turn with a bank of 45 to 60 degrees. As the helicopter went through a downwind condition, the pilot was watching another aircraft nearby. The UH-1 developed an excessive sink rate from which the pilot could not recover. The aircraft crashed into trees, coming to rest on its right side in a heavily wooded ravine.

• Two OH-58 helicopters operating in a training area collided about 50 feet above the ground. One crewmember was killed.

• A UH-1 was the No. 2 aircraft in a flight of two, flying 150 feet above the ground. When the pilot realized he was closing too rapidly on the lead aircraft, he began a deceleration by reducing collective pitch and applying aft cyclic. As the nose pitched up, the pilot lost visual reference to the horizon because of a light snowshower. A rapid rate of descent developed, and the UH-1 crashed in a tail-low attitude.

• A UH-60 was completing a night vision goggle (NVG) training flight in the traffic pattern of an airfield when the airfield tower asked the crew to try to find a downed CH-47. The CH-47 had hit the top strand of a powerline and landed without further damage. The UH-60 crew, using their doppler navigation system, flew to the downed CH-47 site. A medevac aircraft also accompanied the UH-60 to the site. The UH-60 then returned to the airfield traffic pattern and resumed NVG training. The crew was asked to airlift MPs and a jeep to the downed aircraft. They turned the mission down. A CH-47 crew agreed to take the mission and requested the UH-60 crew lead them to the site. The UH-60 crew agreed. The UH-60 and CH-47 landed at the site of the downed aircraft. When the UH-60 crew was told their help was no longer needed, they proceeded back to the airfield. Halfway there, they received a request from the tower to relay a message to the downed aircraft or the other CH-47. Unable to contact the other aircraft on the radio, the UH-60 returned to the crash site. Still with no radio contact, the UH-60 pilot descended in a circular pattern to 300 feet above the ground and proceeded up a valley to locate and land at the downed aircraft site. About 1 mile from the site, the UH-60 hit the lower two strands of the same line that the downed CH-47 had hit earlier. The UH-60 pilot increased collective, and the aircraft climbed into two more cables, which cut off the main rotor blades. The helicopter crashed, killing one of the crewmembers. The wire hazard shown on the pilot's hazard map was marked at 400 feet. The pilot did not have approval for the mission nor did he receive a mission prebrief. At the time of the accident, the crew had flown 4.3 hours with night vision goggles.

Failure to follow established procedures continues to be the main cause of human-error mishaps. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

H series - When crew attempted liftoff from field site, whiteout resulted. Aircraft rolled over and rotorhead, transmission, and blades were destroyed. 8615

UH-1 Class B mishap

V series - Engine failed 18 minutes into training flight. 8616

UH-1 Class D mishap

H series - Loose dzus fasteners were not found on preflight. Postflight inspection showed vertical fin drive shaft cover was open and bent. One dzus fastener was missing.

UH-1 Class E mishaps

H series - During approach to landing by student, IP heard loud grinding from rear of aircraft. Master caution and hydraulic segment lights came on. Inspection showed hydraulic sight gauge empty and large amount of hydraulic fluid on runway.

H series - Engine chip detector light flashed intermittently during cruise flight. Fuzz was found on engine chip detector plug.

H series - During runup, engine fuel pump light wouldn't go out. Fuel pressure switch was replaced.

M series - Right fuel boost pump light came on after takeoff. Frayed electric wire had contacted airframe, completing circuit.

M series - During inspection following refueling, SIP noticed hydraulic fluid leak. No. 2 hydraulic system reservoir was empty. Caused by ruptured hose.

UH-60 Class E mishap

A series - Crew felt two sharp jolts in the airframe during hover. Antiflap assembly had stuck, causing flap restrainer to crack the antiflap assembly.

Attack helicopters

AH-1 Class A mishap

S series - Aircraft went inadvertent IMC. The crew of another aircraft in the flight saw it come out of the clouds, strike the ground, and burn. 8617

AH-1 Class C mishap

S series - On final approach, crew saw engine oil temperature was 80° C. and slowly increasing. During landing and shutdown, temperature rose to 93°. Upper bearing in oil cooler turbine fan had failed, causing shaft assembly to shear. Broken parts were ingested by fan-turbine, destroying oil cooler assembly.

AH-1 Class E mishap

S series - Engine oil pressure fluctuated between 82 and 50 psi while aircraft was being moved from hot refueling area to holding area. Engine oil bypass light came on and engine oil temperature increased. Caused by failure of ball valve.

AH-64 Class E mishaps

A series - Technician was performing MOC. With APU and No. 1 generator on-line, he turned on No. 2 generator. All four external stores ejector cartridges fired and the jettison circuit breaker popped out. Caused by short in connector P457.

A series - During hover, using the PNVS system, high frequency vibration was felt in tail rotor pedals. Cause unknown.

Observation helicopters

OH-6 Class D mishap

A series - During deceleration phase of straight-in touchdown autorotation, stinger portion of the lower vertical stabilizer hit the ground at the same time IP initiated collective pitch pull. Aircraft bounced into air. IP leveled aircraft and cushioned landing with remaining collective pitch. Tail stinger and lower vertical stabilizer were damaged slightly. Mishap occurred during annual flight evaluation. IP had not performed a touchdown autorotation in the aircraft during preceding 90 days as prescribed by regulations.

OH-58 Class E mishaps

A series - Master caution and tail rotor lights came on during cruise flight at 80 knots. Lights went out on touchdown. Caused by malfunction of 90-degree chip detector plug.

A series - During takeoff, IP saw that master caution and fuel filter lights were on. The main fuel filter had become clogged with sand and dirt during field exercises.

A series - Aircraft engine and rotor rpm drooped during landing. Low rotor rpm audio and light came on. As copilot reduced collective, both went off. Strong, gusty winds caused rapid power changes and may have caused engine to droop. Rpm warning set

screw was loose and could have caused rpm warning limits to vibrate out of adjustment, making warning audio and light come on too soon.

C series - During power application to approximately 90-percent torque, torque stabilized at 90 percent. Pilot noticed torque surge to about 102 percent for 1 second before he decreased torque to 70 percent. Caused by pilot overreacting and applying excessive power.

Training helicopters

TH-55 Class C mishap

A series - During flight, IP closed throttle for simulated engine failure. Engine failed. Following autorotation and touchdown, skids dug into soft ground causing aircraft to rock forward, yaw 180 degrees, then rock back. Main rotor blades cut through tailboom, damaging the main rotor and tail rotor blades, tail rotor gearbox, tailboom, tail rotor drive shaft, and landing gear.

Fixed wing

C-7 Class E mishap

A series - Hydraulic light/low pressure indicator came on when gear was retracted after takeoff. No. 1 engine hydraulic pump had failed.

C-12 Class E mishap

D series - While aircraft was taxiing, No. 2 engine oil pressure gauge fluctuated continuously from zero to 50 psi. Caused by failure of oil pressure transmitter.

OV-1 Class C mishap

D series - During flight, crew heard loud bang and aircraft yawed. Ice had been ingested into No. 1 engine.

OV-1 Class E mishaps

D series - No. 1 engine propeller rpm exceeded 2000 rpm for 30 seconds during a maintenance test flight. Propeller governor was defective.

D series - During before-landing check, indicator showed left main landing gear unsafe. Downlock switch had failed. Crew used emergency landing gear extension system.

T-42 Class C mishap

A series - RSP was performing a power approach precision landing. He pulled engines to idle too early and flared late. Aircraft landed hard and bounced back into air as IP continued go around. As gear was lowered, lights did not come on to indicate gear was safe. Tower personnel reported gear appeared to be down and looked normal. Left tire had blown during hard landing and left landing gear, gear door, and propeller were damaged.

U-21 Class E mishap

H series - Right main gear light did not come on when gear handle was placed in down position. Downlock microswitch had failed.

Maintenance

UH-60 Class D mishap

A series - Dzus fasteners failed to hold and the aft recognition light lens assembly came loose. Tail rotor paddle was damaged when struck by the lens assembly. Evidence of chafing could mean part was improperly installed. Could not be determined if chafing occurred over a period of time or just before separation of the lens assembly. Aircraft meter had registered heavy icing during previous day's flight. Accumulated ice may have put excessive load on fasteners, causing them to release.

UH-60 Class E mishap

A series - Tail rotor quadrant warning light came on during takeoff. Improper installation caused rotor control cable to fail.

AH-1 Class D mishap

S series - During rocket loading, left M200A1 pod came off wing, hitting wheel mounting point. Pod was punctured. Armament personnel had repaired the pod the day before and mounting points weren't locked in closed position.

C-7 Class E mishap

A series - After takeoff, landing gear

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**12**	**6**

Mishap briefs

started up but stopped halfway. Shielding on nose landing gear weight switch wire was worn through, causing intermittent short.

C-12 Class D mishap

D series - During taxi, pilot noticed he was unable to apply right brakes. Mechanic had assembled wheel bearing with washer against bearing surface. Brake assembly was damaged.

U-21 Class D mishap

A series - Left nacelle cowling came open during flight. Cowling apparently was not secured before flight.

U-21 Class E mishap

G series - Landing gear down lock switch was adjusted during maintenance. Starting adjustment was not sufficient to allow switch to operate properly.

Safety Messages

• Safety-of-flight emergency message concerning verification of steel pin installation in shear pin actuated decoupler (SPAD) in AH-64 helicopters (AH-64-86-01, 122140Z Jan 86). Summary: Shear pin in lieu of solid steel pin may have been installed in the pilot and copilot flight control SPAD assemblies on the cyclic, collective, and directional controls. Substitution could result in loss of control in the affected axis. This message requires a one-time inspection of the SPAD assemblies of the AH-64 helicopter to ensure that only solid steel pins are installed. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time and recurring inspection of CH-54A input couplings (CH-54-86-01, 221500Z Jan 86). Summary: Twice recently, input couplings connecting the engine to the main gearbox of CH-54As failed in flight. Analysis showed that cracks were caused in the inner coupling half because of inadequate lubrication at the splined joint where it mates with the outer half. Cracked or excessively worn couplings, and those showing pitting or other defects, should be removed from service and splines lubricated. Inspections will be repeated and splines relubricated every 50 hours or every 6 months, whichever occurs first. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning inspection of main rotor blades (AH-64-86-02, 252330Z Jan 86). Summary: Medium frequency vibration occurred during test flight of an AH-64 at airspeeds between 120 and 140 knots. Cracks were found in both blades, as well as minor voids and peelings. An engineering investigation is being conducted. AH-64 main rotor blades will be inspected daily to ensure no cracks have developed. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-use message concerning torque reaction adapter used while installing and removing the rotor head mast nut on AH-1 and UH-1 helicopters (SOU-AH-1-86-01, SOU-UH-1-86-01, 232040Z Jan 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/4200.

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Report of Army Aircraft Mishaps

Taxi accident costs $9½ million

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It was night. Several UH-60 helicopters were parked on the ramp. The taxi lane clearance between rows of aircraft was 150 feet, 10 feet more than the prescribed clearance. Lateral clearance between parked aircraft was 76 feet, 4 feet less than the prescribed 80 feet. There were no obstructions other than the parked aircraft. The control tower was closed. However, taxi in the area was always at the pilots' risk because of the inability of tower personnel to see the area.

One of the UH-60s was scheduled for an ammunition resupply mission. We'll call this UH-60 aircraft No. 1. Another UH-60, aircraft No. 2, was scheduled for a night vision goggles qualification mission. The crews of both aircraft had completed the necessary planning and briefings for the missions. As the pilot of the No. 2 aircraft was walking to his aircraft, he stopped by the No. 1 aircraft to tell the pilot-in-command (PIC) of that aircraft to call him when he completed his mission.

The crew of the No. 2 aircraft completed their runup and proceeded to taxi for takeoff after seeing that the navigation lights of aircraft No. 1 were still in the flash mode, which would indicate the aircraft was not ready for taxi.

The No. 2 crew taxied from their parking spot to the main taxi lane. They had traveled up the taxiway about 50 feet when they saw that the No. 1 aircraft was also taxiing. The pilot of the No. 2 aircraft stopped the taxi but was unable to avoid a collision because of the limited ramp area. The rotor blades of the two aircraft meshed, and both aircraft came to rest on their right sides. Flying debris heavily damaged another UH-60 and did minor damage to six more UH-60s. The total cost of the accident was almost $9½ million.

The crew of the No. 1 aircraft never saw the No. 2 aircraft and did not realize what they had hit until they got out of the aircraft. The crewmembers of both aircraft were wearing night vision goggles.

No procedures were established which required pilots to coordinate their movements and receive a response before moving their aircraft. The pilots at the heliport complied with Air Traffic Control requirements by making a call "in the blind" and then proceeding as desired. The pilots of both UH-60s did, in fact, make a call in the blind, stating their intentions, before moving their aircraft. However, the pilot of the No. 2 aircraft, the aircraft on the main taxiway, was transmitting on the wrong frequency. He mistook a "9" for a "5" when setting his frequency. He did not expect an answer to his call in the blind and, therefore, did not realize he was transmitting on the wrong frequency.

The copilot of the No. 1 aircraft, which was parked to the right of the No. 2 aircraft, was unaware that the other aircraft was moving. The copilot thought he cleared his aircraft before he started to taxi, but he didn't. Simulation of the accident established that the No. 2 aircraft was visible through the door window of the No. 1 aircraft. It was found that the copilot more than likely would not have been able to see the other aircraft without looking through the window because of the angles involved when taxiing to the main taxi lane and the obstructions to vision caused by the door post structure.

The copilot was distracted by the flash of his navigation lights which he realized needed to be changed to the steady mode during taxi and the illumination of the cockpit when the PIC brought up the lights to identify the tail wheel locking switch. The copilot's attention was concentrated on the taxi lane because of the limited clearance from the other aircraft and because he had no reason to think the other aircraft was on the taxi lane.

The PIC of the No. 1 aircraft was performing tasks which required that his attention be inside the cockpit. He was relying on the copilot to maintain clearance while taxiing. The PIC knew that the other aircraft was going to be flying a mission, but since he was well into his runup procedures when the other crew passed by on the way to their aircraft, he did not think about them completing their runup before his departure. Also, he had been monitoring the radios and had not heard any transmission.

Chronic fatigue was considered a possibility in this accident. Although the unit's crew rest policy had not been exceeded, the flight surgeon had noticed the signs and symptoms of chronic fatigue, such as sore throats, colds, back pain which got progressively worse, weight loss, and mild depression. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - While in a hovering right turn, crew felt vibration throughout aircraft and heard an unusual noise. During shutdown, pilot felt very rapid vibration through antitorque pedals. Cause under investigation.

UH-1 Class E mishaps

H series - Crew was hovering while doing maintenance checks, when they smelled smoke from electrical source. Caused by malfunction of UHF radio receiver transmitter.

H series - Aircraft was IMC at cruise flight when engine oil temperature began rising. Before approach control could get aircraft to minimum safe altitude, temperature exceeded limitations for about 10 minutes, climbing to 145° C. Caused by failure of thermostat flow control.

H series - Aircraft was climbing when pilot told copilot to go to base leg altitude for landing. Copilot misinterpreted pilot's instruction and increased collective pitch. As torque passed through 55 or 60 pounds, pilot reduced collective and landed.

H series - During takeoff from confined area, pilot of No. 2 aircraft in flight of three was forced to come to high hover as lead aircraft turned to avoid trees. Torque was about 42 psi when pilot pulled in additional power as he perceived aircraft settling in rotorwash of lead aircraft. Torque reached 58 psi before IP could respond.

H series - While flying over snow-covered, mountainous terrain, crew was unable to locate their position but continued toward destination. About 5 nautical miles from destination the 20-minute fuel light came on. Aircraft landed successfully and fuel truck was dispatched.

V series - Aircraft was entering traffic pattern for landing when master caution and transmission low pressure lights came on. Transmission oil pressure gauge read "0." Excessively worn coupling halves caused gasket to fail and transmission oil dumped.

V series - Engine oil temperature rose rapidly from 75° to 101° C. Caused by failure of engine oil bypass.

V series - Master caution light flickered. Caused by water in transmission chip detector boot.

UH-60 Class D mishaps

A series - Aircraft was trail in a flight of four. Lead landed short, causing remaining aircraft to decelerate more than anticipated. Tail wheel went into ditch, and stabilator struck ground, bending the trailing edge.

A series - Bird flew through rotor system. Dent was found in leading edge of two tip caps.

UH-60 Class E mishaps

A series - During training flight, No. 1 engine oil pressure dropped and continued to decay until pilot pulled control lever to idle. Single-engine airspeed was maintained and engine oil pressure continued to decay until it was evident pressure would be completely lost. Pilot secured the engine and shut it down. During preflight, crew had checked engine oil and left locking handle in up position, causing oil to siphon out of reservoir.

A series - Transmission oil temperature climbed to 130° for 5 minutes during flight. Grass was clogging transmission oil cooler.

A series - Crew felt moderate to severe feedback at hover and high frequency feedback in all cockpit flight controls during takeoff. Upper antiflap stop was stuck.

Attack helicopters

AH-1 Class B mishap

S series - Aircraft was on a maintenance test flight for adjustment of autorotation rpm. At power recovery phase, it began shaking severely. Pilot continued power-off autorotation, landing aircraft upright. Main rotor severed tail boom and transmission was displaced. 8618

AH-1 Class D mishap

S series - Left skid tube was damaged when aircraft landed on rock.

AH-1 Class E mishap

S series - While at low level cruise flight, pilot saw master caution and alternator lights come on. Caused by failure of generator alternator.

AH-64 Class D mishap

A series - On maintenance test flight to perform main rotor blade tracking and autorotational rpm check, cover on the IR jammer fairing was damaged. Three-quarters of cover was torn off.

AH-64 Class E mishaps

A series - During takeoff, fuel crossfeed was placed in aft tank position. Fuel psi light came on and engine failed. Caused by loose cannon plug for fuel management panel.

A series - During postflight, hydraulic fluid was seen leaking from tail rotor servo. Caused by loose hydraulic line.

A series - Master caution and chip lights came on during hover taxi. Magnetic plug was cleaned and engine runup completed. Chip light came on

again. Oil sample showed ferrous material. After engine was flushed and runup, the light came on a third time. Engine was replaced.

Cargo helicopters

CH-47 Class E mishaps

C series - On landing at a field site, crew chief noticed hydraulic fluid leaking. Plastic clamp had rubbed small hole in metal hydraulic line

D series - During taxi, torque indication for engine would not respond to normal beep trim inputs. IP disabled normal engine trim and attempted to adjust engine torque with emergency beep, but got unsatisfactory response. Slight increase of emergency beep resulted in excessive engine acceleration (high side) and slight decrease of emergency beep resulted in engine deceleration to ground idle (low side). Caused by defective N2 actuator.

CH-54 Class D mishap

B series - Aircraft was lead in flight of two. During climbout, crew heard muffled explosion, followed by cockpit engine-out and voice warning. Fire light came on. No. 2 aircraft reported exhaust smoke coming from lead aircraft's No. 2 engine. Pilot declared emergency, secured engine, and made single engine roll-on landing. Both engine inlet covers had been placed on right forward EAPS mount during preflight and were not stowed before takeoff. On climbout, one inlet cover was dislodged and blown back into No. 2 engine, coming to rest in engine inlet in the position it is normally in when aircraft is parked. Engine flamed out and inlet guide vanes were damaged.

Observation helicopters

OH-58 Class D mishap

A series - During engine startup, copilot failed to open throttle past engine idle detent. Thinking he had passed detent, he inadvertently rolled throttle to off position. During his second attempt, he was slow to recognize rise in TOT was abnormal. By the time IP got throttle closed and starter pressed, TOT had been at 940° C. for 2 seconds.

OH-58 Class E mishap

A series - Pilot saw smoke coming from forward portion of overhead console. Caused by failure of rheostat.

Training helicopters

TH-55 Class C mishap

A series - During termination of approach, aircraft drifted forward and right of runway. Student pilot tried to stabilize rpm and activated anti-overspeed device, causing aircraft to spin right. As aircraft was being stabilized over sod area, student abruptly lowered collective pitch control, resulting in hard landing. Tail rotor blades, tail skid, vertical stabilizer, and tail rotor drive shaft were damaged.

Fixed wing aircraft

C-7 Class E mishaps

A series - During approach to landing, right engine began backfiring and losing power. No. 10 cylinder on right engine broke apart near top of cylinder assembly.

A series - Right engine propeller reverse light came on during climb. Switch had failed.

A series - Left main landing gear would not completely retract. Main landing gear uplock switches would not lock gear in up position. Right and left uplock switches were replaced.

U-21 Class E mishaps

A series - Left fuel boost pump fail light and crossfeed light came on after takeoff. Caused by failure of fuel pump.

G series - No.2 engine throttle lever would not move during flight. Water was suspected in throttle cable. After landing, aircraft was warmed and throttle lever freed up. Cable was purged with air to remove water.

Maintenance

UH-1 Class E mishap

H series - During cruise flight at about 90 knots, 30 psi torque, and

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	1-12 Feb	**1**	**0**
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**13**	**6**

Mishap briefs

normal operating rpm, aircraft yawed right three times and crew heard muffled sounds from rear of aircraft. Pilot suspected engine compressor stall. Egt had reached 610° C.; other instruments showed no change. During maintenance test flight, compressor stall happened again. Because of desert environment, engines were flushed each day after the last flight. Crew chief had failed to properly torque air line from bleed air to bleed band actuator after flushing the engine. Inspector failed to detect the loose line. Aircrew may not have known about parts removed or disconnected during engine flush and they did not check.

U-21 Class E mishaps

A series - Navigation light circuit breaker popped out when light was turned on. Splice in tail light wiring bundle had shorted out on airframe, causing breaker to disengage.

D series - Left main gear safe light failed to come on. Landing gear microswitch was out of adjustment.

CH-47 Class E mishap

D series - While aircraft hovered, engine began uncommanded acceleration indicated by increase in N1 speed and increase in rotor rpm. Actuator was out-of-rig. Droop eliminator potentiometer was out of tolerances and the minimum beep resistor was out of adjustment.

OH-58 Class E mishaps

A series - During cruise flight, crew heard grinding noise and flight controls became stiff. Master caution and hydraulic pressure lights came on. Hydraulic reservoir return line was loose, causing fluid loss.

D series - While at level cruise flight, right passenger door came off. Pilot heard a bang accompanied by decreased cabin pressure and change in cabin noise. During attempt to reinstall doors at contractor facility, jettison rods would not adequately engage the hinge half assemblies until receiving holes had been slightly enlarged. Rods apparently had not been checked for proper seating during installation and jettison shaft assembly was not adequately safetied to prevent excessive movement of rods. Problem cannot be detected by pilot on preflight. Check of another OH-58D in final assembly showed holes were large enough but the jettison rods were not long enough to properly engage. Engineering change is being made to solve problem.

Safety messages

- Safety-of-flight emergency message concerning immediate grounding of all AH-64A aircraft (AH-64-86-03, 282100Z Jan 86). Summary: Due to recent problems of cracking in main rotor blades, all AH-64A aircraft are grounded. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.
- Maintenance information message concerning UH-60A aircraft pitch horn retirement life (MIM-UH-60A-86-MF-02, 232030Z Jan 86).
- Maintenance information message concerning EH-60A/UH-60A beryllium copper droop stop health hazards (MIM-UH-60-86-ME-01, 232035Z Jan 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

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Report of Army Aircraft Mishaps

An error in judgment

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The unit was engaged in desert flying operations which also involved pilots and aircraft from the host country. The mission was to provide orientation rides in the AH-1 to acquaint the allied aviators with the Cobra's weapons system.

U.S. Army aviators had been briefed on the nature of the mission on the 3 nights before the daytime mission was to be flown. The unit commander and operations officer had discussed the purpose and limitations of the flights at these briefings, stressing that the other country's aviators were to be passengers only; they would not be allowed to fly the aircraft. Only straight and level maneuvers would be demonstrated and the flight would be restricted to 100 feet agl minimum and 500 feel agl maximum altitudes. Flights would consist of two aircraft.

With the platoon leader flying the trail aircraft, the Cobras took off just before noon and proceeded to the first checkpoint without incident. The passengers in the front seats were tracking targets through the telescopic sight unit (TSU).

When the pilot of the lead aircraft climbed to 1,500 feet, the platoon leader radioed him to come back down to the prescribed altitude. Because of the erratic way the lead aircraft was flying, the platoon leader asked who was flying the AH-1. The U.S. Army pilot replied that he was at the controls.

Shortly afterward, the lead aircraft made two diving runs on imaginary targets on the desert floor. The dives were recovered at about 30 feet agl. As the Cobra began a third dive, the platoon leader called the pilot and told him he was flying too low. He replied, "Roger." Less than a minute later, the lead aircraft struck the ground at 80 to 100 knots. It was in a level attitude with a slight left roll. Both skids, the right pylon TOW missile launch rings, and the TSU were torn off as a result of this initial ground impact.

After hitting the ground, the aircraft bounced back into the air, rotated to the left, and began an uncontrolled slow right-hand spin of increasing speed. As it spun around, the main rotor blades struck the tailboom, severing it at two places. The remainder of the fuselage crashed into the ground inverted.

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - Aircraft was completing approach to hover. Ground control told pilot the helicopter was on fire and crew heard two loud reports. After autorotation and shutdown, white smoke and flames were seen coming from engine area. Aircraft fire extinguisher was used but was ineffective. It took ground firefighters about 5 minutes to put out the fire. Oil spraying on engine from a failed line or seal is suspected to have caused fire.

UH-1 Class D mishaps

H series - Severe compressor stalls caused engine power surges, making aircraft difficult to control. Left skid touched down, aircraft bounced, and right skid hit shoulder of runway. Both skids, crosstubes, chin bubble, and two bulkheads were damaged.

H series - At 1,000 feet, bird came through right windshield, breaking glare shield.

UH-1 Class E mishaps

H series - During cruise flight, crew heard loud bang and copilot's greenhouse blew out. Caused by small crack in greenhouse and extreme difference in temperatures outside and inside the aircraft.

H series - Master caution and right fuel boost lights came on. Electric flow switch failed.

H series - On short final, crew heard loud roaring noise from transmission or tail rotor area and felt high frequency vibration through pedals and airframe. Caused by loose skid tubes.

M series - While aircraft was in OGE hover, instruments showed loss of transmission pressure, engine oil pressure, and torque indicating system. No caution lights came on. Caused by failure of power transformer.

V series - No. 2 in flight of three aircraft made faster than normal approach to landing. Pilot saw ground guide in approach path and decelerated excessively. Aircraft began to settle, requiring rapid collective pitch increase. Torque reached 50 pounds.

UH-60 Class D mishaps

A series - Aircraft landed on tree stump, puncturing skin on underside.

A series - After two normal and one roll-on landing, crew noticed nose-high attitude of aircraft on ground. Crew chief noted aft wheel strut assembly was low. Thinking "O" ring in strut had failed, crew continued flying. Tail strut assembly had broken.

A series - After hot refueling, fuel handler sheared three screws on the fuel receptacle while he was trying to disconnect nozzle.

Attack helicopters

AH-1 Class E mishap

S series - Following air cavalry screening mission, crew found erosion strips at tips of both main rotor blades had been damaged. Suspect tree strike during NOE flight.

AH-64 Class E mishap

A series - During hover, low rotor rpm lights came on and NR instruments went blank at both pilot and copilot stations. Caused by failure of NR sensor unit.

Cargo helicopters

CH-47 Class C mishaps

B series - Airspeed was approximately 25 knots when aft gear touched runway. Crew felt slight vibration. Aft left drag link broke.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	1-19 Feb	**1**	**0**
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**13**	**6**

D series - When engine condition levers were advanced to flight during runup, No. 2 engine failed to accelerate. Engines were shut down, and at 25 percent N1 on No. 2 engine, transmission suddenly engaged. Transmission drive shaft sheared in half.

CH-47 Class D mishap

C series - Aircraft was in cruise flight at 120 knots when left bubble window fell out.

CH-47 Class E mishaps

C series - Aircraft was at level flight when transmission chip detector light came on. Forward transmission assembly had failed internally.

C series - PIC noticed torques were split with low N1. Rotor rpm was 220. Attempts to beep up rpm with normal engine trim and emergency beep trim were unsuccessful.

C series - Aircraft entered inadvertent IMC in heavy snow, at night. Approximately 10 minutes of fuel remained when aircraft landed. Patchy IMC weather was known to exist.

D series - Severe compressor stall during hover caused torque fluctuations. Surging diminished when engine was reduced to ground position.

Observation helicopters

OH-58 Class E mishaps

A series - Aircraft was at cruise flight when master caution and fuel boost signal lights came on. Caused by internal failure of fuel boost pump.

C series - During hot refueling operation, IP noticed oil on fuselage near transmission. Mast bearing seal had failed.

OH-6 Class E mishap

A series - Transmission oil pressure warning light came on about 5 minutes after takeoff. Suspect plugged oil filter.

Fixed wing

C-7 Class E mishaps

A series - Right engine magneto had 200 rpm drop. Caused by carbon arcing of right magneto distributor block.

A series - When left main landing gear was down and locked, light remained out. Down lock switch failed.

C-12 Class C mishap

C series - During landing roll with reverse thrust, one blade on each prop assembly was damaged. Caused by FOD on runway.

C-12 Class E mishap

C series - Aircraft yawed left and left engine torque went to zero during descent. Engine-driven fuel pump failed.

OV-1 Class D mishap

D series - No. 1 prop reversed faster than No. 2 prop, aircraft veered left. Right main landing gear tire blew out, damaging rim, during corrective procedures.

Maintenance

UH-1 Class E mishap

H series - IP noticed oil on pad after liftoff. Hydraulic filter packing had not been replaced when filter element was changed.

UH-60 Class E mishaps

A series - Tail rotor advisory and backup pump lights came on during cruise flight. Electrical connection in tail rotor servo pressure switch was improperly routed.

A series - No. 1 tgt strip and digits became erratic during flight. Caused by loose and dirty cannon plug.

AH-1 Class E mishaps

S series - When blade was swung after landing, pilot heard rattling sound from inside tail rotor drive shaft. Two washers, a nut, and spacer were found loose inside drive shaft in hanger bearing area.

S series - Master caution and chip detector segment lights came on in flight. Improperly installed cowling caused crimping and chafing of wire to chip detector.

CH-47 Class E mishap

B series - While hovering, master caution and oil hot caution lights came on. Caused by loose wire splice to temperature indicator.

U-21 Class E mishaps

A series - Right inboard flap failed to lower. Caused by improper installation of new flap actuator cable.

A series - Airspeed indicator would not go beyond 60 knots. Pitot system had been drained and both drain cocks safetied in full-open position.

A series - Clear liquid was seen streaming from left engine cowling during after-takeoff check. During emergency procedures, fire wall valve could not be closed because improper safety wire was installed on switch. Clear liquid was apparently captured water.

H series - After takeoff, pilot raised gear handle. Gear came up but light wouldn't go out. When gear handle was placed in down position, gear motor wouldn't activate. Gear was manually extended. Crushed flashlight was found on upper drag brace of nose gear.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time inspection of collective lever assembly on UH-1D/H/V and EH-1 helicopters (UH-1-86-01, 061700Z Feb 86). Summary: Recent flight load surveys of the UH-1 flight control system revealed load values higher than shown in previous tests. When new load data is incorporated into fatigue life calculations for collective lever pin, retirement life is reduced. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message concerning restricted flight maneuvers for OV-1 aircraft (080200Z Feb 86). Summary: Restriction is imposed on listed OV/RV-1D aircraft, prohibiting practice of evasive maneuvers and aerobatic flight until aircraft have been inspected/repaired. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

An error in judgment

The cockpit canopy collapsed as it dug into the sand. Because the rear seat of the Cobra is higher than the front seat, it received the greater damage. The pilot was killed. The

passenger, who received major injuries, was dug out of the loose sand by soldiers who reached the crash scene almost immediately.

Investigation revealed that the aircraft had been completely airworthy. The restraint systems were in use and protective gear was being worn. The aircraft's design was crashworthy, but it could not resist the crushing forces of the inverted impact.

The pilot who died in this accident was described as a model professional aviator with a strong safety sense of "going by the book." He had no record of flight violations and had gained recognition for his conscientious performance as a unit ground safety officer. He had gained about 10 hours of desert flying experience in the 15 days preceding the accident, and the number of hours he had in the AH-1 made him very confident of his abilities. The unit commander had approved him to fly the orientation ride.

The reason the unit commander had restricted minimum altitude to 100 feet was the inexperience of his pilots in desert flying and the lack of terrain definitions for depth perception in judging heights. Although the unit had conducted numerous training classes on desert flying, the commander felt the restriction was required for safety. He also knew that his unit pilots had been talking about the low, fast flight mode employed by the foreign pilots. The repeated pilot briefings had emphasized the restrictions and stressed that aviators were not to attempt to demonstrate flight characteristics of the Cobra during orientation rides.

A model Army aviator, overconfident in his abilities, eager to demonstrate the capabilities of his aircraft to an allied aviator, misjudged his terrain clearance and crashed. That, however, was only the culmination of his actions. His real error in judgment was made when he decided to violate the restrictions that had been imposed for the safety of his mission. ■

U.S. ARMY SAFETY CENTER

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More time to think

It was a beautiful day for flying. The temperature was 64° F. and visibility was 15 miles. The pilot and two passengers took off at 0730 for a planned 3-hour flight.

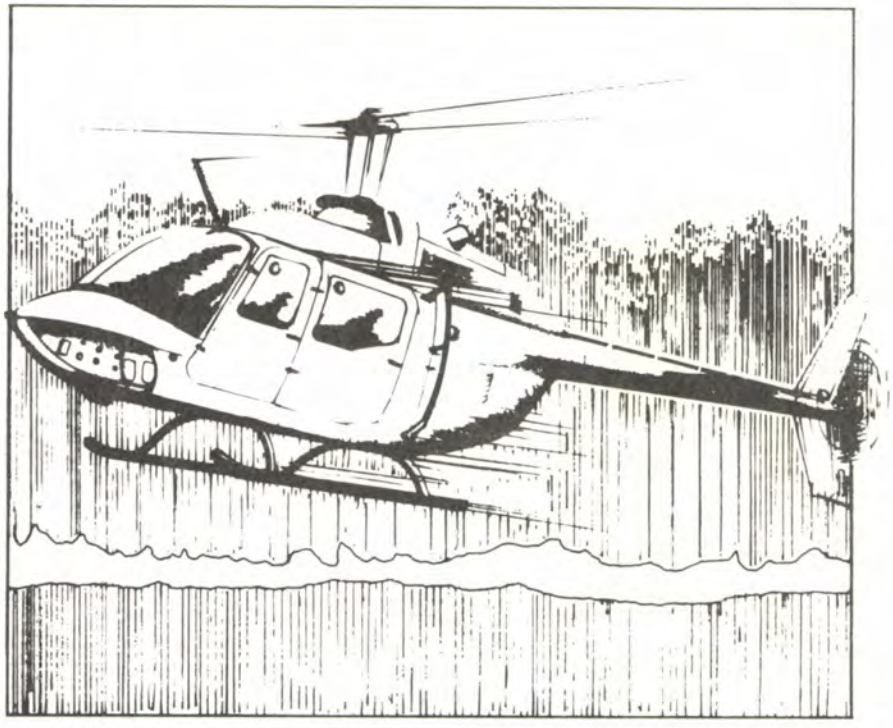
After about 1½ hours, one of the passengers became airsick. The pilot landed the OH-58, and the sick passenger got out. The pilot told the passenger he would be back in about 15 minutes.

The other passenger wanted to take some pictures of an area nearby, so the pilot was going to fly him there. After flying a few minutes, the pilot noticed that visibility had decreased and clouds were low. He decided to turn around, pick up the sick passenger, and return home.

As the pilot started a right turn about 200 feet above the ground, he heard the low rpm audio warning system. He didn't see a warning light. He continued to add collective pitch, trying to keep the helicopter in the air so he would have more time to think about what he was going to do and find a landing area. The pilot saw a sand dune in front of him and applied aft cyclic. The helicopter hit tail low at about 40 knots forward speed and came to rest on its right side.

After getting out of the aircraft, the pilot used his survival radio to try to get help. No one answered, so the pilot and passenger began walking. They walked to the place where they had dropped the sick passenger. All three of them then walked to a range area, where they reported the accident.

The engine and components were shipped to a depot, where a teardown analysis revealed no probable cause for the loss of power. However, after a thorough investigation of the accident, it was concluded that there was a power loss and that it was not pilot induced.



Instead of lowering the collective and beginning an autorotation when loss of rotor rpm occurred, the pilot raised the collective, further compounding the problem. The operator's manual states that the collective should be lowered and an autorotational descent made if an engine underspeed below 96% N2 occurs.

The area over which the pilot was flying contains numerous sand dunes 4 to 5 feet in height and 20 to 30 feet apart. The pilot lowered the collective because he was trying to keep the aircraft in the air long enough to find a large, open area, which did not exist. The unit training program did not focus on the sand dunes in the local area, so the pilot did not react correctly when he was faced with the emergency. By not following the proper emergency procedure, the pilot bled off rotor rpm to such a point that he did not have enough energy in the system to help slow the aircraft when he decelerated and pulled remaining pitch.

The key to safely handling any emergency is knowing and understanding the emergency procedures for the aircraft you fly. The place to plan for an emergency is on the ground when you have time to think about it—not while you are in the air having the emergency. Know your emergency procedures before you need them. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps received 13-19 September

Utility helicopters

UH-1 Class A mishap

V series - Main rotor rpm began to bleed off as aircraft was making an approach to a site at 6,500 feet. Tail rotor authority decreased, and aircraft began uncommanded turn to right. Control was lost, and aircraft crashed on the side of the hill. 8555

UH-1 Class E mishaps

V series - Right-side transmission well soundproofing came loose and blew out cargo door. Soundproofing lodged on right synchronized elevator. When aircraft was on short final, soundproofing dislodged from elevator and fell to the ground.

H series - Torque gauge went to zero. Caused by failure of pressure indicator.

H series - Pilot noticed excessive play between left and right pedal inputs during hover. Caused by failure of tail rotor magnetic brake.

H series - N2 gauge dropped to zero. Caused by failure of tachometer generator.

H series - Master caution and hydraulic lights came on, and hydraulic boost was lost. Caused by ruptured hydraulic line.

UH-60 Class D mishap

A series - Left APU door was lost during flight. Suspect latch failure.

UH-60 Class E mishap

A series - Master caution and No. 1 engine-out lights came on, followed by engine-out audio. Caused by failure of power takeoff drive assembly and shaft.

Attack helicopters

AH-1 Class A mishap

G series - Aircraft crashed in wooded area shortly after takeoff. Pilot and copilot were killed. Engine teardown and analysis by CCAD indicates engine failure due to first-stage power turbine failure. Technical investigation is continuing. 8556

AH-1 Class D mishap

S series - Latch on right turret door was not secured correctly. When turret was slewed full right, open latch caught under fiberglass fairing, damaging fairing.

AH-1 Class E mishaps

S series - As aircraft was being run up, small piece of glass blew out of vent and lodged in corner of unit trainer's eye. Glass was removed by medical personnel.

S series - Pilot was hovering out-of-ground-effect into firing position with a tailwind, over steep rocky terrain and in gusty wind conditions. Aircraft made abrupt and uncommanded descent toward slope. Small amount of power was applied, and right descending turn was made to avoid hitting the slope. Torque went to 60 psi for 1 second. Aircraft landed with no damage. Caused by pilot placing the aircraft in a situation where recovery from the conditions required him to exceed maximum allowable torque.

S series - Master caution and transmission oil hot lights came on. Transmission temperature was 110° C. and engine oil temperature was rising

FY 85 Class A Mishap Countdown

		FY 84			FY 85	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	7	10	October	**3**	**0**
	November	3	3	November	**4**	**3**
	December	0	0	December	**5**	**5**
2nd Qtr	January	4	0	January	**5**	**0**
	February	4	4	February	**3**	**2**
	March	3	1	March	**9**	**14**
3rd Qtr	April	1	3	April	**2**	**3**
	May	4	3	May	**4**	**0**
	June	5	5	June	**1**	**0**
4th Qtr	July	2	3	July	**5**	**1**
	August	2	0	August	**2**	**1**
	September	4	3	September	**3**	**2**
	Total for Year	39	35*	Total to Date	**46**	**31**

*Army personnel only. Total number of fatalities in Army aircraft flight accidents was 37.

through 115° C. During landing, transmission oil temperature rose to 130° C. and engine oil temperature rose to 150°C. Oil cooler turbine fan was binding internally, reducing cooling to engine and transmission oil.

S series - Crew smelled hot oil, and engine oil temperature rose rapidly. Caused by failure of oil cooler fan.

AH-64 Class E mishap

A series - Utility hydraulic oil light came on. Caused by cracked hydraulic pump housing.

Cargo helicopters

CH-47 Class C mishap

B series - Ramp lever was actuated during flight to allow tongue to be extended. For no apparent reason, ramp tongue jettisoned.

CH-47 Class E mishap

D series - Aircraft developed severe vibration during rapid refueling operation. Material in resilient mount on No. 1 hanger bearing had deteriorated. Mount would not dampen drive shaft vibrations.

Observation helicopters

OH-6 Class B mishap

A series - Aircraft was flying low level when it hit a wire and came to rest in a river bed. 8557

OH-6 Class E mishaps

A series - Fifteen percent N1 could not be reached on battery start. Fuel and water ran out exhaust stacks. Heavy rains and strong winds had been experienced. Suspect water was blown in engine. Fuel samples before and after were good.

A series - Fire extinguisher fell out of rack, hit the floor, and fell out of aircraft during flight.

OH-58 Class E mishaps

C series - Pilot heard loud bang from rear of aircraft during runup. Pilot's checklist had been left between tail boom and drive shaft and had blown into tail rotor.

A series - Aircraft lost power during hover. Suspect power loss was caused by air leak from PY line. Twenty gallons of AVGAS had been used in engine 14 hours before. This could have caused power loss.

C series - Pilot had to make evasive maneuver to avoid collision with an AH-1. Pilot suspected he had overtorqued aircraft, but inspection revealed no damage. Both aircraft were operating at low altitude with no radio contact with each other. Neither pilot knew the other was operating in the training area.

A series - Pilot failed to notice N1 drop from 15 to 12 percent in time to prevent hot start. Caused by weak battery.

A series - Loud popping sound was heard during climbout. Vibrations were felt through airframe and controls. After aircraft landed, crew chief found he had left 2 inches of lapbelt hanging outside aircraft. Pilot, however, said the vibration and noise were greater than could have been generated by the lapbelt. Preliminary findings point to compressor stall.

Fixed wing

C-7 Class E mishap

A series - Left engine backfired during flight. Caused by failure of left magneto assembly.

C-12 Class D mishaps

C series - Crew received unsafe landing gear indication after placing gear handle to down position. Gear was recycled twice, and crew received safe indication. Caused by failure of left main gear actuator.

D series - Aircraft yawed left during descent for landing. Pilot looked out and saw small hole in left wing 5½ feet outboard from left engine nacelle. He also saw that left door was gone.

C-12 Class E mishaps

C series - Pilot smelled electrical odor, which appeared to be coming from pilot and copilot vent. Caused by failure of vent blower motor.

C series - At about 50 feet agl during takeoff, IP saw left engine tgt increasing to 750° C. and torque decreasing to 80 percent. Turbine tachometer was indicating 101 percent. Right engine was indicating 670° C. tgt, 100 percent torque, and 96 percent turbine tachometer. Crew continued the takeoff because there was a positive rate of climb and aircraft was continuing to accelerate. Aircraft was then landed. Caused by ruptured left engine high pressure compressor bleed valve diaphragm.

U-21 Class E mishaps

A series - Landing gear would not retract during takeoff climb. Caused by broken wire to right main landing gear safety switch.

A series - Rumbling noise was heard as gear was being retracted after takeoff. When pilot tried to lower gear for landing, he did not receive safe gear-down indication. Emergency gear extension procedure was used and aircraft landed. Worn main landing gear motor spline would not allow gear to extend.

Mishap briefs

Maintenance

UH-1 Class D mishap

H series - Master caution and hydraulic lights came on. Pilot felt feedback in controls. Running landing was made. Hydraulic fluid was lost when hydraulic line chafed against control tube.

UH-1 Class E mishap

H series - Transmission oil pressure went to zero. Master caution and transmission oil pressure lights came on. Loss of oil was caused by chafed transmission oil line.

UH-60 Class E mishap

A series - No. 2 engine oil pressure light came on. Oil cap was not secured, causing loss of oil.

AH-1 Class E mishap

S series - As aircraft was hovered from parking pad, pilot noticed large amount of hydraulic fluid on pad. Armament personnel had failed to properly torque pressure line to No. 2 hydraulic system. Technical inspector did not notice that line was not torqued correctly.

OH-58 Class E mishaps

A series - D.C. amp gauge, fuel quantity gauge, and oil temperature gauge dropped to zero during hover. All the radios went out. Caused by loose wire on starter generator.

A series - Master caution and fuel filter lights came on. Inspection revealed that main fuel filter was contaminated by a foreign material. Suspect material was left in fuel cell during recent depot overhaul.

Safety messages

• Safety-of-flight technical message concerning initial and recurring inspections of H-6 series helicopter tail rotor blade tip caps (OH-6A-85-01, 181900Z Sep 85). Summary: A permanent fix of riveting the metal tail rotor blade tip cap in place has been designed and is presently undergoing testing. Instructions for riveting the tip cap will be contained in a future technical bulletin. This message establishes interim tail rotor tip cap inspection procedures to assure tip cap integrity. Contact: Howard Johnson, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning inspection of UV-18 wing fuselage attachment fittings (UV-18-85-01, 181845Z Sep 85). Summary: The FAA has issued an Airworthiness Directive (AD) requiring an inspection of wing attachment fittings on DeHavilland DHC-6 series airplanes, of which the UV-18 is a derivative. The AD was issued because cracks were found on the inner faces of forward wing fuselage attachment fittings. This message requires one-time and recurring inspections of the fittings and revises the maximum gross weight limitation of the aircraft. Contact: Howard Johnson, AUTOVON 693-3300, commercial 314-263-3300.

• UH-60 maintenance information message concerning inspection of oil cooler access door, APU access door, and center beam for loose or missing fasteners (MIM-UH-60A-85-03, 181915Z Sep 85).

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

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Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

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Utility helicopters

UH-1 Class D mishaps

H series - Main rotor blade hit unknown object during flight. Four-inch hole was found in blade tip cap.

H series - Preflight inspection revealed large crack in collective lever, behind front pivot bolt.

UH-1 Class E mishaps

H series - Aircraft was making NVG landing. At about 50 feet agl, it began slowly turning to the right. When a retaining nut failed, tail rotor went to flat pitch, causing loss of tail rotor control.

H series - On takeoff, pilot felt moderate airframe vibrations. Inspection revealed tail rotor crosshead bearing had failed, wearing inboard bearing race and leaving no bevel. Inboard bearing stop showed signs of overheating.

M series - While aircraft was repositioning at landing pad, transmission oil pressure began dropping, and oil was seen coming from underside. Quick disconnect coupling half failed, causing oil filter gasket to rupture.

UH-60 Class D mishap

A series - As aircraft was landing on dirt road, main rotor blade flexed down, striking a small tree.

UH-60 Class E mishap

A series - Low rotor horn sounded four times in 5 minutes. Rotor lights showed decrease to 93 percent with no other indications of bleed-off. Suspect failure of rotor speed magnetic pickup.

Attack helicopters

AH-1 Class D mishaps

S series - While performing evasive maneuver, pilot made climbing right turn and applied left cyclic. Torque increased to 62 psi. High density altitude and mountainous terrain required high power settings and pilot failed to monitor torque. Trunion bolts on main rotor had to be replaced.

S series - Damage to erosion guards on main rotor blades was found during postflight. Crew decided that either FOD from broken branches or aircraft flying through overhanging branches was the cause. Winds in excess of 50 knots the day before had littered the holding area with tree branches.

AH-64 Class E mishaps

A series - As power levers were brought forward during runup, tail wheel locking pin sheared, causing a 15- to 30-degree yaw.

A series - During runup, No. 2 nose gearbox oil psi caution light came on. It stayed on with engine operating at flight rpm. Oil pressure switch was replaced.

A series - When aircraft was run up for engineering flight test, No. 1 engine started normally. No. 2 engine flamed out after reaching ground idle. Engine fuel valve failed to activate when switch was in the normal fuel select mode. Diode in fuel control panel malfunctioned. During shutdown, oil was observed leaking excessively from No. 1 engine tailpipe. During rotor lock start, oil will

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	1-26 Feb	**3**	**2**
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**15**	**8**

Mishap briefs

pump past labyrinth seals and if seals are weak, more than normal amounts will pump out.

Cargo helicopters

CH-47 Class E mishaps

A series - Chip detector caution light on No. 2 engine came on. Oil samples showed metal. Engine was replaced.

B series - Hydraulic flight boost went to 3800 psi and then returned to normal operating range. Smoke was smelled and seen in aft section. Hydraulic boost pump failed and shaft was sheared.

B series - Crew chief saw oil leaking from vicinity of combining transmission. Hairline vertical crack had developed in oil cooler return line.

C series - Utility system cycled on and off abruptly, causing vibration and loud noises from utility fan area. Failure of thermal switch caused utility hydraulic pump to overheat.

C series - Chip detector light came on during approach. Caused by internal failure of No. 2 engine.

D series - Aircraft was at cruise flight. No. 1 engine torque and N1 decreased in excess of 10 percent with corresponding change in engine noise. Rpm was recovered, aircraft landed, and N2 actuator was replaced.

Observation helicopters

OH-58 Class E mishaps

A series - During simulated engine failure from hover, aircraft touched down toes first. Pilot was late lowering collective. IP lowered collective and aircraft rocked aft, resulting in spike knock.

A series - Transmission hot oil light came on. Caused by moisture in cannon plug.

Fixed wing

C-7 Class E mishap

A series - Flight mechanic saw that left main landing gear shock strut had compressed to approximately 3 inches. Caused by defective schrader valve.

C-12 Class E mishap

D series - Pilot noticed fuel leaking from No. 2 engine at forward nacelle vent. Caused by deformed Teflon backing of end fitting to flow divider.

OV-1 Class E mishap

D series - Parking brake would not engage. Flared fitting on hydraulic line cracked.

Maintenance

UH-1 Class E mishaps

H series - Main inverter failed. A 3-inch piece of safety wire was found on relay. Wire had caused short in electrical system.

H series - Master caution and transmission segment lights came on. Gasket was not seated properly; 1/16 inch of gasket was holding pressure.

H series - Fuel cap retainer wire broke off and fell into fuel cell. To remove FOD, hydraulic ground test connector had to be removed so that engine deck plate could be moved, giving access to the fuel cell. Maintenance personnel failed to reconnect a hydraulic line to the test connector and work was not properly inspected. Disconnected line was not detected by flight crew during preflight. When engine was started and run up, hydraulics did not function.

AH-1 Class E mishap

S series - During approach to landing, copilot discovered pedals were ineffective. After go-around, pilot made run-on landing. Bolt had fallen out of tail rotor push-pull control rod at bellcrank. Nut had not been reinstalled on bolt after maintenance.

C-7 Class E mishap

A series - Line mechanic noticed hydraulic fluid coming from nose wheel well. Steering actuator vent plug was loose.

OV-1 Class E mishap

D series - One hour into training flight, No. 1 engine oil pressure dropped to 20 psi. Temperature remained normal. MOC for Western Gearbox had been overlooked. Before landing, No. 2 engine had compressor stalls above 85 percent N1. Caused by VIGV maladjustment and dirty compressors.

Safety messages

• Safety-of-flight technical message concerning one-time and daily inspection to provide ungrounding of all AH-64A aircraft (AH-64-86-04, 151600Z Feb 86). Summary: AH-64A aircraft were grounded pending investigation and corrective action on reports of cracks in main rotor blades. Purpose of this message is to provide inspection procedures to determine serviceability of main rotor blades and to provide ungrounding of AH-64A aircraft. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message (OV-1-86-02, 082100Z Feb 86) amends AVSCOM message dated 080200Z Feb 86 concerning restricted flight maneuvers for OV-1 aircraft to include control number OV-1-86-01.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

U.S. ARMY SAFETY CENTER

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Terence M. Henry
Colonel, Aviation
Commander, Army Safety Center

Stacom

Standardization Communication

Big sky . . . little aircraft

Don't have to worry about midairs? . . . wrong!

• The pilot of the first aircraft did not see the second aircraft and continued taxi until the main rotor blades intermeshed.

• Aircraft was in level flight when the pilot noticed the shadow of another aircraft on the ground. When he saw the other aircraft, he tried to change his flight path, but it was too late to avoid a fatal midair.

• Aircraft converged from left rear on a 30-degree angle. Rotor systems meshed. Both aircraft were totally destroyed.

• Aircraft were in formation flight. When lead aircraft slowed down, the main rotor blades of the trail aircraft struck the lead aircraft. Both aircraft crashed.

These accounts have been taken from reports of actual Army accidents. Not only are the skies getting smaller for military aircraft, they are getting smaller for our civil counterparts.

The National Transportation Safety Board has recommended the FAA publish standardized helicopter route maps, operations and approach/departure procedures for Washington National Airport, and, if feasible, for other major airports in the U.S. The recommendations result from a September 24, 1985, near-miss at National Airport when an Eastern Airlines Boeing 727 shuttle captain rejected a takeoff to avoid a helicopter crossing his projected path.

Following is a review of procedures for traffic at uncontrolled airports:

• Title 14 CFR 91.65(a) states that "no person may operate an aircraft so close to another aircraft as to create a collision hazard."

• Title 14 CFR 91.67 states, in part, that regardless of whether a flight is operated under IFR or VFR, weather conditions permitting, "vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft in compliance with this section." The regulation also states that "when aircraft are approaching each other head-on, or nearly so, each pilot shall alter course to the right."

• Title 14 CFR 91.89, addressing operations at uncontrolled airports, states, in part, that the pilot of an aircraft approaching to land shall make "all turns of that aircraft to the left unless the airport displays approved light signals or visual markings indicating that turns should be made to the right." The regulation further says that the departing pilot shall "comply with any FAA traffic pattern for that airport."

• The *Airman's Information Manual* (AIM) provides additional information designed to facilitate and enhance the safety of operations at uncontrolled airports. The foreword states, in part, that the manual "is designed to provide airmen with basic flight information and ATC procedures for use in the National Airspace System of the United States.... This manual contains the fundamentals required in order to fly in the U.S. National Airspace System. It also contains items of interest to pilots concerning health and medical facts; factors affecting flight safety; a pilot/controller glossary of terms used in the Air Traffic Control System; and information on safety, accident, and hazard reporting." Procedures contained in the AIM, unless supported by a specific provision of the Federal Aviation Regulations, are not regulatory but are recommended. However, FAA written certification exams test pilots' knowledge of material contained in AIM, and pilots are required to demonstrate their knowledge of material in the manual during flight checks.

• Paragraph 157 of the AIM emphasizes the necessity for visual alertness around uncontrolled airports and states. "To achieve the greatest degree of safety, it is essential that all radio-equipped aircraft transmit/receive on a common frequency ►

STACOM

identified for the purpose of carrying out airport advisory practices." This paragraph further recommends that all inbound traffic "should monitor and communicate as appropriate on the designated CTAF (Common Traffic Advisory Frequency) from 10 miles to landing. Departure aircraft should monitor/communicate on the appropriate frequency from start-up, during taxi, and until 10 miles from the airport unless the FARs or local procedures require otherwise."

• For airports with a Unicom facility, paragraph 157 recommends, in part, that pilots "call about 10 miles from the airport and state aircraft identification, type of aircraft, altitude, location relative to the airport, and request wind information and runway in use; report on downwind, base and/or final approach as appropriate, and report clearing the runway."

• Outbound aircraft are advised to inform other traffic of their departure by broadcasting the name of the airport, aircraft type and call sign, and the departure runway.

• Paragraph 244c of the AIM contains recommended communications procedures for conducting practice instrument approaches at uncontrolled airports and states, "At airports without a tower, pilots wishing to make practice instrument approaches should notify the facility having control jurisdiction of the desired approach as indicated on the approach chart. All approach control facilities and ARTCCs are required to publish a facility bulletin depicting those airports where they provide standard separation to both VFR and IFR aircraft conducting practice instrument approaches."

Analyses of midair accidents have shown the most common trend is failure of aviation units to enforce adherence to regulations. In most cases, adequate operational procedures were established in unit SOPs, field manuals, and technical manuals. Adherence to approved procedures would have prevented most of the recent midair collision accidents. Command attention must be directed toward the fundamentals of good airmanship; i.e., see-and-be-seen.

CY 85 STACOM index

STACOM 108, 16 Jan - UH-1 performance planning

STACOM 109, 13 Feb - CY 84 STACOM Index, Cyalume lightsticks, Update on field circular program, Amendments to FC 1-219

STACOM 110, 20 Mar - Mountainous terrain versus designated mountainous areas, Night vision systems versus night vision goggles, FC 1-216 (cargo helicopter), ATM corrections, New ATM office

Mini-STACOM 2, 24 Apr - Night vision goggle training packet

Mini-STACOM 3, 12 Jun - FAA certification

Mini-STACOM 4, 17 Jul - Excusing aviators from ATP requirements

STACOM 111, 18 Sep - Facts about STACOM, Checklists, AR 95-1, New FM 1-104

STACOM 112, 9 Oct - Publications requirements, Coveralls for fuel handlers

STACOM 113, 20 Nov - Clarification to AR 95-1, Origin and concept of STACOM, Change to 55-1520-210-CL

STACOM 114 26 Feb 86

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TURNER E. GRIMSLEY
Colonel, Aviation
Director, DES

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United States
Army Safety Center
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5 March 1986

Flightfax®
Report of Army Aircraft Mishaps

Necessity . . . the mother of invention . . . can also father an accident

The crew of a UH-1 was flying an afternoon parachute drop mission. Jumps scheduled for that morning had been cancelled because of weather. The copilot was grounded by the flight surgeon around noon, but another aviator volunteered to take his place because he needed the flight time.

Sixteen drops were made before the aircraft had to land for refueling. Before it could be refueled, a pad that had been installed on the leading edge of the right cargo door had to be removed. The pad was there to protect parachute static lines during jumps. One of the jumpmasters cut the cords holding the pad with a knife.

After the aircraft had been refueled, the jumpmaster retied the pad. There was no more of the 550 nylon cord around that had been used originally to secure the pad, so he used pieces of the cut cord. But because the pieces were short, he retied the pad with a single strand whereas it had been tied to the aircraft with a triple strand of cord.

The aircraft took off and continued to drop troops. After the third jump, the copilot, who was now flying the aircraft, was making a normal approach to the pickup area. The UH-1 was at approximately 500 feet, flying at about 60 knots, when the pad protecting the edge of the cargo door on the right side broke free from its tiedowns. It flew off the aircraft, under the tailboom, and into the tail rotor. The tail rotor and about three-fourths of the 90-degree gearbox separated from the aircraft. The copilot, who heard a loud "bang" followed by silence, thought the engine had failed.

The helicopter's nose dropped slightly, and it began a slow right turn.

UH-1 had dropped troops and was approaching pickup area when pad on cargo door broke loose and hit the tail rotor. Aircraft struck the ground, tearing out main transmission and destroying main rotor blades.

The copilot was unable to stop the right turn with the cyclic against the left stop. He told the pilot he couldn't control the aircraft. The pilot-in-command (PIC) took over. At about 30 feet, he placed the aircraft in a 40- to 50-degree nose-high attitude. The copilot got back on the controls to help him. The aircraft spun to the right two or three times, leveled, stopped spinning, and struck the ground in a slight right turn. The throttle was not reduced.

When the Huey hit the ground, it was in a right skid-low attitude. It rolled right and the main rotor hit the ground, tearing out the main transmission and destroying the main rotor blades. The aircraft came to rest on its right side. A small postcrash fire in the engine exhaust pipe and internal N2 power turbine was extinguished by firefighters. The PIC had been knocked unconscious and was removed by the crew chief and jumpmaster.

Pads had become institutionalized

In the jump unit, pads like the one in this accident had been in use for about 5 years. They had been designed by the officer-in-charge of the rigger section and were made locally for use on the UH-1 during parachute missions. The pads were about 3 feet by 5 feet and weighed around 16 pounds. Because they had been in use so long, procedures for using them had become institutionalized. However, no action had been taken to obtain official certification of the pads, and the devices used to attach them, as an approved modification to the aircraft. Nor had action been taken to have their use approved as an accepted procedure during airborne operations.

There were no written procedures for installation and inspection

Before the jumpmaster cut the pad loose, it had been tied at each grommet with triple strands of nylon shroud line.

Necessity . . .

Single strands of parachute cord used to retie pad to cargo door were inadequate. Pad broke loose and flew into tail rotor.

When he cut these lines, he didn't make sure he had enough cord to securely retie the pad. The strength of the single strands he used to retie the pad was inadequate. The crew chief who inspected the reinstallation of the pad failed to realize the single lashing was inadequate, and informed the pilot that the pad was secure. The pad broke loose and struck the tail rotor.

Riggers consistently used triple strands of nylon line to secure the pads to the aircraft, but there was no written procedure saying that triple lines must be used. If there had been a written inspection checklist requiring triple lashings, the crew chief who checked the pad probably would have noticed that it wasn't properly secured.

They thought it was an authorized procedure

The pads had been used for several years. After being handed down through successive commanders, the procedures had become accepted by everyone in the unit, including aviation personnel.

Part of the problem resulted from the manuals used by unit and aviation personnel. Accident investigators found discrepancies between some of the manuals riggers and aircrewmembers were using. TC 57-1: The Jumpmaster states that the door and/or frame of the UH-1D/H *can* be padded and taped to protect static lines from sharp edges, but there is no picture showing a door or frame that has been padded or taped. FM 57-220: Basic Parachuting Techniques and Training is identical to the training circular in both words and illustrations used. FM 1-400: The Aviators Reference Manual gives no option. Paragraph 2-35 on preparation of the UH-1 states, "*Pad and tape* the lower aft edges of both compartment door frames." (Italic added)

All references say that cellulose wadding and masking tape should be used. However, masking tape will not adhere well to a cold airframe, and the use of pads appeared to be a better method of complying with the intent of the references.

The investigation board concluded that long-term use of the pads, and the fact that FM 1-400 implies that padding is mandatory, would cause riggers and aircrew to assume that use of the pads was an authorized procedure. After the accident, use of the pads was discontinued.

They were trying to meet requirements

Unit personnel were trying to meet the requirements as they understood the manuals. The first mistake had been made 5 years back, when use of the pads began without approval as a modification to the aircraft or as an authorized procedure during airborne operations. Continued use without authorization compounded the mistake. As personnel rotated in and out of the unit, use of the pads became institutionalized and accepted as common practice. A further error was the lack of a written SOP for installing the pads and inspecting them after installation.

The aircrew might have avoided the accident

The flight crew did not know that the pad had torn loose from the aircraft. When they heard the noise, and felt the jolt, they thought they had an engine failure because the aircraft didn't show a sudden yaw or forward shift in the center of gravity. The crew did not start a power-off autorotation as directed in the emergency procedures in the Operator's Manual, TM 55-1520-210-10, paragraph 9-26. Therefore, the aircraft began its rapid spin to the right, hit the ground, and rolled onto its side.

The board concluded that the PIC lacked confidence in autorotative maneuvers and was reluctant to use them. He had been copilot of another UH-1H that lost tail rotor authority during a mission. The aircraft crashed and burned when an attempt at autorotation was unsuccessful. Another factor may have been that the UH-1 was not the primary aircraft for either the PIC or the copilot. The C-12 was their primary aircraft.

Lessons learned

Ingenuity in solving problems can be an asset in any military unit, but things still have to be done "by the book." If the book isn't clear on exactly how things must be done, innovations to meet the requirements will have to be subjected to scrutiny and approved, before they become standard practice. Action should also be taken to get the "book" changed.

We recommend you take a close look at how things are done in your unit. Ask yourself, "Is this the way it really should be done?" and then ask, "What if . . . ?"■

—Richard H. Lovely, Jr.
Air Safety Specialist
U.S. Army Safety Center

The problems associated with transition from fixed wing to rotary wing aircraft and vice versa, and lack of confidence in procedures that may have involved an aviator in previous accidents, will be addressed in future articles in *Flightfax*.

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - Whiteout was encountered during hover. When PIC tried to climb and accelerate, torque exceeded 61 psi.

UH-1 Class D mishap

H series - Main rotor blade hit unknown object during terrain flight, causing 5-inch hole in blade tip cap.

UH-1 Class E mishaps

H series - Crew planned to overfly known wire hazard by using long axis of LZ. When additional wires were spotted on takeoff, pilot applied aft cyclic and increased collective. Aircraft cleared wires, but torque reached 60 psi.

H series - Rivets on back of silent chain enclosure failed, allowing cover to come loose at bottom. "L" bracket at top of cover held, although one rivet pulled out.

H series - Fuel check valve failed, causing leak at main fuel filter inlet breakaway fitting.

H series - Excessive play in N2 tachometer generator shaft caused rpm limit light to flicker repeatedly during flight.

V series - Master caution light came on during flight. Caused by electrical short when water filled rubber boot covering engine chip detector.

V series - During internal hoist training, medic saw smoke coming from hoist control panel assembly. Caused by electrical failure in high performance hoist.

UH-60 Class D mishaps

A series - As aircraft hovered to connect slingload, soldier was blown off top of slingload by rotorwash.

A series - During faster-than-normal landing, PIC misjudged tail wheel clearance. Wheel caught behind frozen mound of dirt, breaking tire split ring. PIC reduced collective to full-down and hard landing caused main and tail wheel struts to fully depress. Tail wheel strut stayed depressed.

A series - Pilot's greenhouse was broken when struck by duck during low-level flight.

UH-60 Class E mishap

A series - Chip main module and sump caution light came on during flight. Caused by internal failure of main transmission.

Attack helicopters

AH-1 Class D mishap

S series - Pilot made right descending turn of 40-degree bank, 10-degree dive, and 100 knots. Torque rose to 60 psi when pilot applied left cyclic without reducing collective during rollout.

AH-1 Class E mishaps

S series - TOW wire wrapped around forward edge of main rotor blade, digging into blade erosion guard.

S series - While aircraft hovered, rotorwash pulled tree branches into tip of one main rotor blade. Tip cap was loosened and dented.

S series - Aircraft was at cruise flight when crew saw smoke coming from

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	1-5 Mar	**1**	**0**
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**16**	**8**

Mishap briefs

gunner's weapons control panel. TCA shorted, causing wire bundle to overheat and burn insulation on wire harness.

AH-64 Class A mishap

A series - Aircraft was on maintenance recovery mission when it lost power at 700 feet and crashed into trees. 8619

Cargo helicopters

CH-47 Class E mishaps

D series - Latch indicator tripped on engine transmission during runup and again shortly after takeoff. Caused by transmission failure.

D series - Aft longitudinal cyclic trim (LCT) system wouldn't program into ground position or respond in manual mode. LCT actuator failed.

CH-54 Class E mishap

A series - While aircraft hovered with slingload, engine fire light came on. Caused by failure of sensor.

Observation helicopters

OH-58 Class D mishap

A series - Rotorwash from another aircraft hovering into parking space caused copilot's door to blow open. Door was shut, but not latched.

Training helicopters

TH-55 Class C mishap

A series - Student pilot was on first supervised solo flight. Antioverspeed device activated as power was added for takeoff. Aircraft yawed. Student stabilized aircraft and decided to land. Heel of left skid hit runway, aircraft rocked back, and tail rotor hit runway. Tail rotor drive shaft, gearbox, blade assembly, and anticollision light were damaged.

Fixed wing

C-12 Class E mishap

C series - SIP shut engine down with condition lever at 12,000 feet agl. Engine wouldn't restart because fuel flow divider wouldn't work.

U-21 Class E mishaps

G series - Left main gear light flickered after retraction. Later, gear extended normally, then gear handle lights came on. False indication was caused by failure of left main sensing switch.

G series - Flaps failed to move to "up" position after missed approach. Caused by burned-out flap motor. Suspect ice from moisture buildup caused housing to burst, jamming switch.

Maintenance

AH-1 Class E mishap

S series - Crew felt binding in cyclic control. Crew chief found wire bundle touching gunner's cyclic control rod.

OH-58 Class E mishap

A series - Wire lead came loose, causing transmission oil pressure light to come on.

C-12 Class E mishap

C series - Flap control circuit breaker popped out. Caused by eroded and tarnished left and right split flap protection fuses.

U-21 Class E mishaps

A series - During takeoff, a bright flash was seen under copilot's subpanel and sparks fell to floor. Turn and slip circuit breaker had popped. Aircraft had been returned earlier same day for same problem. Problem was misdiagnosed, and aircraft was returned as mission capable after disconnected cannon plug was found. The electrical fire was caused by locally fabricated bus bar which was too long for bracket. Extra brass extending over bracket touched airframe and grounded the deice circuit breaker.

A series - Engine overspeed governor test switches wouldn't activate. Screw on engine power levers, leading to governor override microswitch, had worked loose.

Safety messages

- Safety-of-use operational message concerning laser boresight safety on the AH-64A Apache aircraft (312315Z Jan 86).
- AVSCOM message concerning inspection of T-63-A-700 turbine engine compressors on all OH-58A and OH-6A helicopters (302130Z Jan 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/4202

Foreign object damage

FOD—This acronym, and what it stands for, has been the subject of countless articles, stories, reports, and catchy phrases. All of us in the business of flying aircraft are taught that the major cause of FOD is human error. If "an ounce of prevention is worth a pound of cure" then a similar dose of carelessness seems to add up to many pounds of damaged turbine wheels, compressors, and tons of aircraft wreckage. FOD **can** be prevented with **F.O.D.**—Familiarization, Observation, and Discipline.

Familiarization—This is perhaps the most basic and fundamental principle of our jobs. We must be familiar with our jobs if we're in charge, and we must also know that our people are familiar with theirs. But are we familiar enough? Are we familiar with our bad habits such as putting tools, nuts, bolts, etc., in our pockets? Are we **too** familiar with those handy little ledges, formers, and flight control actuators that make excellent holding trays for our tools while we're changing that hard-to-get-to valve? Are we so familiar that we take the job for granted? Did we tighten down that bolt? Could we have forgotten to put on that clamp? Did we pull the rigging pin out after we finished the job?

Familiarization implies not only knowledge of how to do a job, but knowledge of ourselves, our strengths, and our weaknesses. It also means being familiar with our environment, the potential hazards of a situation, and those working with or around us.

Observation—People can look at something but not really see it. I propose to define observation as something beyond merely noticing.

It's being able to **comprehend** and draw **conclusions** from what we see. It means paying constant and continuous attention to the world around us. On the flight line the wind, noise, weather, our personal thoughts, and our current working situations can affect our "sense" of observation. This goes hand-in-hand with familiarization. Keep your eyes open for that communication cord or for that person standing next to the intake or for that object laying on the ramp. Observation can eliminate all of those "foreign objects" that cause damage.

Discipline—This is probably the most important measure in the prevention effort. But, unfortunately, it's also the most difficult to practice. How do you rate FOD discipline at your base, in your shop, and on your flight line? Walk around and check the discipline. Is the checklist or T.O. in use? Was the tool kit inventoried before break and after completing the job? Are you and your troops walking around with tools in your pockets? Where do you keep your "scrounge bag"? Or do you pencil whip the red X?

FOD discipline is much like any other form of discipline—it doesn't come automatically and it isn't genetic or inherent. **It must be learned!** Initially, a certain amount of "imposed" discipline may be necessary. This can only happen by observing and correcting bad practices. The old cliche "leadership by example" is still one of the best forms of prevention. However, by the already described processes of familiarization and observation, we can all contribute to the amount of discipline that's instilled in ourselves and our workers. FOD discipline is developed in successive stages.

Team discipline involves everyone. "FOD walks" often become just another detail, but it's an excellent example of working as a team. Pilots, mechanics, expeditors, and civil engineers must get involved. Team discipline also means looking out for each other. If you notice an incident that could cause or contribute to FOD, correct it on the spot!

FOD is a people problem more than a mechanical one. The reports keep coming in. The FOD rate soars and the costs keep adding up. Foreign object damage can be stopped with Familiarization, Observation, and Discipline. Stop FOD with **F.O.D.** ■

—From Air Scoop
SMSgt Leo Carillo, Propulsion Manager
USAFE Logistics

Ten receive Broken Wing Award

Ten aviation crewmembers received the Broken Wing Award from November 1985 through January 1986.

CW3 Charles R. Shaffer
E Company, Task Force 160
1st Special Operations Command
Fort Campbell

CPT Robert A. Doyle
Company A, 3d MI Battalion
(Aerial Exploitation)
501st Military Intelligence Group
APO San Francisco 96271-0153

CW2 George T. Anderson, Jr.
B Company, 503d Aviation
Battalion (Cbt)
APO New York 09165-1539

CW3 Michael D. Spradling
9th Aviation Training Battalion
Aviation Training Brigade
U.S. Army Aviation Center
Fort Rucker

CW2 Mark C. Rogers
9th Aviation Training Battalion
Aviation Training Brigade
U.S. Army Aviation Center
Fort Rucker

CW3 James M. Roser
224th MI Battalion (Aerial
Exploitation)
Hunter AAF

CW2 Kenneth Haney
11th Regimental Combat Aviation
Squadron
11th Armored Cavalry Regiment
APO New York 09146

James L. Couch, DAC
U.S. Army Transportation Center
Fort Eustis

CW3 Richard J. Karle
3d Squadron, 7th Cavalry
3d Infantry Division
APO New York 09033

CW4 James A. Bannenberg
136th Transportation Company
(Hel Mdm)
Grand Prairie, Texas

Flight line fire extinguisher requirements

AR 420-90: Fire Protection is being revised. HQDA is revising par. 7-11 to clarify requirements for the 150-pound Halon wheeled fire extinguishers on flight lines. All inquiries regarding fire extinguisher distribution should be directed to HQDA (DALN-ZCF-B), Washington, DC 20314-1000. POC is Mr. Bruce Park, AUTOVON 285-0866, commercial 202-272-0866. ■

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Colonel, Aviation
Commander, Army Safety Center

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12 March 1986

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Report of Army Aircraft Mishaps

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps

H series - Aircraft was trail in flight of five. Flight landed short in LZ. Approach was steep and aircraft experienced high sink rate. Pilot applied 45 pounds of torque to slow descent. Ground effect was encountered at about 2 feet and torque surged to 60 pounds.

V series - Grooves in underside of rotor blade were found during postflight inspection. Blade apparently contacted a tree or loose debris when aircraft landed at emergency LZ on a freeway lighted by highway flares.

UH-1 Class D mishap

H series - Main rotor blade struck tree branch during contour flight.

UH-1 Class E mishaps

H series - Master caution and engine oil pressure lights came on during cruise flight. Caused by failure of pressure transmitter.

H series - When starter trigger was released, N1 didn't increase and egt began rising rapidly. Two bolts on No. 2 gas producer nozzle had broken off. Safety wires held bolt heads, but shanks were ingested, damaging engine.

H series - Master caution and hydraulic segment lights came on during flight. Caused by failure of hydraulic pressure switch.

H series - Rotor tachometer generator failed in flight. Caused by failure of tachometer generator shaft.

H series - During downwind takeoff, pilot applied collective to increase lift and gain airspeed. Improper technique caused overtorque to 53 psi.

UH-60 Class D mishaps

A series - During flight, safety retaining spring loop came off cargo hook manual release lever, allowing cargo hook to release slingload.

A series - Aircraft hovered while FLIR system was being demonstrated. SIP decided to land because of blowing snow. FLIR turret was damaged when it hit snow-covered ground.

A series - When APU failed during runup, crew chief reported fire and pilot pulled APU "T" handle. Fire was coming from exhaust; fire extinguisher wasn't used.

UH-60 Class E mishaps

A series - Aircraft was about 200 feet agl when ¾-inch rope on front of slingload broke. When other three legs of sling also broke, the load fell, leaving sling attached to cargo hook. Suspect break was caused by instability of load and chafing of rope on fiberglass silhouette cover on the vehicle being transported.

A series - Aircraft passed deice check during runup. During takeoff, aircraft hovered over sod used to resurface runway. Sod was covered by snow and ice. As aircraft passed through 2,500 feet, nose yawed left and No. 1 engine-out audio and light came on. Engine was shut down. Postflight inspection showed large piece of ice on No. 1 engine inlet and FOD to the engine.

A series - Medic reached around medevac carousel to get equipment. Harness caught on cargo door emergency release handle, causing both windows to jettison.

Attack helicopters

AH-1 Class E mishap

S series - Aircraft was flying NOE during NVG training mission with IP at controls. As IP decelerated through effective translational lift, coming to NOE hover, compressor stall occurred. IP reduced throttle and made emergency landing. Emergency governor switch had caught on pocket of rated student pilot's flight suit. When student moved, the governor switch lifted over gate and into emergency position.

Cargo helicopters

CH-47 Class C mishap

C series - IP wasn't satisfied with rated student pilot's maximum performance takeoff. As he demonstrated maximum takeoff for student, IP realized it was only 10 minutes to down time. IP abbreviated the traffic pattern by making a circling approach, to allow student time to make one more takeoff. As IP terminated the approach, he misjudged height of aft right landing gear, allowing it to hit the ground while aircraft was sliding to left. Landing gear collapsed, damaging gear assembly.

CH-47 Class D mishap

B series - On postflight inspection, hinge pin on stubb ring was found sticking into No. 2 engine inlet. Vibration had caused hinge pin crimp to wear through, allowing wire to slide out.

CH-47 Class E mishap

B series - In-flight high-frequency vibration was caused by failure of 8 sync shaft bearing.

Mishap briefs

Observation helicopters

OH-58 Class A mishap

A series - During terrain flight, aircraft hit tree and crashed. 8620

OH-58 Class C mishap

C series - Engine didn't start on first attempt. After 60 seconds, a second attempt was made. TOT rose to 1,000° C. for 4 seconds.

OH-58 Class D mishaps

A series - Crew was engaged in NVG, NOE training. After landing in a confined area, crew performed OGE hover check. As they descended, student pilot allowed aircraft to drift backwards. IP took controls. IP heard sound like tail rotor hitting vegetation. During preflight next day, damage to underside of both main rotor blades was found.

A series - As he got out of aircraft, copilot let kneeboard slide off console and hit left chin bubble. Hole was found in chin bubble.

C series - Aircraft was about 200 feet agl when it entered IMC because of heavy rain. Downdraft caused aircraft to lose altitude and descend into trees at 50 feet agl. After loud thud was heard, pilot applied power and climbed above trees. Tree strike caused bent pitot tube, broken UHF antenna, and small dent in main rotor tip cap. Lower wire strike protection system was pushed into fuselage a fraction of an inch.

OH-58 Class E mishaps

C series - During start sequence, pilot recognized possibility of engine overtemp. IP directed pilot to abort start by closing throttle and continuing to motor starter. Pilot closed throttle with such force, idle detent plunger couldn't be depressed and engine temperature rose to 940° C.

C series - Rated student pilot was performing low-level autorotation. Student allowed aircraft to touch down, right skid first. Rocking motion of transmission resulted in spike knock.

C series - Transmission chip detector light came on during flight. Normal fuzz was found on magnetic plug. Because of frequent chip detector lights, transmission was changed. When maintenance personnel removed mast, they found main rotor mast bearing had spalled.

Training helicopters

TH-55 Class C mishap

A series - Maintenance crew was troubleshooting aircraft for high-frequency vibrations. Flight mechanic attached Vibrex equipment to tailboom and gave pilot clear-to-start signal. As main rotor blade engaged, gusty winds caused one blade to flex down and strike the mechanic, knocking him into the aircraft's tail rotor.

Fixed wing

C-7 Class E mishap

A series - After aircraft leveled off, right engine low fuel pressure warning light came on. Switch and fuel management panel were replaced.

C-12 Class E mishap

D series - No. 1 engine TGT decreased to 40° C. as aircraft climbed to 9,000 feet agl. Caused by rise in T-5 buss bar internal resistance.

Maintenance

UH-1 Class E mishaps

H series - Sparks came from vicinity of pilot's side map light. Caused when wire cover chafed against bulkhead.

H series - Master caution and segment panel lights flickered and transmission oil pressure fluctuated between 20 and 40 psi. Transmission line was improperly clamped, causing line to chafe against airframe.

M series - Packing on pressure line fitting deteriorated, causing failure of No. 1 hydraulic system.

V series - Crew noticed flight controls were stiff, then master caution and hydraulic pressure caution segment lights came on. Hydraulic line fitting had vibrated loose, causing fluid to be lost.

AH-1 Class E mishap

S series - During maintenance test flight, master caution and transmission oil bypass lights came on. Transmission oil temperature began rising and transmission oil hot light came on. Pins on quick disconnect coupling

(continued on back page)

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	1-12 Mar	**2**	**3**
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**17**	**11**

Stacom

Standardization Communication

Securing aircraft during adverse weather

Directorate of Evaluation and Standardization (DES) recently received a recommended change to the AH-1S operator's manual because an AH-1S aircraft sustained damage to a main rotor blade when the aircraft was subjected to high winds associated with a tropical storm.

The high winds caused the helicopter's Kaman rotor blades to feather. When feathering occurred, the trailing edge of one main rotor blade struck the IR jammer mounted on the engine cowling, and the blade was damaged. The unit reported that investigation showed if the pilot's collective tie-down strap had been secured after flight the blade wouldn't have feathered and damage would have been avoided.

The operator's manual for the AH-1S, TM 55-1520-236-10, **does not** require that the strap be secured during post-flight procedures. However, securing aircraft during adverse weather conditions is a maintenance function. The procedures for preventing mishaps of this type are outlined in TM 55-1520-236-23 in the unit on parking/mooring procedures. ■

Maneuvering limits of aircraft

DES has received numerous queries recently about maneuvering limits of OH-58, AH-1, UH-1, and UH-60 aircraft. In answer to a previous DES inquiry on this subject, the U.S. Army Aviation Systems Command (AVSCOM) provided the following information:

"Helicopters shall be limited to roll attitudes not greater than 60 degrees and pitch attitudes from 30 degrees nose-down to 30 degrees nose-up. It is agreed that maneuvering limits as currently presented in the operations manuals for rotary wing aircraft are of limited usefulness. The problem is that of defining to a pilot exactly what he can and cannot do with a given aircraft in terms that are meaningful. Additional complexity results from the simple fact that the pilot's training and proficiency are very significant factors (i.e., there can be a world of difference between what two different pilots can safely do with a given aircraft).

"It seems to us that a gathering of the appropriate expertise is required to meet and define a program to resolve the maneuvering limits issue. It is not sufficient to singularly identify certain engineering parameters as limits, and neither is it possible to identify all of the many critical combinations of those engineering parameters. Even if it were, how would you present this information to the pilot (e.g., it is one thing to have a 0.25 'g' load factor at 120 knots while at the same time commanding a rapid roll rate).

"An approach to this problem certainly includes some definition beforehand of those maneuvers one considers appropriate and having defined these, initiate an instrumented flight test program to verify the capabilities (e.g., an Immelmann, split 'S,' hammerhead turn, etc.). The reciprocal problem is that of defining new maneuvers peculiar to rotary wing aircraft as a result of flight test. As a start, the former approach would allow us to include in the operator's manual a list and description of flight test demonstrated maneuvers.

"Pending a flight test evaluation program, it is appropriate that all current operators' manuals for rotary wing aircraft include the limitation that 'aerobatic flight is prohibited.' Additionally, lacking any better definition at this time, it should state that 'aerobatic flight is defined to be any intentional maneuver involving an abrupt change in the aircraft's attitude, and abnormal attitude (pitch or roll angles greater than ± 30 or ± 60 degrees respectively), or abnormal acceleration, not necessary for normal flight.' Our preference for the terminology 'aerobatic' versus 'acrobatic' reflects the consensus of those actively involved in the type of flight maneuvering in question.

"Real limits for the helicopters referenced are being developed.

- Testing being conducted by the Applied Technology Laboratories (ATL) should yield valuable engineering data which may be applied to determining limits.
- Bell Helicopter is in the process of developing data, in conjunction with the UH-1 and AH-1 main rotor hub restraint program, which will more clearly define reasonable limits for these aircraft.
- An air-to-air training program being tested should be helpful in establishing the nature of the air combat mission. This, in turn, should be helpful in placing a boundary for the mission and what is the nature of the data on flight instruments which would be useful for the pilot.

"When the results of the above activities are available, AVSCOM, in conjunction with the Aviation Center, will be available to participate in the necessary manuals' changes." ■

STACOM 115 12 Mar 1986

Prepared by the Directorate of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5000, AUTOVON 558-3589 during duty hours, 558-6487 after duty hours. Information published here generally precedes the formal staffing and distribution of Department of the Army official policy. This information is provided to all commanders to enhance aviation operations and training support.

TURNER E. GRIMSLEY
Colonel, Aviation
Director, DES

Mishap briefs

were not properly seated, causing quick disconnect on oil line from transmission oil bypass manifold to oil cooler to come loose.

CH-47 Class D mishap

C series - Crew smelled burning wires and saw flames under console. Flames were put out with fire extinguisher. Caused by chafing of wire bundle against NVG lighting rheostat.

CH-47 Class E mishap

C series - While ground taxiing, No. 1 engine accelerated uncontrollably. Wires in the engine beep trim switch were soldered wrong.

C-12 Class E mishap

C series - Pilot had difficulty trimming aircraft nose down. Trim wheel started binding and then jammed. Elevator trim cable had begun binding, then broke or came off front control spool. Kinks were found in cable.

OV-1 Class D mishap

C series - While aircraft was taxiing for takeoff, brake on left wheel began grabbing. Nut had backed off bolt, allowing bolt to contact wheel. Wheel and brake housing assembly were damaged.

U-21 Class E mishap

A series - Left main landing gear safe light did not come on when gear was lowered. Caused by broken electrical wire. Wire was spliced where landing gear moves up and down, causing it to break.

Safety messages

• Safety-of-flight technical message concerning replacement of tail rotor drive shaft bearings in EH-60A/UH-60A Black Hawk helicopters (UH-60A-86-01, 220100Z Feb 86). Summary: SOF message UH-60A-85-23 and SOF message UH-60A-85-24 required inspection of all Black Hawk tail rotor drive shaft bearings and replacement of all suspect bearings. SOF message UH-60A-85-24 confirmed that MRC bearings with more than 100 hours of operating time were serviceable and that plans were being developed to replace all unserialized bearings manufactured by MRC with serialized bearings. The message permitted MRC bearings with more than 100 hours of operating time to continue in service. This permitted operation of bearings which were not identified by a serial number on the bearing outer diameter and were not subjected to the enhanced manufacturing/inspection procedures which have been established to assure that all subject bearings are properly lubricated. Purpose of message UH-60A-86-01 is to provide direction for the replacement of unserialized bearings not manufactured/inspected utilizing the enhanced techniques. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of tail rotor drive shaft nuts in EH-60A/UH-60 Black Hawk helicopters (UH-60A-86-02, 220101Z Feb 86). Summary: Findings of loose coupling nuts on the tail rotor drive shaft of these helicopters have been reported. This message directs an inspection of coupling nuts for proper torque. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

The human in human error

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The time was dawn, the place a desert field training site. The pilot was qualified and current in the aircraft. His record showed no mishaps but that was about to change. Almost before the flight began he would make errors—human errors—that would cost the Army close to $144,000.

The unit had been in the field for 16 days supporting a mechanized infantry brigade. In response to an operations order issued the night before, the pilot and copilot started the OH-58 at 0515, then waited for missions to be assigned. A few minutes later, the company commander received a service mission request. The crew was told to take off at 0530 to pick up a liaison officer from the brigade's Tactical Operations Center and take him to the post cantonment area. There was no sense of urgency about the flight.

The pilot took off into the wind. As the aircraft accelerated to approximately 30 knots and began a right turn, the main rotor blade struck an aluminum antenna support pole about 36 feet above the ground, 400 feet from the takeoff point. The pole broke and the nylon supporting ropes became entangled in the flight controls. The ropes restricted the pilot's control inputs to the rotor system. The OH-58 began an uncommanded descending right turn. The pilot applied aft cyclic and told the copilot, "We're going down." He tried to cushion the touchdown by applying collective pitch.

The helicopter hit the ground upright on an 8- to 10-degree slope, bounced, and slid upslope for about 50 feet. The right skid collapsed, the main rotor blade hit the ground, and the mast was severed. The aircraft spun left, rolled onto its top, finally coming to rest on its right side. Neither crewmember was injured.

The first mistake. The pilot failed to follow prescribed procedures when he took off over the highest obstacle and terrain. When he failed to maintain a constant angle of climb until clear of the antenna support pole, he was not complying with instructions in Task 1034 of ATM FC 1-215.

Investigators concluded that the pilot was extremely apprehensive of loss of tail rotor effectiveness (LTE). His concern about LTE caused him not to give proper attention to other factors that determine takeoff direction. His apprehension resulted from a lack of training in the capabilities of the OH-58. The unit had not had an OH-58 IP assigned for 13 months and during this time the problem of LTE had been much publicized. Because discussions in the unit about LTE were not supervised by a knowledgeable IP, confusion and misunderstanding resulted.

The second mistake. The pilot failed to brief his copilot because he was overconfident in his ability to operate the aircraft and clear obstacles without assistance. Task 1007, ATM FC 1-215; AR 95-1; and the aircraft checklist require that the copilot be briefed before the engine is started. The pilot also failed to communicate with his copilot concerning crew coordination or any requirement for the copilot to assist him in maintaining terrain and obstacle clearance as required by Task 2060, ATM FC 1-215.

The pilot's overconfidence resulted from the fact that he had been operating the same aircraft from the same field site as a single pilot for 3 days preceding the accident. If he had communicated with his copilot he could have reduced his own workload at a critical phase of flight. By giving more attention to the obstacles outside the aircraft and the rising terrain, he might have been able to make a successful takeoff in spite of his first error. The OH-58 has enough power so that it could have cleared the antenna if the pilot had executed the takeoff as the ATM stipulates.

More mistakes. Battalion and company tactical standing operating procedures were not being complied with in regard to hazard map updates, landing area configurations, and other functional areas. And, unit mission briefings were not being conducted in accordance with a message from the Vice Chief of Staff, Army, requiring a *complete* mission briefing. While these conditions did not directly contribute to this accident, if left uncorrected, they could contribute to a future accident.

Expensive as this accident was, it could have been worse. If lessons are learned from it, however, we might prevent another accident like it.

- Units must ensure that their personnel receive adequate training. Problems such as LTE should be discussed with an experienced IP to prevent inexperienced pilots from reinforcing each other's misapprehensions.

- All procedures must be strictly followed. This accident is an example of what happens when they are not.

- Overconfidence and failure to coordinate crew effort can be fatal mistakes. The prefix in the word copilot means "together, joint, shared." A copilot is a partner in flight, but he must be told what the pilot is going to do and what is expected of him. That's the only way a partnership works. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

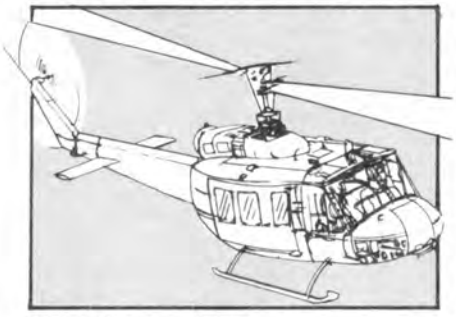
Utility helicopters

UH-1 Class D mishaps

H series - During simulated engine failure at a hover, student pilot applied excessive collective cushioning pitch. Aircraft climbed about 10 feet, then hit ground hard due to low rotor rpm. Pilot's chin bubble cracked and lower unit wire cutter tip sheared off.

H series - Crew noted loss of power and altitude on takeoff, and rpm warning light came on. PIC checked to see throttle was full on and entered autorotation. Collective was not fully lowered because of apparent low altitude. When deceleration began, low rpm audio sounded. PIC lowered collective to full-down position and rpm light went out. Aircraft touched down hard and slid about 30 feet, bending crosstube-breakaway tip on lower wire strike protection system.

H series - Aircraft encountered unforecast heavy rain. Visibility deteriorated and landing was attempted. Overcast and heavy rain impaired pilot's depth perception. Front and rear retention straps were damaged during hard landing.



UH-1 Class E mishaps

H series - Engine oil temperature rose intermittently to 95° C. during flight. Caused by faulty sensor probe.

H series - Rotor tachometer failed in flight. Caused by sheared tachometer generator shaft.

H series - Aircraft hovered toward slope area during NVG training. Large piece of cardboard from open dumpster was pulled through main rotor system.

H series - Master caution and oil pressure segment lights came on in flight. Engine oil pressure was zero psi. Engine oil pump had failed.

UH-60 Class E mishaps

A series - As aircraft passed through 50 knots during takeoff, IAS stabilator failed in auto mode and wouldn't reset. Stabilator actuator was replaced.

A series - During takeoff, crew chief saw oil streaming down right cargo door. Input module seal failed, causing loss of main transmission fluid.

Attack helicopters

AH-1 Class D mishap

S series - Aircraft had flown 3 hours NVG training. Next morning, inspection showed FOD had been thrown by tail rotor against vertical fin, causing small hole.

AH-1 Class E mishaps

S series - While firing illumination rockets during night gunnery exercise, pilot thought aircraft had begun to settle. Pilot increased power and leveled off. Torque reached 103 percent. Light blowing snow as aircraft hovered caused pilot to feel aircraft was moving.

S series - When ECU was turned on during hover, smoke filled cockpit. Caused by overheated bearing in aircraft turbine used in ECU.

AH-64 Class E mishaps

A series - Battery hot light came on during runup. Battery was replaced.

A series - During extended ground run while downloading aircraft armament system, low fuel light came on. Aircraft was refueled.

Cargo helicopters

CH-47 Class E mishaps

B series - During runup, No. 2 transformer rectifier warning light came on, then went out. It would stay on line for a minute, then sequence would repeat. Caused by internal failure of generator voltage regulator and protection panel.

B series - While aircraft was in cruise flight, second cabin window on left side flew off.

C series - Aircraft was 2,500 feet agl, at 100 knots. Pilot found cyclic wouldn't move laterally unless control centering button was pushed. Aircraft had operated at field site for 3 days and blowing dust had caused dirt to accumulate in centering spring.

Observation helicopters

OH-58 Class A mishap

A series - When aircraft tried to hover on side of hill, tail rotor struck hill. Tail rotor control was lost and aircraft rolled down hill. 8621

OH-58 Class E mishaps

A series - Copilot began unmasking at 85 percent torque, then looked outside and corrected for wind with left pedal input. Pilot saw torque go to 110 percent for about 2 seconds. Copilot failed to divide attention between battle drill and cockpit duties.

A series - Crew smelled fumes and saw smoke in cockpit. Anticollision lights came on, turn and slip circuit breaker popped. Caused by internal

failure of anticollision light flasher unit.

Correction

Reference report on OH-6 Class D mishap in 5 Feb 86 *Flightfax.* The last sentence of the brief implies the IP was not in compliance with prescribed regulations. The IP was taking a currency ride and annual flight evaluation with an SIP as prescribed by regulation.

Training helicopters

TH-55 Class C mishap

A series - Aircraft had completed practice standard autorotation. As ground slide ended, aircraft's weight settled on forward landing gear damper strut assemblies, putting helicopter in a normal nose-low attitude with low rotor rpm. Strong gust of wind caused main rotor blades to flex down, severing tailboom. Tailboom, tail rotor drive shaft, and main rotor blades were damaged.

Fixed wing

C-12 Class E mishaps

C series - Approach flaps went to full-down position and wouldn't retract. Caused by failure of flap switch.

C series - No. 1 engine fire light came on at 700 feet agl. Fire warning light was replaced.

D series - No. 2 engine N1 gauge fluctuated from 30 to 60 percent during cruise flight. Caused by failure of tachometer generator.

OV-1 Class E mishap

D series - No. 2 engine fire warning light came on in flight. Caused by malfunction and overheating of No. 2 AC generator.

U-8 Class E mishap

F series - During flight, IP noticed oil flowing to rear of nacelle from vicinity of access door to oil filler cap of No. 1 engine. Pilot failed to secure cap during preflight.

Maintenance

UH-1 Class E mishaps

H series - N1 went to 68 percent during engine start, then N1 and egt decreased and engine flamed out. Caused by corrosion of cannon plug on fuel gate.

H series - As aircraft entered holding, crew noted feedback from controls and heard squeal from hydraulic pump area. Master caution and segment warning lights came on. After run-on landing, crack was found in hydraulic line. Clamp holding line to bulkhead was also missing.

V series - During postflight, pilot noticed liquid on fuel control unit. O-ring had been improperly installed, allowing fuel to seep past damaged ring.

AH-1 Class E mishap

S series - As aircraft hovered into hot refueling site, maintenance IP noticed feedback in cyclic and grinding noise from transmission. Master caution and No. 2 hydraulic caution lights came on and hydraulic fluid sprayed left side of canopy. Armament personnel failed to tighten hydraulic line after inspecting armament system.

CH-47 Class E mishap

C series - During runup, transmission oil temperature gauge went to maximum and transmission oil hot caution light came on. Caused by loose wire in cannon plug on No. 2 engine transmission temperature bulb.

C-12 Class E mishap

C series - During climbout, No. 1 engine top cowling was loose. Aft cam lock was unsecure.

OV-1 Class E mishap

D series - During cruise flight, pilot noted ring cowl dzus fastener had come loose. Suspect dzus fastener was not properly fastened before flight.

T-42 Class E mishap

A series - Crew smelled gas fumes during flight. Right fuel drain had a small leak.

U-21 Class E mishap

A series - Excessive vibration was felt from left propeller during runup. Propeller was out-of-balance, one deice boot was improperly wired, and all blades were 2½ to 3 degrees off static settings.

Safety messages

- Safety-of-flight technical message

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	1-19 Mar	**4**	**3**
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**19**	**11**

Mishap briefs

concerning revision to one-time inspection of tail rotor drive shaft nuts in EH-60A/UH-60 Black Hawk helicopters (UH-60A-86-03, 231740Z Feb 86). Summary: SOF message UH-60A-86-02 listed three different nut part numbers which required torque checks, but only prescribed the torque value for one of the three. This could be interpreted to mean that all three nut part numbers should be checked at the same torque value. This revision prescribes specific torque values for all three part numbers. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of CH-54B upper link assembly (CH-54-86-02, 032330Z Mar 86). Summary: Several upper link assemblies have been found with manufacturing defects. Defects include forging laps and excessive plating buildup. All defective links were made by one vendor. Purpose of this message is to direct inspection of links and have all links made by this vendor removed from service. Contact: Roger Heindenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning revision to replacement of tail rotor drive shaft bearings on EH-60A/UH-60A Black Hawk (UH-60A-86-04, 061930Z Mar 86). Summary: AVSCOM message UH-60A-86-01, 220100Z Feb 86, is interpreted to require unnecessary disassembly to verify identification of unserialized bearings, continues an unnecessary requirement to enter all bearing serial numbers on DA Form 2408-16, and is being interpreted as authorization for AVUM activities to perform AVIM-level functions. Purpose of this message is to provide appropriate corrections. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

Hazard alert

The following hazard alert message (031730Z Mar 86) concerning an AH-64A Class A accident has been dispatched by the Safety Center.

"A hazard identified during an aviation accident investigation being conducted by the U.S. Army Safety Center (USASC) is provided to addressees to prevent similar accidents.

"A hazard has been identified during a USASC investigation of an AH-64A Apache Class A accident. The hazard concerns the engine chop collar.

"The engine chop collar, located at the upper end of both the pilot and copilot/gunner (CPG) collective stick, is not distinctively marked, guarded, or designed to alert untrained personnel as to its purpose or the critical consequence if manipulated or displaced. When the collar is displaced forward (lifted) and turned slightly (approximately 45 degrees) to the right (clockwise), both engines are reduced to idle.

"The USASC recommends that pilots-in-command (PIC) include the location and function of the engine chop collar in their briefings to untrained personnel who may occupy the CPG position during demonstration, ferry, maintenance recovery, or maintenance test flights.

"The USASC POC is MAJ Coberly, AUTOVON 558-4198/3901." ■

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26 March 1986

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Followups

Additional information on mishap briefs previously published

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Utility helicopters

UH-1 Class A mishap in 3 Jul 85 issue (8545) □ Engine power loss occurred as helicopter was about 70 feet above trees during takeoff from a field location. IP took the controls and checked that the throttle was full on. Two student pilots in the rear of the aircraft noted a decrease in engine noise. As the aircraft was about to descend into the trees, the IP told the student in the right seat to switch to emergency governor. There was no response from the engine. The IP applied collective pitch to cushion the landing. The aircraft crashed in a near-level, left-side-low attitude in a swamp. Teardown analysis of the engine, fuel control, associated hardware, and selected items from the fuel system failed to reveal the cause of the power loss. It is suspected the power loss most likely resulted from an intermittent problem in the fuel control/governor.

UH-1 Class A mishap in 24 Jul 85 issue (8546) □ Aircraft was on night vision goggles training mission over a lake. Pilot allowed aircraft to descend into the water and it sank inverted. Pilot did not monitor his instruments to ensure altitude was maintained. IP did not take corrective action even though he had twice told the pilot to stop the descent.

UH-1 Class B mishap in 31 Jul 85 issue (8547) □ Downgraded to Class C. Engine failed during training mission. IP autorotated to an open field. Aircraft was damaged during landing. Engine failure resulted from fatigue failure of a first-stage compressor blade. This caused the gas producer section of the engine to seize.

UH-1 Class A mishap in 2 Oct 85 issue (8555) □ During approach to a landing pad at a mountain site, the pilot-in-command terminated at an 8- to 10-foot hover slightly forward of the intended touchdown spot. As a result of the high hover and the terrain features, the helicopter was in an out-of-ground-effect hover condition. Power available was not adequate, and N2 and rotor rpm decayed. The aircraft spun right and then settled. Both main rotor blades hit the hillside, and the UH-1 rolled onto its left side. During the planning phase of the mission, the copilot failed to recognize the significance of performance data obtained while completing the performance planning card. In this situation, power required to perform an out-of-ground-effect hover exceeded the power available by 5 psi. The copilot was a low-time aviator with limited experience in mountain flying operations. When he determined adequate power was available for an in-ground-effect hover, he was not concerned about the out-of-ground effect hover capabilities. The pilot-in-command did not review the performance planning data compiled by the copilot and was unaware that power available was not adequate for an out-of-ground-effect hover.

Attack helicopters

AH-1 Class A mishap in 2 Oct 85 issue (8556) □ As aircraft was in contour flight, first-stage power turbine failed due to overstress mechanisms at high temperature. The result was a loss of power and N2 speed at a critical point in flight, causing the aircraft to crash on a mountain ridgeline. The most probable cause of the overstress forces was the fatigue-cracked second-stage power turbine nozzle rubbing the aft side of the power turbine disc. This condition was allowed to exist because of inadequate inspection criteria. The engine and components are inspected "on condition" based on some indication that problems exist. There was no history of potential problems of this nature.

Cargo helicopters

CH-47 Class B mishap in 28 Aug 85 issue (8553) □ Downgraded to Class C. As aircraft was being refueled, the left main fuel cell was overpressurized, resulting in fuselage damage. During the refueling operation, the forward end of the hose disconnected from the 2-inch fuel breakaway valve inside the left main fuel cell. The exact cause could not be determined.

Observation helicopters

OH-6 Class B mishap in 2 Oct 85 issue (8557) □ While flying at 50 knots and 50 feet above the ground, aircraft hit a wire stretched across the flight path. The aircraft crashed in a river bed and came to rest on its left side in about 2 feet of water. The position of the sun contributed to the pilot's inability to see the wires. The wires were not plotted on the hazard map. A flight route recon had been flown earlier, but the crew flying the recon did not see the wires.

OH-58 Class A mishap in 9 Oct 85 issue (8558) □ Aircraft hit wires during NOE night vision goggles training flight. When the pilot-in-command transferred the wire hazard data from the master overlay to his map, he failed to transfer the wires the aircraft hit.

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

V series - Aircraft was conducting hoist training mission when it entered an uncommanded, descending right turn. The main rotor blade struck a hillside. The aircraft rolled down the hill about one and one-half times before coming to rest inverted. 8622

UH-1 Class D mishaps

H series - During flight to live fire training area, exhaust diffuser cover broke loose from retaining bolt. Airflow forced diffuser cover up into tail rotor, and tail rotor blade deflected the cover down into synchronized elevator. During postflight inspection, puncture in left synchronized elevator assembly and 4-inch gouge in tail rotor blade were found. Caused by failure, due to heat stress, of metal where retaining bolt and washer attach diffuser cover to exhaust.

H series - After landing during airmobile exercise, troops approached aircraft. One soldier ran around helicopter's nose, hitting pitot tube assembly, breaking mount.

UH-1 Class E mishaps

H series - Aircraft was making approach to landing. During turn from base to final, cyclic jumped aft right-quadrant and returned to original position with moderate control pressure. After landing, there was resistance in cyclic control in aft right-quadrant. Ice was found on servo. Snow had fallen during previous two days, and aircraft didn't have full transmission cover.

H series - Copilot was making initial takeoff when rpm warning light came on and engine tachometer went to zero. Caused by failure of tachometer generator.

UH-60 Class A mishap

A series - Aircraft was conducting training when it crashed for unknown reasons. 8623

UH-60 Class C mishaps

A series - Aircraft was on takeoff as chalk 2 in NVG flight of two carrying external loads of M102 105mm howitzers. Pilot, who was on controls, told copilot to turn on searchlight. Copilot may have touched emergency jettison switch. Load was jettisoned. Postflight inspection showed blown squib in cargo hook.

A series - Aircraft had several engine compressor stalls, followed by partial engine failure during approach. Pilot autorotated to confined area without further damage to aircraft.

Attack helicopters

AH-1 Class D mishaps

S series - During postflight inspection, pilot discovered signs of possible tree strike on tail boom and damage to tail rotor blades. Crew noticed no indication of strike during flight.

S series - Pilot made normal shallow approach to running landing. During runout, skids came off, crosstubes turned to rear, and aircraft scraped the ground, damaging turret fairing and underside of aircraft. Discoloration of metal on right rear saddle indicates it may have been cracked before mishap.

S series - Cobra was hovering to parking. Rotorwash blew open an unsecured door on parked OH-58. Personnel preflighting OH-58 couldn't secure door before it reached hinge stop, breaking window.

AH-64 Class E mishaps

A series - During ground runup, master caution and primary hydraulic caution light came on. Hydraulic pressure gauge showed normal reading.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	1-26 Mar	**4**	**3**
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**19**	**11**

Caused by failure of hydraulic pressure switch.

A series - Rated student pilot placed power lever in idle position during start of No. 1 engine. Shaft-driven compressor (SDC) light came on. Caused by failure of SDC.

A series - During runup, target acquisition and designation system (TADS) wouldn't respond to elevation commands from thumb force controller or integrated helmet and display sight system. TADS amplifier assembly was replaced.

Cargo helicopters

CH-47 Class D mishaps

D series - During uploading of M151 ¼-ton truck and trailer for internal transport, flight engineer was operating aircraft winch. Crew chief was monitoring side clearances between aircraft and cargo. Ground crew failed to raise and secure trailer tongue support leg, as indicated by caution notice in M151 operator's manual. Trailer tongue support leg hit cargo ramp extension, making 3- by 4-inch tear in sheetmetal and crushing honeycomb.

D series - Aircrew was participating in movement of artillery weapons and support equipment. Flight engineer was operating winch, assisting ground crew in uploading M101 ¾-ton trailer aboard aircraft. Loose rope from trailer entangled with support tubing of aircraft passenger seat, breaking support tube before winch could be stopped. Ground crew allowed trailer tongue to rotate into cargo ramp extension/APU maintenance platform, tearing and crushing a 9- by 4-inch piece of sheetmetal skin and honeycomb area. Ground support crew did not adequately prepare trailer for uploading, and ropes were not secure.

D series - Aircraft had been transporting internal and external cargo, an M151 ¼-ton truck and equipment, configured for single-hook external transport, was aborted twice during initial hookup because of marginal rigging conditions. After final hookup, aircraft had been at cruise flight about 5 minutes, and was about 100 feet agl, when crew chief attempted to transmit status of cargo over intercom. He inadvertently pressed the cargo hook release switch. The release switch is located less than an inch above and left of intercom switch, on the winch hoist control grip which he was holding. Cargo fell from hook into swampy area.

CH-47 Class E mishaps

A series - As thrust control was lowered, N1 decreased and egt began to rise. Caused by malfunction of fuel control.

B series - Aircraft was at cruise flight when crewmembers saw smoke in aft cargo compartment. They couldn't see exactly where smoke was coming from. Utility hydraulic pressure dropped to about 30 psi, and the crew smelled fumes in cockpit. Rupture in hydraulic flex line caused utility system to fail.

C series - During engine start, when No. 2 engine condition lever was moved from stop to ground idle, engine accelerated past ground idle rpm and continued to accelerate uncontrollably. There was no response when lever was moved to stop. Engine stopped when fire control handle was pulled. Caused by malfunction of electromechanical actuator.

C series - Aircraft was on approach. No. 2 engine torque and N1 increased. Emergency engine trim was used to control fluctuation during remainder of approach. Torque and N1 continued to fluctuate during hover. Caused by failure of engine fuel control.

D series - During approach to confined area, engine No. 1 experienced normal trim failure to low side. After aircraft landed, No. 1 engine torque and N1 fluctuated erratically with emergency engine trim in manual position. Caused by out-of-adjustment droop eliminator.

D series - Aircraft was at cruise flight when No. 2 engine fire warning light came on. Caused by failure of fire detector control indicator.

Observation helicopters

OH-6 Class C mishap

A series - While aircraft was at cruise flight, crew heard a thump and noted tail rotor feedback and binding in pedals. During postflight inspection, ADF sensing antenna was found wrapped around tail rotor assembly. Caused by failure of device used to secure antenna.

OH-6 Class D mishap

A series - Antiflap assembly separated from main rotor system during flight. Punctures in leading edge of main rotor blade and right cargo door were found during postflight inspection. Antiflap stop had stuck in static position during runup, and probably broke during takeoff. Bushing in antiflap assembly is susceptible to grit, which causes binding of antiflap stop. Aircraft had been operating in unusually sandy and dusty conditions for two weeks before the mishap.

OH-6 Class E mishap

A series - During preflight, pilot noticed tail rotor yoke bearing had spun loose from race.

OH-58 Class C mishap

C series - Crew was conducting observer training over heavily wooded, rolling terrain. Aircraft was at a hover with a left-quartering tail wind, causing student observer's map to be blown about. IP suggested moving downslope and heading aircraft into wind (approximately 260 degrees/10K), to allow student to reorient himself. As aircraft turned into wind, IP noted thump in pedals and aircraft began uncommanded right yaw. IP said when he attempted to fly out of the yaw, he got no response from engine, and the right turn continued. IP saw small clearing under aircraft's nose, and closed throttle to autorotate into the clearing. Aircraft hit the ground, nose low, and came to rest with its nose on the ground. The tailboom was resting against a tree at about a 40-degree angle. Forward cabin, main rotor blades, tailboom and tail rotor assembly, and landing gear were damaged.

OH-58 Class D mishaps

C series - Aircraft made running landing, then slid off end of runway

Mishap briefs

onto uneven ground. NVG searchlight was broken. IP failed to take timely corrective action.

C series - Crew initiated start with tiedown still attached to blade, causing damage to tail rotor hub and blades.

OH-58 Class E mishap

A series - Pilot was holding rotor blade as another OH-58 approached. Left rear door was open. Rotorwash blew door back, breaking door hinges.

Fixed wing

C-12 Class D mishap

C series - As aircraft landed, it swerved left from runway center line. Both left main tires blew out on landing roll. Suspect pilot had pressure on brake during touchdown.

OV-1 Class E mishap

D series - During cruise flight above 12,000 feet agl, technical observer's oxygen regulator stuck in open position. Caused by failure of oxygen regulator.

Maintenance

UH-1 Class D mishap

H series - When aircraft picked up to a hover, rotorwash blew maintenance stand into parked, unoccupied helicopter. Maintenance personnel hadn't secured stand to ramp.

UH-1 Class E mishaps

H series - While making normal approach, pilot noticed sticking/binding in left forward- and left rear-quadrant of cyclic. Crew chief found hydraulic fluid on right irreversible valve. Caused by improper positioning of cyclic wiring bundle.

H series - Aircraft had flown 2 hours before being shut down. When crew attempted restart, engine accelerated normally, but igniters didn't function. Inspection showed frayed and twisted wires on ignition switch. Switch had recently been replaced.

V series - During level flight, fuel gauge fluctuated and dropped to zero pounds. Loose wire was found on center quantity probe of center fuel cell.

V series - While in flight, crew noticed transmission oil pressure had slowly dropped to about 40 psi, then dropped more rapidly to between 5 and 10 psi. Inspection showed crack in one hydraulic line. Crack was repaired and, during MOC, transmission oil pressure showed normal. Aircraft returned to airfield and, during shutdown, transmission oil pressure again dropped to about 10 psi. Inspection showed connector on rear of transmission oil pressure indicator was broken, allowing wires to contact side of indicator, causing short in system.

AH-1 Class D mishaps

S series - Maintenance IP was performing test flight to determine accuracy of pilot's torquemeter. After verifying accuracy with PPC card, MIP attempted takeoff. Aircraft was 70 feet agl with instruments showing 78 percent torque, engine oil 90 psi, engine oil temperature 55° C., and transmission oil 60 psi and 48° C., when MIP heard and felt two reports from aircraft. He presumed it was compressor stall and landed. He noticed high frequency vibration in airframe during shutdown. Particle separator was pulled, and paper shop towel was found balled up in inlet guide vanes of first stage compressor section.

S series - During troubleshooting of alternator, sparks were seen on left side of battery, followed by small fire. Tail rotor unit relay wiring bundle shorted out on bottom left battery mounting bolt. Bolt was mounted perpendicular to battery, causing wiring bundle to chafe.

AH-1 Class E mishaps

S series - Shortly after takeoff, master caution and transmission pressure lights began blinking. Improper installation of internal transmission oil filter O-ring caused ring to fail.

S series - When aircraft was started, fire guard noticed fuel running down side and onto engine deck. Fuel line to variable-inlet guide vane actuator wasn't properly installed. Crew chief didn't correctly connect, and MOC, fuel lines after engine flush. Neither IP nor pilot discovered loose fuel lines during inspections. When pilot accepted aircraft, MOC hadn't been signed off.

CH-47 Class E mishaps

C series - During climb in traffic pattern, both engine torque needles dropped to zero. Rotor rpm and N2 decreased. After pilot established autorotation, he saw N2 was stabilized at 65 percent and made a running landing. Wire soldered to normal engine beep switches showed poor workmanship: broken wires, bare wires, and incomplete solder.

C series - When No. 2 engine condition lever was advanced from ground to flight during runup, engine fire light came on. Caused by chafing of No. 2 engine fire element.

D series - During runup, copilot's instrument panel lights went out, popping circuit breaker. Crew smelled burning electrical insulation and saw smoke and sparks under center console. As wiring around vent tube chafed against tube, insulation wore away, causing electrical short.

D series - Aircraft was landing for refueling when master caution and right fuel pressure lights came on. Caused by dirty fuel pressure transducer cannon plug.

OH-58 Class E mishap

A series - Master caution and engine oil bypass lights came on during cruise flight. Engine oil filler cap hadn't been properly installed by maintenance personnel after 25-hour inspection. Aircrew failed to detect improperly installed cap during preflight and engine oil escaped past cap during flight.

C-12 Class E mishaps

C series - When aircraft reached FL 270, power levers were reduced to set cruise power. No. 2 engine power lever would move, but would not reduce below 91 percent N1. As aircraft passed through FL 140, control of power was regained. Caused by high idle linkage freezing due to lack of lubrication and high moisture content.

D series - During after takeoff check, fluid was seen coming from No. 2 engine area. Oil cap had vibrated loose.

U-21 Class E mishap

A series - Shortly after instrument lights were turned on at cruise flight, smoke began coming out of flap indicator glass. Caused by crushed light bulb on printed circuit board.

Safety messages

• Safety-of-flight maintenance mandatory message concerning inspection of AH-64 main rotor head assembly (AH-64A-86-05, 041800Z Mar 86). Summary: Report has been received which cites main rotor head stretched strap assemblies had loosened and the laminates were twisting at the outboard end, causing them to kink, warp, and separate. This message augments the daily inspection. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of T53-L-13B series engines in UH-1/EH-1 and AH-1G aircraft (UH-1-86-03, AH-1-86-01, 092300Z Mar 86). Summary: 1990 retirement date of T53-L-13B series engines has recently been extended until year 2010. A government/contractor team has been assembled to assess current fleet status, analyze USASC data, and determine all short- and long-term actions to safely extend engine service life. This message directs actions to be taken on records survey, removal and turn-in of engines, inspection, engine analysis checks and HIT baselines to be performed. It also directs procedures for establishment of permanent HIT baselines and engine troubleshooting procedures, and identifies data units should provide from engine records. Contact: Robert Lawyer or CPT Marsha Cure, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight emergency message concerning immediate grounding of AH-64 series aircraft (AH-64-86-05, 130300Z Mar 86). Summary: An AH-64A aircraft has experienced a failed critical bolt in the mixer assembly. This failure occurred during ground runup with no resulting accident. Pending results of engineering investigation and corrective action, all AH-64A aircraft are restricted from flight until further notice. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight emergency message concerning immediate grounding of UH-60/EH-60 series aircraft (UH-60A-86-05, 122200Z Mar 86). Summary: A UH-60A has crashed from unknown causes. Pending results of the accident investigation, all UH-60A/EH-60A aircraft are restricted from flight until further notice. Contact: Robert A. Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Message concerning T63-A-700 engine compressor case and vane assemblies (102100Z Mar 86). Summary: Reference safety-of-flight maintenance mandatory message concerning inspection of T63-A-700 turbine engine compressor on all OH-58A and OH-6A helicopters (OH-58A-85-05, OH-6A-85-03, 261920Z Dec 85); safety-of-flight maintenance mandatory message concerning revision to inspection of T63-A-700 turbine engine compressor on all OH-58A and OH-6A helicopters (OH-58A-86-0, OH-6A-86-01, 110300Z Jan 86); and message concerning T63-A-700 turbine engine compressor inspection (AMCPM-ASH-W, 302130Z Jan 86). "Push" requisitions have been prepared at AVSCOM to meet reported requirements for case and vane assemblies. Shipment is in progress and will continue on accelerated basis until total changeout of unserviceables has been completed. Message specifies procedures for making returns of unserviceable case and vane stocks following replacement. Contact: Pat Roulch, AUTOVON 693-3727, commercial 314-263-3727.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

CAUTION . . . use the right hardware to install MILES devices

Caution should be exercised to use correct screws when installing Multiple Integrated Laser Engagement System (MILES) on AH-1S and UH-1H series helicopters.

Standard aircraft screws are made of soft material that strips easily under stress and can lead to possible separation of detector belts and cabling from the aircraft during flight. The MILES screws are made of a hardened material that meets airworthiness specifications. These screws must be used to install MILES on aircraft.

The following technical manuals require use of MILES screws to install MILES devices on AH-1S and UH-1H aircraft. They also require that any standard aircraft screws which may have been used to install MILES devices, must be replaced with MILES screws made of the required material.

• TM 9-1270-223-10: Operator's Manual for Multiple Integrated Laser Engagement System (MILES) Simulator System, Firing, Laser: M80 AH-1S Attack Helicopter Weapon System, NSN 1270-01-165-6240.

• TM 9-1270-224-10: Operator's Manual for Multiple Integrated Laser Engagement System (MILES) Simulator System, Firing, Laser: M79 NSN 1270-01-159-0481 for the UH-1H Utility Helicopter.

All installation hardware will be issued with the MILES kits when drawn from the Training and Audiovisual Support Center MILES warehouse. If the MILES installation hardware is missing from a kit *do not* use the kit.

Point of contact: SFC Kenneth N. Westover, Project NCO, U.S. Army Training Support Center, Fort Eustis, VA 23604-5166, AUTOVON 927-4713/4714, commercial 804-878-4713/4714. ■

Followups

Therefore, he did not know the wires were there and did not see them.

Fixed wing

OV-1 Class A mishap in 29 May 85 issue (8540) □ During takeoff, both engines of the OV-1 intermittently entered a state in which power provided was significantly reduced. The No. 1 engine, at a minimum, entered into bleed band popping and may have had a compressor stall. The No. 2 engine did have a compressor stall. The pilot had not retracted the landing gear and, because of the increased drag, the aircraft had not climbed or accelerated to a safe single-engine flight envelope before the engine malfunction. At an altitude of 150 feet above the ground and an airspeed of 100 knots, with the gear still down, the pilot reduced power on both engines when the compressor stall occurred. Aircraft capability to operate at reduced power was exceeded, and since the No. 1 engine power lever was retracted, the power that may have been available from this engine was not being used. The pilot, realizing he could not sustain flight, told the technical observer to eject and seconds later ejected himself.

OV-1 Class A mishap in 31 Jul 85 issue (8548) □ During a training mission at approximately 200 feet agl after takeoff, with the pilot at the controls, the IP simulated an engine failure. The pilot took corrective action, but airspeed became too slow for continued flight. The IP took the controls, but airspeed and altitude continued to decay. The pilot ejected successfully, but the IP ejected too late and was killed. The IP did not recognize the actual cause of the feathered left propeller. He apparently did not understand the autofeather system well enough to realize the propeller feathered because he left the autofeather switch in the on position and activated the throttle lever microswitch before the No. 1 engine torque advanced above the torque level required to activate the system. As a result, he became confused and distracted. As airspeed decreased, control of the aircraft was lost at an altitude that provided no margin of safety.

U-21 Class A mishap in 7 Aug 85 issue (8551) □ After about 3 hours and 40 minutes of flight, pilot noticed his left fuel pressure had dropped to 10 psi. Assuming the left fuel boost pump was failing, the pilot placed the crossfeed switch in the manual open position. Fuel pressure returned to normal. Thirty minutes later, the fuel pressure fluctuated. Shortly afterwards, both engines failed. The pilot ditched the aircraft in the sea. The pilot placed the crossfeed switch in the manual position because he lacked confidence in the engine-driven fuel pump to provide fuel to the engine. Because the switch was in the open position, the pilot received no indication when the left fuel boost pump completely failed, and when all of the fuel in the right nacelle tank was consumed, both engines flamed out. Had the pilot permitted the fuel system to function as it was designed, he would have had enough fuel to complete his flight. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

"... something grabbed the helicopter"

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The OH-58 crew was engaged in nap-of-the-earth flight during a tactical exercise. The aircraft hovered up to a ridge line and unmasked. After looking at the terrain and searching for opposing forces, the copilot, who was on the controls, accelerated to about 35 knots. He began a descending flight path parallel to the two ridge lines of the valley.

The aircraft was flying down the middle of the valley when the copilot saw a wire directly in front of the helicopter. He tried to climb over it. The aircraft missed the wire he had spotted, but struck three wires above it that he hadn't seen.

The wires passed under the rotor blades and over the upper cutter of the wire strike protection system, hitting the pitch change links and mast. As the momentum carried the aircraft through the wires, the first wire pulled loose from its pole. The other two broke about midway between the poles and were dragged by the helicopter down the valley.

One end of a wire wrapped around the mast, severing both pitch change links. The aircraft started an uncommanded moderate bank in a descending left turn. After turning almost 180 degrees, it made an abrupt right turn, descended into trees, and crashed on an upslope. The aircraft was nose-low with a 30-degree right roll when it hit the ground, coming to rest on its right side. The copilot's leg was broken and he had a sprained ankle. The PIC had only minor injuries.

The squadron's aviators were not experienced in flying where there was a high density of wire hazards. Because of that, when they first arrived in the area where the ARTEP would take place, the squadron commander imposed an altitude restriction of 100 feet agl for all flights, including NOE.

The altitude restriction had been lifted for this particular exercise, allowing attack teams to fly at NOE altitudes. The pilot-in-command (PIC) was acting as navigator of the observation aircraft. Instead of using a map available at unit operations which showed comprehensive wire hazard markings, he was using the copilot's map which wasn't marked in the same detail. He used that map because the copilot was the last one to receive a mission update from the platoon leader, and the copilot's map was used in the briefing.

The OH-58 crew had altered course at about the midway point to avoid heavy air traffic. They planned to follow the range of hills to their mission area. When the aircraft crossed the last ridge into the small north-south valley, they were flying with the morning sun over their shoulders.

Both pilots had their attention on the mission, the terrain, and "enemy" forces. The PIC was also looking at the map. Neither of them saw the wires across their flight path until the aircraft was almost on them. When the copilot saw a wire directly ahead of the aircraft, he increased collective and pulled back the cyclic. "It started to climb...we heard a big thud, and something grabbed the helicopter, then it just started shuddering really bad and went into a left turn."

The helicopter had hit three wires strung above the one it missed. The wires were draped over the draw from supporting poles located on ridges

above each side of the valley. The poles were partially concealed by trees.

The errors in this accident were not deliberate, but they caused the crash nonetheless. The PIC failed to comply with paragraph 2-5, FM 1-400, in preparing for terrain flight. He should have checked the hazards map in the operations office, or his own map, for known hazards along the route of flight. There was a wire hazard posted on the PIC's map in the same grid square where the wires they hit were located.

The copilot had posted his map with the wire hazards that were made available by the in-country Aviation Safety Office. However, the wires the aircraft struck were not marked on the wire hazard overlay because they were only 40 feet agl. A criteria of 50 feet and above was used for inclusion on the overlay. If the PIC had compared the map he was using with his own map, he could have alerted the copilot about the wire hazard, and he probably would have been looking outside the cockpit for wires himself. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - During landing on tank trail, extremely dusty conditions caused pilot to lose ground reference. Lower tip of wire strike protection system was broken off during hard landing. Lower cutter hit ground and was pushed up into aircraft, causing structural damage.

UH-1 Class E mishaps

H series - Aircraft was on IFR flight in IMC, and outside air temperature measured plus 6° C., with visible moisture. Deice was on. Crew heard three muffled reports and aircraft yawed slightly. When deice was turned off, compressor stall stopped. Engine was replaced.

H series - Aircraft was in cruise flight and instruments were in normal range, when controls were transferred from pilot to copilot. Copilot checked throttle position and found throttle turned continuously to open direction. When he attempted to remove slack in throttle, throttle turned freely in that direction also, with no effect on operating rpm. Sheared pin allowed copilot's collective control head to work loose and slightly out, disengaging throttle linkage.

H series - Engine oil pressure fluctuated from 80 to 99 psi. Caused by failure of main inverter.

H series - Crew felt medium frequency vibration in flight. Caused by failure of tail rotor thrust bearing.

H series - During cruise flight, master caution and transmission oil pressure segment lights came on. Transmission oil pressure gauge verified loss of pressure. Deteriorated gasket caused transmission to lose all oil and oil pressure.

H series - Aircraft was in level cruise flight at 500 feet altitude. Crew heard dull thud and torque fluctuated 22 to 38 psi before stabilizing. Small amount of play in feedback rod, between fuel control and variable inlet guide vane actuator, had allowed improper positioning of inlet guide vanes.

H series - Aircraft was chalk 2 in formation flight. On short final, at about 20 feet agl, with 5- to 7-mph tailwind, aircraft started to pass through effective translational lift (ETL). Pilot overreacted when aircraft fell through ETL. He increased collective to stop rate of descent and rapidly applied left pedal, causing torque to rise to 54 pounds for about 1 second.

EH-1 Class E mishap

H series - Engine oil temperature increased from 58 to 128° C., in less than 2 minutes. Caused by failure of oil cooler fan bearing and housing.

UH-60 Class C mishap

A series - Aircraft was on takeoff at 30 knots, 90 feet agl, when crew chief noticed open left-hand cowling. After shutdown, inspection showed missing tgt cowling, holes in main rotor blade, broken BIM indicator glass on other main rotor blade, cracked right tgt cowling, and cracked right exhaust fairing.

Attack helicopters

AH-1 Class A mishap

S series - Aircraft was conducting screening mission in support of field exercise when it struck wires crossing a river. Pilot made a forced landing to river bed where aircraft settled to the

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	1-2 Apr	**1**	**0**
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**20**	**11**

left side. As aircraft settled, main rotor struck ground and was torn off. Wire strike protection system was installed on aircraft. 8624

AH-1 Class E mishaps

S series - During NOE flight, altitude 5 feet and airspeed below ETL, loose, dry tree branches were pulled into rotor system, causing blade damage.

S series - During preflight inspection, small hole was found 3 to 4 inches from tip of rotor blade. Wood fragments were found in hole, indicating tree strike. Caused by hovering too close to tree during NOE flight.

S series - Aircraft was hovering as crew performed flare delivery. Pilot in back seat was on controls. During recovery after firing first flare, aircraft backed into thin tree line. Aircraft landed, but no damage was found.

S series - Aircraft was equipped with MILES/AGES equipment and was being engaged by enemy armor. Aircraft tried to evade and engine overtorqued to 100.5 percent. Pilot became engrossed in action and forgot to fly aircraft.

Cargo helicopters

CH-47 Class D mishaps

A series - During cruise flight, crew chief started to close upper cabin door section. Escape panel and window flew off. Crack and hole were found, during postflight inspection, on bottom forward section of No. 3, right-side, jettisonable cabin window.

A series - Aircraft was in cruise flight when crew felt moderate vibration throughout aircraft and feedback from flight controls, primarily the cyclic. No. 10 pocket of aft blade had become unbonded and peeled back on bottom side of blade.

D series - As aircraft hovered to taxi, rotorwash blew open door on UH-1, breaking hinge on pilot's door. Door had been secured only by first latch.

CH-47 Class E mishaps

C series - After 10 minutes of flight, crew chief noticed hydraulic leak from pressure line on the yaw SCAS link. Caused by failure of hydraulic line at fitting.

C series - At 120 KIAS, crew chief felt unusual vibrations under C-box. Caused by stuck lorde mount.

Observation helicopters

OH-6 Class E mishap

A series - Crew felt brief lateral cyclic vibration as aircraft came to hover. Abrasion tape was missing from one-third of outboard main rotor blade. Caused by poor bonding.

OH-58 Class D mishaps

C series - Left passenger door on parked aircraft was blown open by rotorwash from hovering AH-1, breaking top hinge and bending bottom of door outward. Door had been left unsecured.

C series - During postflight inspection, crew found dents and holes on main rotor blade. Training area had lots of loose, dry tree branches which could have blown up into rotor system during NOE flight.

OH-58 Class E mishaps

A series - Aircraft was 500 feet agl, in cruise flight, when master caution and fuel boost lights came on. Before descent could be made, rpm audio and warning light came on. N2 dropped to about 95 percent before coming back up to 101 to 102 percent. Before a forced landing could be made, N2 again dropped below 101 percent and continued to fall until, at about 8 to 10 feet agl, pilot saw N2 was below 90. Pilot increased governor and used about 75 percent of collective to clear a 6-foot dike and land. Caused by failure of fuel boost pump and partial collapse of fuel line, causing low fuel supply to engine.

C series - Combining transmission oil pressure gauge fluctuated from 40 to 105 psi twice within 5 seconds, then remained at 105 psi. Caused by failure of oil pressure transducer.

Fixed wing

C-7 Class E mishaps

A series - Landing gear wouldn't retract after takeoff. Caused by internal failure of selector valve assembly.

A series - Aircraft was in cruise flight. No. 2 engine vibrated, backfired, ran smoothly, then began to surge and backfire again. Caused by failure of No. 4 cylinder.

OV-1 Class E mishaps

D series - No. 2 engine began 10- to 15-percent power surges while aircraft was in cruise flight. Caused by internal failure of fuel control.

D series - Fuel pump light came on during runup. Caused by failure of aft boost pump.

U-21 Class D mishap

A series - Both engines were started, heater was turned to automatic position, and aircraft taxied to pick up passengers. After running engines 5 minutes, pilot saw black smoke coming from heater and defroster vents. Copilot, who was outside aircraft, used fire extinguisher to put out flames visible through heater air intake on right of nose section. Cause unknown.

U-21 Class E mishap

A series - On climbout, pilot noticed fuel siphoning from No. 1 engine nacelle tank cap. Cap had not been properly seated by civilian refueler.

Maintenance

UH-1 Class C mishap

M series - A 5/16-inch, [illegible]-inch drive, snap-on socket was ingested through engine intake. Socket caused internal explosion and damage to engine. Suspect socket was inadvertently left in engine intake particle separator.

UH-60 Class E mishap

A series - APU exhaust pipe was ejected from exhaust shroud while unit was running. Suspect bolt on exhaust pipe missing or not properly torqued.

Mishap briefs

CH-47 Class E mishap

A series - Crew was performing internal load training mission when master caution, No. 2 SAS segment, and No. 2 hydraulic boost segment lights came on during cruise flight. Crew verified hydraulic pressure had dropped to zero and made forced landing. Same line had ruptured 8 months before. Aluminum tubing was used in replacement line instead of corrosion resistance steel. Hydraulic technician didn't recognize manufacturing error, and installed the weaker tubing in lower combining transmission area. Hydraulic tubing burst, causing loss of fluid.

OH-58 Class E mishaps

A series - At about 500 feet agl, pilot noticed high frequency vibration. When vibration strengthened, pilot landed in open field. Mechanic had omitted installing preformed packing in main drive shaft O-ring, causing lubricating grease to be lost.

A series - During hover check, aircraft had been turned into wind for HIT check. After completion and clearance for taxi, sparks came from lower instrument panel on pilot's side. Caused by wire on turn and slip indicator coming loose and touching another wire lead.

C-12 Class E mishaps

C series - After liftoff, top front cowl on No. 2 engine rear lock came loose. Lock was out of adjustment.

C series - Aircraft was on approach. Flaps failed to lower. Caused by corroded fuse mount.

U-21 Class E mishaps

A series - Pilot noticed right main gear door was out of adjustment and could contact gear strut, which could cause landing gear to get stuck. Turnbuckle on right main gear outboard door was out of rig

J series - No. 2 engine compartment inboard cowling forward latch opened in flight. Caused by misadjustment of latch.

Safety messages

- Safety-of-flight maintenance mandatory message concerning correction to previous message, AH-64 series aircraft (AH-64-86-07, 201330Z Mar 86). Summary: Referenced message was incorrectly assigned control number AH-64-86-05 and is in error. Correct message number is AH-64-86-06. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.
- Maintenance information message concerning EH-60A/UH-60A aircraft inlet particle separator blower for T-700 engine (MIM-UH-60A-85-ME-03).

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

Fire extinguisher can become a safety hazard

Applying unregulated air pressure into the cylinders of water-type fire extinguishers (WS 900 series) for the purpose of washing or flushing aircraft engines is a safety hazard. The fire extinguisher was not designed to be used for this purpose and people have been seriously injured when cylinders exploded. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

Broken Wing Award recipients

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The Broken Wing Award is given to aircraft crewmembers who demonstrate a high degree of professional skill while actually recovering an aircraft from an in-flight failure or malfunction necessitating an emergency landing. Requirements for the award are spelled out in AR 672-74, dated 15 May 1982.

The following aviation crewmembers recently received the Broken Wing Award.

• **CW3 Charles R. Shaffer, E Company, Task Force 160, 1st Special Operations Command, Fort Campbell.** CW3 Shaffer was pilot-in-command of a CH-47D on a night vision goggle training mission. As the aircraft approached an off-shore platform, No. 2 engine bleed bands opened, causing a severe compressor stall and resulting in sudden loss of power and internal-engine fire. There was a sudden torque split and rapidly decreasing N1. Shaffer told the copilot, who was on the controls, about the torque split but the copilot wasn't aware of the seriousness of the power loss and continued the approach.

Realizing the copilot wasn't going to take immediate action, Shaffer took the controls and made a shallow diving turn, trying to gain airspeed and avoid hitting the platform. The crew chief and personnel on the platform told him the No. 2 engine was on fire. The copilot shut the engine down, and the fire went out.

Shaffer knew a running landing wasn't possible on that kind of platform. Weather conditions and gross weight meant the aircraft wasn't capable of a single-engine out-of-ground-effect hover that would be required to successfully land on the platform. He decided to fly the 40 miles back to an onshore airfield, where he successfully made a single-engine running landing.

• **CW3 Robert A. Doyle, Company A, 3d Military Intelligence Battalion (Aerial Exploitation), 501st Military Intelligence Group, APO San Francisco 96271-0153.** CW3 Doyle took off at 0305 hours on an SLAR mission in an OV-1D. The first part of his flight was normal but, while icing was not forecast, he encountered clouds at 14,000 feet and noticed a continuous buildup of light ice. He turned on deicing and anti-icing equipment and continued to fly for a little more than 2 hours before he felt unusual inputs on the rudder pedals. Finding he had little control over the rudder pedals, he declared an emergency and began his return to home base.

When he began descending to land, the aircraft started to yaw. Engine instruments showed nothing wrong, then the enlisted specialist on board reported sparks coming from the exhaust system of No. 2 engine. Doyle rechecked his gauges and they confirmed engine failure. Shutting the engine down, he completed emergency procedures and considered his options.

Because of his hampered rudder controls, Doyle couldn't properly trim the aircraft for single-engine flight. He told his passenger to be prepared to eject if he lost control, and continued the descent. With both engines functioning, loss of rudder, although serious, would not have been a major obstacle to safe return to base, even in a night, weather situation. But with only one engine, Doyle couldn't counteract the adverse yaw imposed by loss of thrust. Without rudder control, his single-engine best rate of climb and velocity of minimum control were higher than he had originally computed them. To offset this dual emergency, Doyle flew a terminal area pattern of shallow turns, keeping his airspeed as high as conditions would permit—and landed safely.

Postflight inspection showed the high-frequency antenna had snapped, possibly due to ice, and wrapped around the center vertical stabilizer and rudder, impeding rudder control. Cause of the engine failure was not known when the Broken Wing Award nomination was submitted. ►

Broken Wing Award recipients

• **CW2 George T. Anderson, Jr., B Company, 503d Aviation Battalion (Cbt), APO New York 09165-1539.** CW2 Anderson was a maintenance test pilot with a unit in Europe. The pilot of an OH-58C noticed, on takeoff from a field site, that there was a fluctuation in the torque gauge. He returned to the field maintenance area. Anderson questioned the pilot about the problem with the aircraft, and after inspecting the engine and trying to duplicate the problem during ground and hover checks, decided a test flight was needed.

Anderson took off and began flying traffic patterns, trying to recreate the torque gauge fluctuation. On the first pattern, there was only a small fluctuation. When he reached the turnaround point on the second pattern, Anderson increased torque to 75 percent. Torque fluctuated at about 20 percent and N1 at about 1 percent. He slowly increased collective pitch, and the engine flamed out. Anderson entered autorotation and, after completing a 180-degree turn, steered the aircraft toward a plowed hilltop. Clearing wires on the approach end of the landing area, he landed with a minimal ground run, with no damage to the aircraft.

• **CW3 Michael D. Spradling, 9th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CW3 Spradling was instructor pilot on a UH-1H, engaged in a nap-of-the-earth training flight. The student pilot crossed the phase line, and had started to cross a tree line, when the crew heard a grinding noise from the engine/transmission area. The airspeed was about 15 knots and altitude was 10 feet.

Spradling took control and headed the aircraft toward an open field. As he turned toward the field, the aircraft started losing power; the rpm warning light came on, and rotor and N2 rpm began decreasing. Spradling held off applying collective until just before touchdown, when he would need it most.

Just prior to touchdown, Spradling pulled all available collective and the aircraft hit the ground with very little forward movement. Due to uneven terrain, the aircraft rocked up on its nose, causing both crosstubes to collapse. The Huey turned about 90 degrees on its nose and came to a stop. Spradling's quick decision to land in the only available open space minimized damage, and possibly prevented loss of life, in the rough terrain and swampland surrounding the field.

• **CW2 Mark C. Rogers, 9th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CW2 Rogers was instructor pilot on a UH-1H, flying trail in a flight of five. The aircrews were conducting advanced combat skills training during contour flight. The aircraft were about 50 feet above a thickly forested, swampy creek area, when Rogers saw his master caution and transmission oil pressure segment lights come on. The transmission oil pressure gauge showed pressure had dropped to zero.

Rogers maneuvered the aircraft toward one of the few available safe landing areas. As a Mayday call was transmitted, students in the rear of the aircraft saw oil on the floor of the cargo compartment. Soon, heavy smoke filled the cargo and crew compartments, affecting visibility and making breathing difficult. Rogers knew his transmission could seize at any time, and now he also had a fire of unknown origin.

As he applied collective pitch to slow forward movement and minimize descent, N2 bled off below 6000 rpm, causing a severe loss of available power for touchdown. There was a series of sharp reports, and loud grinding noises were heard coming from the rear of the aircraft. The aircraft touched down on the rough terrain, and after a forward movement, came safely to rest.

When the engine was tested later, there was a severe compressor stall. Seven compressor blades were found bent and two variable ihlet guide vanes were loose, which explains the loss of power on short final to the landing area.

• **CW3 James M. Roser, 224th Military Intelligence Battalion (Aerial Exploitation), Hunter AAF.** CW3 Roser was pilot-in-command of an OV-1D operating from a field located at 2,070 feet in a valley, surrounded by mountains. The Mohawk had just taken off and was about 40 feet agl when two birds were ingested by No. 2 engine, causing a catastrophic failure.

Because of the immediate internal damage to the engine, it didn't wind down gradually; it seized instantly. The propeller did autofeather, but the low altitude of the aircraft and high density altitude of 4,800 feet, placed the aircraft in a very precarious situation.

Roser jettisoned the fuel tanks, and completed emergency procedures. At first, he was unable to get the aircraft to climb, and he considered ejecting as he struggled to gain airspeed and altitude. After flying for 3 miles, at 50 feet agl, Roser succeeded in getting the aircraft high enough to allow him to return to the field and make a single-engine landing.

• **CW2 Kenneth Haney, 11th Regimental Combat Aviation Squadron, 11th Armored Cavalry Regiment, APO New York 09146.** CW2 Haney was pilot-in-command of an AH-1S(MC) which was involved in a gunnery training exercise over terrain covered with brush and large rocks. There were also numerous small areas of soft soil with standing water, crisscrossing slopes, and clumps of trees of varying heights in the area. The Cobra had been in low-level tactical cruise flight only a couple of minutes when an emergency occurred.

Haney was flying about 50 feet agl, at 50 to 55 KIAS, when the aircraft began yawing and sinking. N2 rpm bled off to about 95 percent and fluctuated slightly. Within 1 or 2 seconds, there was rapid reduction in N1 and N2 rpm and the low rpm warning system came on. Haney correlated the low rpm reading with the reduction he had noted in engine noise and the need for

more collective pitch to maintain altitude. He set up an approach to a gravel tank trail, the only suitable landing area within a 30-meter radius of the aircraft. Both N1 and N2 rpm stabilized for a moment, leading Haney to believe he could complete an approach to the trail. But, just as the aircraft completed the turn, N1 and N2 rpm began rapidly decreasing, and the aircraft yawed left. Reacting to an indication of engine failure, Haney entered a low-level, low-airspeed autorotation, lowering collective only slightly, due to the extremely low altitude and airspeed.

Since the engine was still operating, although at a reduced level, Haney analyzed the emergency as a possible underspeeding N2 governor and reduced the throttle to engine idle. His altitude, airspeed, and position, in relation to the only suitable touchdown area, meant that completing this emergency procedure would probably result in major damage to the aircraft, so he continued autorotation.

Haney realized he couldn't make an autorotational landing perpendicular to the tank trail without the aircraft sliding across the road, through the ditch, and into trees beyond. So, he applied full left pedal to bring the tail parallel to the road and maneuvered to land with the long axis. A group of trees to the right of the road meant he had to position the aircraft with precision, so that the right skid was on the road and the left skid was over the ditch. Applying the last bit of available collective pitch and the deteriorating rotor rpm, Haney maneuvered the aircraft onto the only available piece of ground within 5 meters of the aircraft, with a slope of less than 18 degrees. The aircraft came to rest with a left-bank angle of nearly 10 degrees.

• **Mr. James L. Couch, U.S. Army Transportation Center, Fort Eustis.** Mr. Couch was conducting an over-water test flight of an OH-58A when the aircraft suddenly yawed right, accompanied by an N2 increase to about 110 percent and increase in rotor rpm to 380. Couch reduced collective and throttle to prevent overspeed and turned toward land.

As collective was lowered and throttle reduced, N2 and rotor rpm continued to increase. When Couch again reduced throttle, N2 and rotor immediately dropped below normal operating limits, and the rotor warning light and audio came on. As he increased throttle to regain normal rpm, N2 again reached 110 percent and rotor rpm reached 380. Couch was at 400 feet agl over the landing area, and rpm couldn't be manually controlled. He made a successful power-off autorotation to the only available landing area, a space 110 feet by 80 feet, surrounded by poles, wires, and vehicles.

• **CW3 Richard J. Karle, 3d Squadron, 7th Cavalry, 3d Infantry Division, APO New York 09033.** CW3 Karle was instructor pilot of an AH-1S in a three-ship fomation flight engaged in tactical terrain training. The aircraft, in trail position, was in cruise flight, about 60 feet agl, when the master caution and forward and aft fuel boost pump lights came on. Karle checked to ensure his main fuel switch was in the on position, and then checked the N1 and N2 gauges. Then the low rpm warning system came on.

Karle turned his attention to the landing area in front of the aircraft and, because there wasn't enough altitude to make any turns, he began autorotation. N1 was below 20 percent, N2 at 35 percent and decreasing, and rotor rpm was at 82 percent and not recovering, despite the fact the aircraft was decelerating. Karle continued to decelerate in an attempt to lose as much airspeed as possible before touchdown.

At about 20 feet, Karle put the aircraft in landing attitude and pulled initial pitch. He used all remaining pitch during cushioning, in an attempt to prevent the aircraft from settling too deep into the freshly plowed field. As the aircraft came to a stop, its M97 gun hit the ground, and the aircraft rolled up onto its nose. Karle pulled additional aft cyclic, preventing the main rotor blades from hitting the front cockpit. After a 70-foot ground run, the aircraft stopped, with no damage.

There were 75-foot trees on either side of the flight path when the emergency began. The touchdown area of freshly-plowed ground sloped slightly and was about 100 by 200 meters in size.

• **CW4 James A. Bannenberg, 136th Transportation Company (Hel Mdm), Grand Prairie, Texas.** CW4 Bannenberg was instructor pilot of a CH-47A on a unit training mission. The aircraft, with 3 other people on board, was 1,000 feet above gently rolling terrain, when, with no warning, a severe vibration was felt throughout the aircraft. The most pronounced vibration was in the vertical axis. The vibration fed back through the flight controls and was magnified through the cyclic, which was almost uncontrolllable.

Below the aircraft was a single-storied factory building with a lighted parking lot, surrounded by an 8-foot fence. It was the only available emergency landing site, and Bannenberg made his decision to land.

As he began the descent, cyclic feedback dampened slightly. No caution lights came on, but the pilot's instrument panel couldn't be read because of the vibration. Bannenberg turned his searchlight on, and the copilot made a Mayday call. Bannenberg made a 180-degree descent to the vacant parking lot. On short final, he saw two 50-foot poles holding high tension wires. He applied power, cleared the wires, and landed without damage to the aircraft. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - While in cruise flight, passenger noticed strap hanging from right side of aircraft. It was pulled in and found to be a cargo tiedown strap.

Postflight inspection showed holes and dents in tailboom skin and tail rotor drive shaft cover and scoring on No. 3 drive shaft. Tiedown strap hadn't been properly secured.

UH-1 Class D mishap

V series - Aircraft was on approach to land. External load was about 20 feet agl when the cargo hook inadvertently opened and load fell to the ground. Release button had not been pressed, and cargo release switch was in arm position.

UH-1 Class E mishaps

H series - Aircraft was turning to land when crew saw transmission low pressure light come on. Broken transmission oil filter gasket seal allowed oil to leak from system.

H series - Engine rpm needle dropped to zero, with no rpm light or audio warning. Engine tachometer generator failed.

H series - Master caution and right boost pump segment lights came on at 3,000 feet agl. Caused by failure of submerged fuel boost pump.

UH-60 Class E mishaps

A series - During shutdown, crew chief noticed broken spring on droop stop was causing blade to droop.

A series - Loud, whining noise was heard from No. 1 engine during hover. Caused by bent blade on first stage compressor.

Attack helicopters

AH-1 Class C mishap

G series - Engine temperature began climbing and by the time aircraft landed, engine oil temperature had gone to 135° C. for more than 5 minutes. Transmission oil temperature was 100° C. Bearing failed, causing turbine fan to seize and engine and transmission to overheat.

AH-1 Class D mishaps

S series - Damage to both main rotor blades was found on postflight inspection. While on NVG mission, aircraft was on approach to lighted forward-area refueling point (FARP). Operator of forklift in front of aircraft turned on floodlights, causing PIC's NVG to shut down. PIC continued approach, refueled, and returned to parking. Investigation showed broken limbs on small trees in flight path to FARP.

S series - Aircraft was used for NVG NOE flight training, including confined area operations. Crew chief found damage to tail rotor during daily inspection. Pilot had failed to maintain adequate clearance from obstacles.

AH-1 Class E mishap

S series - Closed-circuit refuel retaining ring pulled free from fuse-

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	1-9 Apr	**2**	**8**
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**21**	**19**

lage when refuel nozzle was mated to CCR system. Nozzle couldn't be properly seated.

AH-64 Class E mishaps

A series - Aircraft was performing weapons training. While hovering 200 feet agl, No. 1 engine torque dropped to zero and No. 2 engine torque climbed to 125 percent. IP reduced collective and flew out of the

hover. Engine torques rejoined, and gauges read normal. Maintenance couldn't duplicate.

A series - While at 6-foot hover, before performing a slope landing, aircraft's shaft-driven compressor (SDC) light came on. Postflight inspection showed oil leaking from SDC area. Caused by failure of shaft-driven compressor.

Cargo helicopters

CH-47 Class D mishaps

C series - Aircraft was landing with low-density external load. Load began spinning and slings twisted tight, causing cargo hook support brackets to bend.

C series - Aft left work platform came open in flight and struck No. 1 engine tailcone. Caused by failure of left aft work platform hinge.

CH-47 Class E mishaps

C series - As aircraft came to hover, low-density external load began to spin. As load was positioned, sling clevis failed, and load was dropped.

C series - During runup, crew noticed decreasing utility hydraulic pressure and No. 2 generator dropped off line. Large amount of hydraulic fluid was found near No. 4 and 5 drive shafts, and utility hydraulic reservoir showed loss of fluid. Caused by cracked flair fitting.

D series - During missed approach, aircraft had a high-side beep failure on No. 2 engine. Caused by failure of N2 actuator.

Observation helicopters

OH-6 Class E mishap

A series - Pilot inadvertently applied pressure on right position light fairing, causing it to crack.

OH-58 Class E mishaps

A series - IP was demonstrating hydraulics-out landing on downwind. Hydraulics were turned off, but as aircraft touched down on landing, hydraulics came back on. Switch was in off position, but hydraulics couldn't be turned off. Caused by internal failure of solenoid valve.

C series - Aircraft landed short of destination because low-fuel light came on during cruise flight. Pilot was unable to locate VFR entry point into control zone at unfamiliar airfield, and radar wasn't able to identify aircraft.

C series - During hover power checks, N1 tachometer began giving wrong indications. Caused by failure of tachometer generator.

Training helicopters

TH-55 Class D mishap

A series - As rotor system of parked helicopter slowed down, another aircraft hovered close by. Downwash from second aircraft caused main rotor blades of parked aircraft to flex down and strike the tailboom, damaging main rotor blade and tailboom.

Fixed wing

C-12 Class E mishaps

C series - During cruise flight, pilot heard change in engine noise. Instruments showed drop in No. 2 engine propeller rpm and zero oil pressure. Caused by failure of engine oil pressure regulating valve.

C series - When gear was lowered to perform landing configuration stall, left main gear light showed unsafe. Caused by failure of nose gear limit switch.

OV-1 Class E mishap

D series - No. 2 engine fuel pressure light came on during start. Caused by faulty pressure switch.

U-21 Class D mishap

F series - Aircraft was on takeoff, at about 75 knots, when pilot saw fuel truck pulling out on runway. Aircraft stopped about 100 feet from truck. Two main gear tires had to be replaced.

U-21 Class E mishap

A series - As aircraft leveled for cruise flight, left nacelle fuel tank cap began siphoning fuel overboard. Pilot failed to properly seat fuel cap after refueling.

Maintenance

UH-1 Class D mishap

V series - Aircraft was in cruise flight when crew heard loud pop. Pilot's greenhouse window had cracked. Window panel was probably installed under stress.

UH-1 Class E mishaps

H series - Rpm warning light came on intermittently while aircraft was in cruise flight, N2 was 6500 rpm; rotor rpm was 320. Caused by loose master arm cannon plug.

H series - Copilot saw, and smelled, smoke during runup. Shielded wire in wire bundle contacted circuit breaker, causing short. Wire bundle was retied and insulated from circuit breaker panel.

Mishap briefs

H series - After liftoff to hover, tail rotor pedals froze hard and aircraft began right rotation. Aircraft landed and, after reducing rpm to flight idle, pedals could be moved with difficulty. Tail rotor grip bearings were installed wrong.

UH-60 Class E mishap

A series - During high hover for slingload, No. 2 fuel filter bypass light came on. After 5 minutes of flight, No. 1 fuel filter bypass light came on. Dirt was found in fuel filters.

CH-47 Class E mishaps

C series - Aircraft was on test flight for autorotational rpm check. When power recovery from autorotation was initiated by reengaging normal engine trim, No. 1 engine didn't respond and stayed below 70 percent. Cannon plug connector was contaminated with dirt, oil, and water.

C series - During engine start, No. 2 engine fire warning light came on when engine condition levers were advanced to flight. No. 2 engine fire detection element was installed wrong, causing it to rub on engine cowling, chafing the element.

D series - Aircraft was at 3,000 feet agl, in cruise flight. Master caution and No. 2 hydraulic flight control segment lights came on. Hydraulic fitting on hose assembly had become loose, causing loss of hydraulic fluid.

OV-1 Class E mishap

D series - While at 19,000 feet, pilot raised and lowered seat and oxygen hose came loose. Hose was improperly positioned.

U-21 Class E mishap

A series - During engine runup, No. 2 secondary idle-stop warning light couldn't be reset. No. 2 prop was 200 rpm higher than No. 1. Caused by out-of-adjustment No. 2 engine secondary idle stop.

C-12 Class E mishap

D series - Left cowl lock on No. 2 engine vibrated loose during cruise flight. Lock wasn't properly seated.

Safety messages

• Safety-of-flight technical message concerning inspection of primary servo pressure switches on all CH-54B helicopters (CH-54B-86-03, 271400Z Mar 86). Summary: CH-53 helicopters recently experienced several failures of primary servo pressure switches, resulting in loss of corresponding hydraulic system and requiring precautionary landings. Same switch is used on CH-54B. Failed pressure switches were procured from unqualified sources. The only approved switch is manufactured by Consolidated Controls. Switches will be inspected, and nonapproved switches will be removed. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300. ■

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

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Bird strikes

Birds aren't the biggest problem Army aviation has, but bird strikes still occur with monotonous regularity and they're a particular hazard at this time of year, because large numbers of birds are migrating north for the summer. If you happen to be operating in or near their migratory routes, your chances of a bird strike are entirely too good.

Most bird strikes occur at low level, but that also happens to be where most Army aircraft operate. Bird strikes to Army aircraft usually occur below 1,000 feet, with more than two-thirds of them occurring during takeoff, climb, final approach, and landing. But, there's always the exception to the rule, and strikes have occurred above 5,000 feet.

The danger to a slower-flying helicopter from a bird strike isn't as great as it is to high-speed jet aircraft. But, ask any Army aviator who has suddenly found his lap full of bird and shattered windshield, and he'll tell you it's an experience you will do well to avoid. As for birds ingested into an aircraft's engine, the Army pilot whose Mohawk ingested two birds into an engine, causing a catastrophic engine failure, would probably trade his Broken Wing Award for the years the emergency took off his life. He flew at 50 feet for several minutes before he could gain enough altitude to clear mountains in his path and made a single-engine landing.

As a UH-1 was entering the airfield traffic area, the pilot and copilot noticed a large number of birds. The pilot turned on the landing light and selected a flight path clear of the birds. While the crew was concentrating on another aircraft which was also landing, a buzzard dived toward the UH-1. The pilot shielded his head with his arms as the buzzard hit the upper part of the left windshield, breaking the greenhouse. Glass flew into the pilot's face and over his body. His helmet visor was down, saving his eyes.

Another UH-1 was flying 100 feet above the ground at 100 knots when a seagull hit and shattered the chin bubble. The seagull ended up inside the aircraft between the pilot's pedals. The copilot took control and landed.

As an Army helicopter was approaching a civil airport for landing, a goose hit one of the main rotor blades. The pilot was able to land without further incident or injury. This particular airport is bordered by two rivers which are major flyways for migrating waterfowl.

Regardless of the size of the bird, it should be considered a potential hazard. The speed of the aircraft dictates the force of impact. The faster you are flying, the greater the impact forces. Each time the aircraft's speed doubles, the force quadruples.

Conditions that attract birds vary at each base and airfield. Hazards may be seasonal or year round. Birds are attracted by food, water, or shelter. Bird activity increases around newly planted farmlands and during grain harvest season. Birds are more active in the mornings and evenings than at midday.

While there is no sure way to avoid the birds every time, keeping the following points in mind may help reduce the possibility or severity of a bird strike.

- Watch for birds while taxiing for takeoff. If possible, do not take off or land if flocks of birds are on or adjacent to the runway.
- Try not to fly over wildlife refuges. Operations within 30 miles of these refuges are considered hazardous.
- During cruise, watch for flocks of birds and try to climb above them. A bird will usually try to avoid a collision by diving or sideslipping to lose altitude.
- If high bird concentrations are encountered, slow the aircraft to minimize impact forces.

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap

H series - Aircraft had been washed and was sitting on wash rack. Pilot, in left seat, attempted to bring aircraft to hover. Aircraft began dynamic rollover to right, main rotor blades struck the ground, and aircraft came to uncontrolled hover. PIC took controls and reduced collective. Aircraft landed hard. 8625

UH-1 Class C mishap

H series - During rappelling operation with two students on the ropes, aircraft was at stable hover over trees. At about 80 feet agl, with 40 pounds torque, crew heard two loud, sharp reports. Engine surged and aircraft yawed right. Pilot told rappelmaster to put ropes in or out, so aircraft could land. Rappelmaster called, "ropes clear," and aircraft landed. After landing, rappelmaster told pilots that he released one rope and cut the second. Student was injured when rope was cut while he was about 40 feet above the ground. Cause of aircraft problem under investigation.

UH-1 Class D mishaps

H series - Engine oil pump drive shaft sheared and oil cooler had to be replaced. Oil pump failed because of overpressurization resulting from failure of coupling half. Coupling half failed because cracked retaining ring allowed coupling to move.

H series - Aircraft had just completed hot refueling operation. Refueler wanted to get pump operator's attention, and he threw a rock in his direction. Rock hit main rotor blade. Refueler was not adequately trained in safe fueling operations.

UH-1 Class E mishaps

H series - During flight, crew smelled burning electrical wires. Engine oil pressure went past 100 and volts dropped to 50. Main inverter burned out, causing malfunction of engine oil pressure gauge.

H series - While performing power-cylinder check at a 20-foot hover, cyclic locked in right-front quadrant. When hydraulic switch was recycled, lockup was released and hydraulic power lost. Power was restored by pulling circuit breaker. This happened again during base final. Caused by internal failure of irreversible valve.

Attack helicopters

AH-1 Class A mishap

S series - Pilot heard popping noise and aircraft began a right turn which progressed into a right spin. Aircraft hit a tree, then crashed. 8626

AH-1 Class B mishap

S series - Aircraft was on NOE training mission when it struck a tree. Aircraft proceeded to drop zone and landed. Pylon, wing stores, all rotor blades, and turret were damaged. 8627

Cargo helicopters

CH-47 Class E mishaps

C series - Three 500-pound bridge boats were being transported externally by CH-47s. Two were rigged with new multileg slings, and the other with the old nylon-sling assembly. The two multileg slingloads were transported without problems. The aircraft carrying the load rigged with nylon sling climbed to about 250 feet agl, flying at about 35 knots. The load twisted, then continued to twist slowly. The pilot tried slowing the aircraft, but the load continued to twist. As the pilot tried to place load on ground, rotorwash aggravated twisting. Spin acceler-

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	1-16 Apr	**2**	**8**
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**21**	**19**

ated to about one revolution per second. When load was about 10 feet from the ground, the sling failed because of torque loading on the nylon straps. Load fell to ground but wasn't damaged.

C series - Aircraft was in cruise flight when copilot felt vibration in pedals. Flight engineer found vibration and sound were coming from drive shaft area. Caused by failure of lorde mount.

Observation helicopters

OH-6 Class D mishap

A series - During maintenance operational check, aircraft was started to adjust N2 governor. Ignition was normal, but engine made loud noise at 50 percent N1, then bound up and wouldn't accelerate. EGT fluctuated before being shut down. Piece of fifth-stage stator vane, forward of damaged area, was found missing. Suspect stator vane failed and caused FOD.

OH-58 Class E mishap

A series - Aircraft was at 1,500 feet agl in cruise flight. When power was increased to 70 psi indicated torque, crew heard whistling sound and felt vibration. Caused by failure of bonding at first main rotor doubler.

Training helicopters

TH-55 Class C mishap

A series - During termination of standard autorotation, aircraft began yawing and drifting right. Aircraft lifted off runway about 6 inches and touched down in left yaw, drifting to right. Right skid hit sod to right of runway; aircraft pivoted up on toe of skids. Main rotor blades hit the ground and the tailboom. Aircraft continued to yaw and roll right, coming to rest on its right side. Main rotor blades, tail rotor drive shaft, tail rotor gearbox mount, and both skid tubes were damaged.

Fixed wing

C-7 Class E mishap

A series - No. 2 engine left magneto went dead during runup. Magneto points were broken, allowing improper opening of points.

C-12 Class E mishap

C series - During runup, fuel flow on No. 1 engine fluctuated 25 to 35 pounds per hour. N2 fluctuated 25 rpm, and N1 1.5 percent. Caused by failure of propeller governor.

OV-1 Class E mishap

D series - Left engine lost power during approach. Caused by internal failure of fuel control.

U-21 Class E mishap

A series - Aircraft was at cruise speed when pilot noticed fuel siphoning from No. 1 nacelle fuel cap. After landing, fuel cap was reseated. During previous sheetmetal work, the cap seat on this aircraft was recessed more than normal. Fuel cap wasn't properly seated.

Maintenance

UH-1 Class E mishap

H series - As engine was started N1 reached 30 percent, and fire guard told pilot to shut down. Fuel was spraying near start fuel nozzles and igniters. Caused by crack in start fuel line.

AH-1 Class E mishaps

S series - During runup, loud noise was heard and small object was seen flying away from aircraft. Small gouge was found in leading edge of blade. Caused by screwdriver left on flexure plate while anticollision light was replaced.

S series - During cruise flight, pilot noticed grinding sound followed by master caution and No. 1 hydraulic system segment lights, and disengagement of yaw SCAS channel. Caused by improper installation of hydraulic plumbing T-fitting. Nut backed off, causing leak in No. 1 hydraulic system.

CH-47 Class E mishap

C series - During HIT check with No. 2 engine at ground idle, flight engineer noticed high frequency vibration near combining transmission. No. 1 engine transmission drive shaft splines were found dry. Lack of lubrication caused high frequency vibration.

OH-58 Class E mishap

A series - Aircraft was in cruise flight when crew began hearing high-pitched generator bleedover sound from all radios. Pilot noticed transmission oil hot light had come on. Aircraft landed. No transmission problem found. J-600 impedance pad had been short-circuited by a loose rivet found behind pad. Rivet was probably dropped when windshield was replaced.

C-12 Class E mishap

D series - During touch-and-go maneuver, at approximately 20 percent power, pilot was told by IP to apply takeoff power. No. 1 engine failed to respond and developed only 40 percent power. Acceleration dome on fuel control unit was adjusted and aircraft released.

OV-1 Class E mishap

D series - No. 2 generator amperage showed zero during cruise flight, but generator failure segment light wasn't on. No. 1 generator amperage was 315. Terminal end for shunt was loose, causing arcing and fluctuation of amps display.

U-21 Class E mishap

A series - Landing gear position warning lights stayed on after gear was retracted, and landing gear motor continued to cycle. Caused by landing gear clutch out of adjustment.

Safety messages

• Safety-of-flight operational message concerning operating limitation on OH-58A/C aircraft with controllable landing light installed (OH-58-86-02, 021400Z Apr 86). Summary: Through Equipment Improvement Report, problem was identified concerning effectiveness of OH-58 wire strike protection system (WSPS) with the controllable landing light in extended position. Analysis reveals possibility of degrading WSPS when controllable landing light is not in fully-stowed position. Testing will be conducted in FY 86 to determine extent of problem. This message is to warn users a potential hazard exists. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300. ■

Bird strikes

• Remember that flocking birds may fly between their roosting and feeding areas during the early morning and evening.

• If possible, avoid flying low in the vicinity of swamps, garbage dumps, wooded hilly areas, or any other place that may be attractive to birds.

• Windshield and greenhouse penetrations are the greatest potential danger to aircrews from bird strikes. Helmet visors worn in the down position have protected many pilots from serious injury from glass and bird fragments.

• When pilots sight birds, they should notify other pilots and the control tower of the hazard.■

Alert notice on SPH-4 flight helmets

Investigation of complaints from users has revealed that the multiple layers of fiberglass lining on the inside of some SPH-4 flight helmet shells are not properly bonded and are separating. This causes loss of impact resistance and makes these helmets unsuitable for use. A decision has been made to immediately recall helmets showing this defect for repair/replacement by the contractor. The helmets were made by Safetech, Inc., under contract DLA 100-83-C4207. Helmets from the following lot numbers are suspect:

NSN	Size	Label/Lot No.
8415-00-144-4981	Regular	2
8415-00-144-4985	X-large	11,12,13,14

Defective helmets are to be returned to Defense Construction Supply Center, Columbus, Ohio, mark **for TWC** Credit will be given for exact quantity received at Columbus. Contract and lot number must be placed in the remarks section of the 1348-1 form, which must accompany stock to depot.

A. Report of excess material card (FTE) in MILSTRIP format to DPSC (RIC S9T) will be used.

B. Card columns 54-56 (receiving depot) SCT.

C. Card columns 57-59, project code RDE.

D. Card column 71, condition code A.

Transportation costs will be paid by DPSC. Cite fund appropriation 97X4961 5101 01 22.3. These instructions are applicable only to returns from contract DLA 100-83-C-4207, Safetech, Inc., for the lot numbers listed above.

Stocks are not available, at this time, for replacement of defective helmets. Estimated available date is July 1986. Helmets manufactured under referenced contract and lot numbers not showing evidence of defect will be replaced when adequate replacement stocks are available.

Contact: Jim Dittmer, AMCPM-ALSE, AUTOVON 693-3215; Gerri Lyles, U.S. Army Support Activity, AUTOVON 444-2537.■

U.S. ARMY SAFETY CENTER

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23 April 1986

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Report of Army Aircraft Mishaps

Do you know enough about droop stop pounding?

Although there were several factors that contributed to this accident, the actual cause was failure to properly align the directional pedals during the before-starting-engine check.

The CH-47D was sitting on the refueling pad at ground operating rpm. The refuel handler thought the No. 2 engine was vibrating excessively, but when he mentioned it to the flight engineer, he was told the vibration was normal.

When refueling had been completed, the crew began bringing the aircraft systems back to normal operation. The pilot had been doing the flying, but now, for the first time during the day, the copilot was on the controls and the pilot was handling the checklist. The flight engineer was standing outside the aircraft by the No. 2 engine.

The pilot had advanced the engine condition levers about 5 percent from the ground position toward the flight position when the crew felt a severe shudder and an extreme vibration of the aircraft. The pilot moved the levers to the stop position and turned the fuel pumps off. At the same time, the flight engineer told him that a droop stop block had been thrown from the aircraft.

The pilot took the cyclic controls from the copilot and told the crew and passengers to get off the aircraft. After calling the control tower for crash rescue support, he also left the aircraft, turning off switches as he left the cockpit area.

The aircraft rotor system began coasting down, but as the aft rotor slowed, one blade drooped down and hit the top of the fuselage at a tunnel cover. Before the rotors stopped turning, another blade had struck the fuselage. There was major damage to the aircraft and to the rotor blades.

He hadn't adjusted the pedals correctly

During the before-starting procedures, the copilot adjusted his pedals incorrectly. The left pedal adjusted to the third hole, and the right pedal to the fourth hole. He failed to detect his mistake because he gave the pedal adjustments only a cursory glance when "pedals adjusted" was called out from the checklist.

When the copilot tried to neutralize his directional pedals during ground operation of the aircraft, the mismatch between them (left in the third hole and right in the fourth) resulted in actual control inputs to the swashplates which exceeded control limitations for normal ground operations. This resulted in excessive droop stop pounding at low rotor rpm.

Bolts on an aft droop stop block were sheared, and the block was lost. Without the block being held in place, the first blade to strike the fuselage was allowed to "droop" below its normal lower limit. As the rotor system slowed down, the blade struck the fuselage, followed shortly thereafter by another aft blade.

How about you?

- How careful are you when you adjust the directional pedals on a CH-47? The pedals must be individually adjusted and aligned. To do that correctly, and to be able to see the adjustment holes, a pilot must lean forward and twist to the left and right. Just giving a glance isn't enough—you've got to really check.
- Would you be able to recognize droop stop pounding at low rpm? What would you do if it happened to you? It might be a good idea to go back and study what the operator's manual has to say about preventing droop stop pounding and what to do if it occurs.
- Forewarned means there's still time to learn, time to plan, and time to prevent this kind of mishap from happening to you. That's why we publish these reviews of accidents. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - Aircraft was fighting forest fire with two other aircraft when it was diverted to another fire. After reconnaissance, crew flew to a pond for water. As aircraft descended for water pickup, an excessive rate of descent developed. Copilot was on controls, and he pulled collective. Copilot stated he hit left pedal stop. Pilot took controls. He saw torquemeter gauge going back down through 65 pounds, reduced collective, and landed. Pilot stated it felt like the bottom fell out during descent. Winds were reported at 230 degrees, 11 knots. Appears aircraft may have been in downwind condition, and copilot allowed excessive sink rate to develop. Pilot was late with corrective action, allowing engine to overtorque.

UH-1 Class D mishaps

H series - Aircraft was started for maintenance check of fuel control installation. Fuel control failed to meter fuel properly and allowed excessive amount of fuel to enter engine. Igniters caused torching effect from engine exhaust, burning paint off tail rotor drive shaft and tailboom.

V series - Aircraft was involved in MOPP training. During postflight inspection, oxygen cylinder was found missing from bracket on cabin wall. Bracket arm inadvertently opened during flight, releasing cylinder. An unauthorized modification had been made to the mounting bracket which was designed to hold portable fire extinguisher.

UH-60 Class D mishaps

A series - Aircraft was on tactical mission when it landed at pickup zone. Gunner fired off about 100 rounds of blank ammunition from gunner's window. Concussion caused crack in pilot's window at lower track.

A series - Pilot felt unusual vibrations during runup. Suspect FOD to tail rotor paddle was from ice shed by main rotor. Caused by inadequate deicing of rotor blades.

Attack helicopters

AH-1 Class A mishap

S series - AH-1 and CH-47D collided in midair during training mission. 8628

AH-1 Class C mishaps

S series - Aircraft was landing after maintenance test flight. As it approached hover, ground personnel saw 20mm gun was down. MTP said gun elevation stow advisory light was on. The gun hit ground, shearing gun mounts. During recovery, tail stinger hit ground and collapsed. Gun turret and tailboom were damaged. Suspect gun elevation drive clutch failed, allowing gun to depress without command.

G series - During low-level weapons night firing, aircraft was 400 feet agl, at 60 knots, when pilot brought aircraft to 20-degree nose-high attitude and fired one pair of 2.75-inch illumination rounds. Pilot slowed airspeed and aircraft began to settle. Pilot applied power, aircraft continued to settle, and pilot applied more power. Torque was at 60 pounds. Aircraft landed. Caused by pilot's failure to follow firing procedures as briefed by IP, and failure to use -10 procedures for settling with power.

AH-1 Class D mishaps

S series - During before-starting

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	1-23 Apr	**2**	**8**
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**21**	**19**

procedures, pilot put jettison switches in up position. After engine was started and run up, armament systems and aircraft circuit breaker were closed and pilot placed master arm switch in standby. Crew heard a clunk which they thought was the 20mm gun stowing. Crew saw both TOW launchers and inboard left MILES pod had been jettisoned. One TOW launcher was damaged and has to be rebuilt.

S series - During standard autorotation, rated student pilot held aircraft above the ground with cushioning pitch until rotor rpm decayed. Aircraft fell from about 1 foot with extremely low rpm, resulting in pylon rock. Postflight inspection showed both main rotor control tubes were bent, and both friction dampers, damper mounts, and control tube rod end bearings were damaged.

AH-1 Class E mishaps

S series - During cruise flight, copilot's collective cover broke in half. Forward portion of cover lodged under collective, restricting downward movement. Minimum attainable torque was 42 percent. IP reduced throttle to 92 percent N2, slowed to 80 knots, and made a running landing.

S series - As aircraft landed, unit trainer felt part of aircraft touch ground before skids. Gunner got out and saw 20mm gun was fully depressed and resting on ground. Gun had come out of stowed position during flight. Inspection showed turret control unit had failed and arced onto control rods.

Cargo helicopters

CH-47 Class D mishap

D series - Aircraft was conducting rappelling operations at 80 feet agl hover. One soldier became inverted on rope and hit the ground. Supported unit hadn't received proper training.

Observation helicopters

OH-58 Class C mishap

A series - Aircraft were in formation flight at 1,000 feet agl. Chalk two noticed fire coming from lead aircraft's exhaust and lead aircraft had an engine-out light and low rpm audio. Autorotation was made to unimproved landing area. Cause under investigation.

OH-58 Class D mishaps

C series - During runup, IP saw smoke in cockpit. Suspect failure of relay switch caused excessive electrical charge to enter and overheat electrical wire.

C series - IP was conducting hydraulics-off approach and was unable to evade bird which struck aircraft's nose.

OH-58 Class E mishaps

A series - During climbout from confined area, pilot heard noise after passing close to tops of trees. During postflight inspection, a 3-inch wrinkle was found on trailing edge of rotor blade tip cap.

A series - Cockpit filled with smoke during hover taxi. Caused by short in heater wire.

C series - Aircraft was 10 to 15 feet agl, at about 50 knots, when it hit a single strand of commo wire. Wire hit crosstubes below wire cutter and broke without damaging aircraft. Ground unit had strung wire between trees and failed to remove it when they left the area.

Fixed wing

C-7 Class D mishap

A series - Right propeller feathered during taxi. Mechanic found and rejoined broken wire leading to brush block cannon plug. He moved the ladder he was using about 10 feet from the propeller and left it standing there while he went to get tools to finish wire splice. Pilot decided to run up No. 2 engine for idle and reverse check. He asked the copilot, who was outside on pilot's side of aircraft, if the prop was clear. The copilot walked around the nose, looked, and said, "OK." The engine started and accelerated to 1300 rpm and then the wooden ladder toppled over into the rotating propeller. Propeller blades were nicked, an 18- x 4-inch hole was torn in the fuselage, and two windows were broken. The pilot failed to verify with the flight mechanic that the engine was ready for runup.

C-12 Class D mishap

C series - During runup, inboard cowling of No. 2 engine blew open, bending sheetmetal and breaking retaining chain. Caused by failure of PIC to secure cowling on preflight.

OV-1 Class E mishaps

D series - While in cruise flight, No. 2 generator dropped off line. Caused by failure of DC generator voltage regulator.

D series - During power-approach precision landing, IP pulled power levers into reverse. No. 2 propeller went into reverse, but No. 1 propeller stayed in forward. Aircraft yawed right and left the runway. The IP regained control and successfully maneuvered the aircraft to avoid hitting runway/taxiway lights. Caused by failure of No. 1 propeller control.

T-42 Class D mishap

A series - Aircraft made normal touchdown at about 85 knots. After approximately 500-foot roll, pilot applied excessive pressure on brakes. Left main tire blew out.

U-21 Class E mishap

D series - During cruise flight, left propeller tachometer generator fluctuated, then N2 tachometer completely failed.

Maintenance

UH-1 Class E mishap

H series - Feedback was felt in cyclic during takeoff. Irreversible valve had been installed backwards.

AH-1 Class D mishap

S series - Maintenance crew was attempting to perform tail rotor track, using stick method. Mechanic pushed improperly prepared tracking stick too far into tail rotor system, damaging both tail rotor blades. Caused by inexperienced mechanic attempting procedure he wasn't properly trained to do.

Mishap briefs

AH-1 Class E mishaps

S series - During cruise flight, pilot felt binding in forward cyclic quadrant. Hydraulic line hadn't been repositioned when synchronized elevator was reshimmed, causing line to chafe against elevator control tube.

S series - Rotor blades wouldn't turn by 15 percent during runup. N2 turbine wheel wasn't installed correctly during maintenance, causing engine to seize.

CH-47 Class E mishaps

B series - As aircraft entered traffic pattern to land, No. 2 engine oil low caution light came on. Switch was out of adjustment.

C series - No. 1 fire light wouldn't test on. Fire handle was improperly installed, causing light not to come on.

OH-58 Class E mishaps

C series - Airspeed indicator went from 80 KIAS to zero during flight. Pitot drain line cap was installed wrong and vibrated off during flight.

C series - Rubbing was noticed each time tail rotor pedal input was applied during cruise flight. Caused by improperly balanced tail rotor.

OV-1 Class E mishap

D series - No. 2 hydraulic pressure fluctuated and dropped to zero pounds during cruise flight. During before-landing check, pressure on No. 1 hydraulic dropped to zero and unsafe gear was indicated. When gear was blown down, pressure on No. 1 pump returned to 1,500 pounds, allowing for power steering during rollout. Pilot brought aircraft to stop by use of reverse. Improper jam nut had been used on No. 2 hydraulic pump pressure line, causing pinching of preformed packing and allowing hydraulic fluid to leak.

U-21 Class E mishap

B series - When power lever was reduced to idle during cruise flight, No. 1 engine wouldn't go below 83 percent and 460 pounds torque. Use of oversized clamp allowed oil line to move, causing power lever linkage cotter pin to catch on oil line.

Safety messages

• Safety-of-flight technical message concerning one-time inspection of pitch link connecting bolts on CH-47B/C/D helicopters (CH-47-86-0I, 102315Z Apr 86). Summary: In Jun 85, SOF message CH-47-85-07 required immediate one-time inspection of pitch link bolts in all CH-47B/C/D helicopters to identify bolts with manufacturer's code 8U928. These bolts had to be removed before flight because manufacturing defects could cause loss of an aircraft. The vendor subsequently revised manufacturing procedures to solve the original problems, but then introduced a corrosion problem by failing to plate the bolt shaft under the shouldered sleeve. Bolts with this corrosion potential must be removed from service before corrosion can reduce their strength. The purpose of this message is to again inspect all CH-47B/C/D helicopters in stock at all levels and to remove all bolts with manufacturer's code 8U928. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

Too busy to fly

An AH-1S was scheduled for a training mission in support of a field training exercise. The pilot and copilot preflighted the aircraft the night before the mission. The crew got up at 0630 on the day of the mission and left the field site at 0750.

The first part of the mission was routine. At 0915, the AH-1 was flown to a refueling location and refueled. At the refueling location, the low fuel light flickered on and off, with a fuel gauge indication of 400 pounds of fuel remaining.

About 15 minutes later, the crew took off from the field site en route to the mission area. An OH-58 and two AH-1S helicopters, which made up the attack team, joined up at the designated battle position and proceeded with the mission. Armored vehicles were sighted and reported to the Tactical Operations Center.

The team was told to engage the target and report the vehicle panel marking number to confirm the vehicle kill, even if they had to fly over the target to get the numbers. This instruction came from the unit commander through unit operations.

The AH-1 pilot positioned the aircraft for engagement and the copilot engaged the armored vehicle. The pilot called in the target engagement and the kill, but he did not call in the panel marker number. He told the pilots of the OH-58 and the other AH-1 that he was repositioning the aircraft.

The AH-1 pilot accelerated the aircraft into a climb. Fifteen feet above the trees, he leveled the aircraft and flew east. The pilot repositioned to fly over the armored vehicle he had just engaged to get the panel marking number. Seeing his altitude had increased to 25 feet above the trees, the pilot reduced collective pitch to return to 15 feet. He then applied a small increase in collective because the helicopter was descending through 15 feet.

The AH-1 did not respond to the collective increase and continued to descend toward the top of the 50-foot trees. The pilot again applied collective to stop the descent, but got no response from the aircraft. Glancing at the torquemeter, which indicated 66 to 72 percent, the pilot again increased collective but still got no response.

The aircraft, flying at 40 knots, crashed into the trees. The pilot sustained minor injuries, and the copilot sustained major injuries.

While the pilot was flying low level, his attention was divided among too many tasks. He was searching for the armored vehicle, trying to locate the vehicle on the map, looking for other aircraft in the immediate area, listening and awaiting a radio call from the other AH-1 in the team, and flying and controlling the aircraft. When he realized the aircraft was approaching a critical altitude, he applied too little collective too late. By the time he realized collective application was not enough to stop the descent, the AH-1 was already hitting the treetops.

Although not cited as contributing to this accident, the unit had no written crew rest/endurance policy. The only guidance used was that contained in AR 95-1; however, it was not being followed. Paragraph 2-12 of AR 95-1 states that commanders will design a

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps

H series - While aircraft was in flight, rpm decreased to 6000 when collective pitch was raised to around 30 psi. Rpm increased when collective was lowered to 24 psi. Caused by failure of overspeed governor.

H series - During cruise flight, rpm light came on and engine rpm needle dropped to zero. Engine N2 tachometer generator shaft sheared.

H series - Pilot was picking aircraft up to hover after completing HIT check when loud bangs were heard. Caused by internal failure of fuel control.

H series - PIC heard loud noise from engine during takeoff. Caused by compressor stall.

Attack helicopters

AH-1 Class E mishaps

S series - During postflight inspection, scratch was found on tail rotor drive shaft. Caused by unsecured cowling.

S series - Alternator light came on during flight. Caused by failure of alternator generator.

S series - During NVG flight, N2 began overspeeding. Collective pitch was increased and throttle reduced to about 95 percent. Then N2 tachometer failed, N1 became erratic, and engine chip detector light came on. Caused by failure of engine gas turbine.

S series - Aircraft was downwind for landing when pilot noticed high frequency vibrations in antitorque pedals. Caused by faulty tail rotor servo.

Cargo helicopters

CH-47 Class D mishaps

C series - Aircraft was transporting external load of boxed mortar rounds inside A-22 bags. During cruise flight, flight engineer noticed airstream was entering cargo bag. As PIC began descent to resecure load, one box was blown out of bag. Cargo bags hadn't been properly secured for multibag load.

C series - Eighteen-foot fiberglass boat for use in combat service support mission was being transported externally, using tandem hook rigging. Military equipment was stowed in boat to increase load density and neutralize aerodynamic qualities of vessel hull. Total weight was about 5,000 pounds. Initial leg of flight was uneventful, but during return flight, an updraft caused boat to swing aft. Aluminum rail on boat punched hole in aircraft skin aft of cargo hook.

CH-47 Class E mishaps

C series - Aircraft dropped external load off and landed. Work platform on left side of aft vertical shaft was found open. Latch mounting point was cracked on left panel assembly.

C series - During cruise flight with external load, crew chief reported load had dropped. Caused by failure of type 4 sling connector. Load was junked car body to be used as target.

Observation helicopters

OH-6 Class D mishap

A series - While aircraft was in level flight at 1,000 feet, pilot heard noise from rear of cabin area. Pilot looked back, saw smoke and sparks coming from transmission area, and landed. Impeller assembly had cracked and separated, breaking blower scroll and causing unbalanced condition.

OH-58 Class D mishap

D series - Autorotation landing

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**20**	**19**

evaluation was being performed during engineering test flight. During autorotations before mishap, real-time telemetry indicated stress-bending load on yoke and mast were building rapidly after touchdown. Crew decided to correct this response by lowering collective sooner after completing autorotational landing sequence. Pilot applied aft cyclic input after touchdown, while lowering collective. This, with the aircraft's rocking motion, caused main rotor to flex down and hit the tail rotor drive shaft cover.

OH-58 Class E mishaps

A series - Tail stinger hit ground during practice standard autorotation. Caused by failure of student pilot to level aircraft as it touched ground.

C series - During start, N1 was at 16 percent with throttle open to idle. There was no sound from igniters or from fuel burning, but crew could smell fuel from engine area. Two more start attempts were made, with same results. Pilot failed to notice popped circuit breaker.

C series - Collective was lowered and aircraft seemed stable during touchdown. About 2 seconds later, pilot felt extreme vibration and heard noise. He thought the rotor was hitting something and turned the tail slightly. Directional control was intact. Pilot then thought main rotor was disintegrating. Aircraft was sitting with nose uphill, resting lightly on front cross tube, and heavy in rear. Maintenance couldn't duplicate problem.

Training helicopters

TH-55 Class E mishap

A series - Aircraft was on training flight, at 800 feet agl. IP maneuvered aircraft over clear area for simulated engine failure. Throttle was closed. Student pilot lowered collective and turned into wind. IP saw engine tachometer read zero, took control, and made forced landing. Fuel servo assembly was removed for investigation.

Fixed wing

C-12 Class D mishap

D series - Postflight inspection showed numerous nicks in all three propeller blades on No. 2 engine. Caused by FOD on runway.

OV-1 Class E mishap

D series - During descent in IMC, airspeed indicator became unreliable and then went to zero. Bee was found in pitot tube.

U-8 Class E mishap

F series - Gear wouldn't extend during approach. Gear was pumped down, but right main wouldn't indicate down. Each power lever was retracted with no gear horn, indicating gear was down. After tower personnel told pilot gear appeared to be down, normal landing was made. Caused by stuck switch assembly.

U-21 Class D mishap

A series - Aircraft encountered severe wind shear on short final and touched down with left wing low, allowing propeller blades of No. 1 engine to hit ground. Tips of all three blades were bent about 1 to 1 1/2 inches off-center. Wind shear phenomenon was reported by tower as aircraft was on short final and committed to land.

Maintenance

UH-1 Class E mishaps

H series - Aircraft was on approach at about 30 feet agl. when a series of rapid, loud discharges were heard. Rpm dropped to 5900, maximum torque available was 25 psi, and nose yawed several times. Bleed band closure time and variable inlet guide vane "begin to open" times were found on extreme low side of scales.

H series - After start, fire guard saw fuel leaking from fuel control servo filter. O-ring appeared to have been cut during installation.

V series - Hydraulic pressure light came on during cruise flight and hydraulic pressure was lost. Hydraulic line wasn't manufactured correctly. End fitting was too long.

EH-1 Class E mishap

X series - Master caution light came on in flight, but no segment light came on. Caused by loose engine chip detector plug.

CH-47 Class E mishap

C series - Engine transmission hot light came on during flight. No. 1 engine dual-element chip detector/temperature bulb wire chafed against transmission cowling.

OH-58 Class E mishaps

C series - Engine oil bypass light came on during low-level cruise flight. Maintenance inspection showed fitting at N1 gearbox for oil pressure line to No. 7 and 8 bearing pack was stripped, causing oil to leak enough to activate oil bypass system.

C series - During runup, IP couldn't get left seat inertia reel to lock or unlock properly. Inertia reel lever assembly was clogged with dust and grit.

C-7 Class E mishap

A series - When left magneto was selected during ignition check, left engine wouldn't operate. Wire to internal coil had shorted out.

Safety messages

• Safety-of-flight technical message concerning replacement of mixer support bolts, lockwashers, inspection of mixer support bushings, and pitch link rod ends (AH-64-86-08, 161030Z Apr 86). Summary: Due to a failure of mixer support bolt, corrective action consists of replacing existing bolt with newly manufactured bolt with improved metallurgical characteristics. Additionally, contractor will measure and inspect mixer support bushings for perpendicularity and cadmium plating condition. A special one-time inspection relative to main rotor pitch link rod ends is also required. Completion of maintenance action contained herein releases the aircraft from grounding conditions cited in SOF message AH-64-86-06 and the AH-64 aircraft are released for flight. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

Too busy to fly

crew rest program tailored to their unit mission and include it in their SOP. AR 95-1 also provides commanders with a guide for scheduling of personnel for duties.

The AH-1 crew had reported for duty at 0830 the day before the accident. They had flown 6.3 hours at contour/low-level altitudes from 1000 to 2030 hours. Using table 2-3 of AR 95-1 and the environmental relative factor for day contour/low level of 1.3, the crew had flown an equivalency of 8.2 hours. After they had debriefed and were briefed on the next day's mission, the crew preflighted their aircraft in preparation for the following morning. Finishing the preflight at 2215 gave them a crew rest day starting at 0830 and ending at 2215, or a total of 13 hours and 45 minutes with a flight time of 8.2 hours.

On the morning of the accident, the crew got up at 0630, ate breakfast, received a briefing, and departed on the mission at 0750. At the time of the accident, the crew had flown 2.3 hours, for a total of 8.6 actual flight hours in the 24-hour period. Using the environment relative factor in AR 95-1, the total flight time for the crew at the time of the accident was 11.3 hours for the 24-hour period. The guidance in table 2-3 of AR 95-1 is 8 hours of flight time in a 24-hour period with the environment relative factor applied.

A Department of the Army message on aircrew mission briefing, brief back, and debrief makes the crew endurance status a mandatory mission debriefing item. The crew endurance status for the entire mission is also a mandatory item for briefings of new missions.

Had the unit had a written crew rest/endurance policy or been following the guidance in AR 95-1 and the requirement of the DA message on mission briefing, brief back, and debriefing, this crew would not have been flying on the day of the accident. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

Could this happen to you?

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This account of a near accident was written by the copilot involved. He tells how his complacency led to a near disaster.

It was about 1930 when the call came to operations. Some courier material had to be delivered to an airfield 50 miles away as soon as possible. There were only two pilots at the airfield, myself and another officer who had stayed later than usual to catch up on some end-of-the-month paperwork. Since it would have taken some time to get two other pilots to fly the mission, we decided to do it ourselves. Although we had both been on duty since early that morning, the individual who was to be the pilot had not flown that day and I had flown only 4 hours that afternoon. While we weren't in danger of passing out from exhaustion, we had put in a long day and were tired. Of course, we were irritated at having to perform this relatively simple flight at such an inconvenient time.

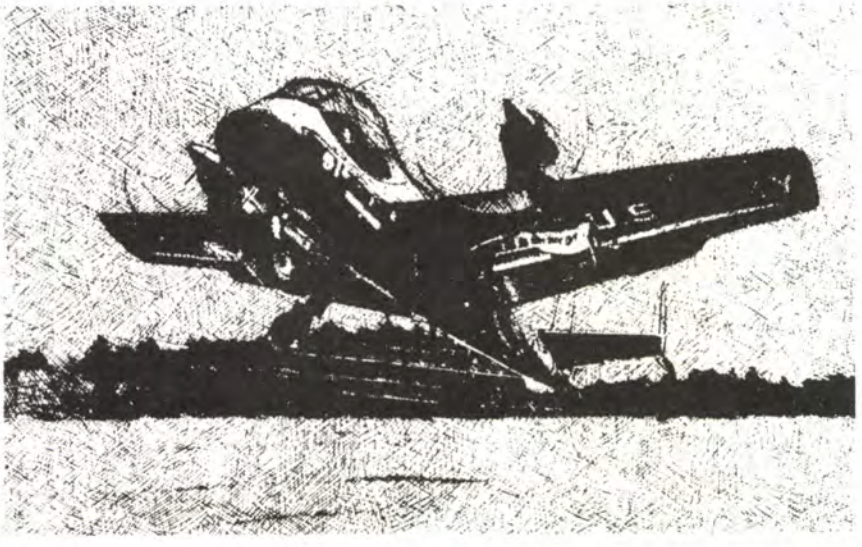
We called the weather forecaster and he told us our destination was reporting clear, with 5 miles visibility in haze, and calm winds. The flight would be a piece of cake—20 minutes up, 5 minutes on the ground, and 20 minutes back. We might still have time for a few hands of bridge before turning in for the night. Our flight plan was filed with company operations, our preflight accomplished, and we completed an engine runup. After receiving takeoff clearance, we left the airfield, climbed to 3,000 feet, and headed toward our destination.

The outbound flight was uneventful. We had just enough time to have a quick cigarette before contacting the destination tower for landing instructions. The pilot, anticipating instructions, positioned the airplane for a straight-in approach. About 10 miles out, I called the tower, was cleared for the straight-in approach, and told to report gear down and locked. The approach was normal in all respects. The gear was lowered about 2 miles out. After checking it, I called the tower, reported gear down and locked, and received clearance to land. Full flaps were put down about 1 mile out, the props were put full forward on short final, and the pilot greased it on. "Not bad for an old man, sir," I said, drawing a smile from him.

The tower cleared us to the ramp and said personnel were waiting for us. That was good news. We wouldn't have to shut down. The pilot taxied to where a captain stood waiting, swung around, and throttled back to 1000 rpm on both engines. As I opened the door and climbed out onto the wing, I saw the flaps were still full down. Clutching his hat to his head and bending forward, the captain struggled through the propwash and reached the wing. Above the engine noise, we concluded our business. He left with the courier material and I stuffed the signed receipt into my pocket, clambered back inside, and locked the door.

Taxi clearance was given by the tower. As we rolled toward the runway, I told the pilot the flaps were still down. As he flicked the switch to the UP position, he grinned sheepishly and muttered something under his breath. He stopped short of the runway, made a quick mag check, ran through a pre-takeoff check, and told me he would make a no-flap takeoff. As we taxied into position for takeoff, I noted 25 minutes had elapsed since departure from our home field. The pilot said, due to the reduced visibility, he would be going on the gauges after takeoff and told me to keep us cleared.

As we rolled down the runway, I scanned the gauges, noting all indica-



Could this happen to you?

tions in the green. If our takeoff roll was longer than usual, I figured it was due to not using any flaps. After liftoff, at the pilot's command, I put the gear handle in the UP position. Within a few seconds I saw the correct indications and told the pilot the gear was up. "Are you sure?" he asked.

Realizing something must be wrong, I quickly rechecked the gear and again told the pilot it was up. "Something's wrong!" he exclaimed. A scan of the instruments showed we were climbing at 100 knots and about 200 to 300 fpm. Both engines sounded good, and the gauges showed they were still developing takeoff power. Both cylinder head temperatures were normal. All instruments and gauges were in the green, but the airplane felt sloppy and the rate of climb was far less than it should have been.

The pilot rolled into a very shallow right turn and said we were going to return to the airfield and land. He told me to request clearance from the tower. I looked out the right window to clear the turn and was about to begin my transmission to the tower when I saw what our problem was. There, reflecting light from the rotating beacon, were the wing flaps, still in the full down position. Turning quickly, I saw the flap switch was in the UP position. Immediately I knew what was wrong. A flick of my wrist lowered the circuit breaker panel cover and a quick glance confirmed my suspicion. The flap motor circuit breaker had popped.

I can't recall the exact comment I made at the time, but I know it was uttered in a tone of pure disgust. How could we have been so careless and sloppy. If either of us had glanced out the side windows prior to takeoff, we would have certainly seen the flap setting. After I reset the circuit breaker, I glanced out the window, saw the flaps coming up, and told the pilot what I had done. I told him the flaps were coming up and that everything would be okay in a few seconds. From the time the pilot rolled into a shallow right turn until I saw the flaps coming up, only a few seconds had elapsed. In fact, the airplane had turned only about 30 degrees.

A scan of the cockpit showed our airspeed back to normal. The pilot was still concentrating on the instruments. Satisfied all was well once more, I slouched down in my seat and absentmindedly gazed out the window. What a stupid mistake, I thought. How could anyone be so careless? Oh, well, nothing serious had come of it and I would certainly be more careful in the future.

Suddenly my train of thought was interrupted by a red light flashing by slightly above and just beyond the wingtip. That jerk didn't miss us by much, I thought, snapping erect and looking toward the rear, trying to see the offending aircraft. Seeing nothing, I turned in my seat and was reaching for the mike button on the yoke to tell the pilot of our miss when I became aware of two things almost at once. The altimeter was flashing past 200 feet and we were indicating approximately a 1,200 fpm rate of descent.

Complacency is an indiscriminate killer!

Reacting instinctively, I grabbed the yoke and pulled back hard and fast. As g forces pressed me down in the seat, I glued myself to the instruments. I was aware of a blur of lights passing beneath and a feeling of sheer terror as I waited for us to crash. Then, miraculously, we were climbing. As a wave of relief washed over me, I looked at the pilot. He was looking at me with a dazed expression on his face. His state of confusion was made more apparent by his first comment, a rather shaky, "What happened?"

What happened? Well, it was rather simple. On a routine flight in VMC, we had almost killed ourselves by diving straight into the ground. Why and how had it happened? We discussed this at length as we flew back to the airfield.

After takeoff, the pilot went on the gauges and remained there. During climbout he trimmed the airplane for a climb. As he started his turn, the flap motor circuit breaker was pushed in and the flaps came to the full up position. While we were turning and the flaps were coming up, the airplane transitioned from a climb to a screaming dive. How did this happen? The pilot, obviously, was not making any kind of an instrument crosscheck, yet his undivided attention was focused on the instrument panel. Apparently, he had been staring at something. So much so, in fact, that he had practically hypnotized himself. Fatigue obviously had something to do with his condition. Although this was his first flight that day, he had been on duty for 14 hours before the incident.

As we discussed what happened, he could not remember what he had been looking at. He was not asleep in the full sense of the word because his eyes were open. He was an experienced and very proficient pilot. He took pride in his work and was one of the most dedicated, hard-working men I have ever known. He was the most respected officer in our company and was accepted as one of the more proficient pilots.

This near accident was entirely my fault. A copilot has certain duties to perform in any aircraft. On this flight, I failed to perform mine. This near accident was due entirely to lack of attention and completely unprofessional performance on my part.

No checklist was used! I should have used a checklist and called each item off for the pilot to check. His decision to use no flaps for takeoff was entirely acceptable and normal. We were using a long 4,000-foot runway and the pilot was planning to fly on the gauges. When he told me a no-flap takeoff would be made, I should have made a visual check to ensure the flaps were up. If I had, the problem would have

(continued on back page)

Stacom

Standardization Communication

Publication requirements

TRADOC PAM 310-12 states that field circulars are distributed on a one-time basis by TRADOC service school commandants/integrating center commanders who determine their own distribution requirements. Further, resupply of field circulars is not available from the preparing agency or the AG Publications Center. MACOMs are authorized to reproduce field circulars to meet mission requirements.

The Aviation Training Brigade, Fort Rucker, is the proponent for aircrew training manuals and is responsible for maintaining a mailing list for initial distribution of these manuals. All MACOMs should request an update for all subordinate aviation units' publication requirements. The following format should be used for this request:

a. Unit
b. Office symbol
c. Mailing address
d. POC (publications officer)
e. AUTOVON
f. Desired number of FCs 1-209, 1-210, 1-211, 1-212, 1-213, 1-214, 1-215, 1-216, 1-217, 1-218, 1-219, 1-221, and 1-222.

The following guidelines may help units determine the number of publications required:

a. FC 1-210—One copy per commander, XO, SIP, IP, IFE, and MTFE.

b. FCs 1-211 through 1-218—One copy per aviator assigned or per operational aviator position in TDA or TOE.

c. FC 1-219—One copy per aviator in a designated NVG TOE or TDA position, commander, XO, SIP, and IP.

d. FCs 1-221 and 1-222—One copy each per commander, XO, SIP, IP, IFE, and MTFE.

Unit publications requests should include enough manuals to sufficiently cover an 18-month period. This is due to the one-time distribution restriction.

Send ATM publication requests to Aviation Training Brigade, ATTN: ATZQ-FT-O (ATM), Fort Rucker, AL 36362-5000. Requests should be received by this office by 15 November 1985.

Points of contact at the Aviation Training Brigade for ATMs are Captain Sherlock and Mr. Perez, AUTOVON 558-2425/2188.

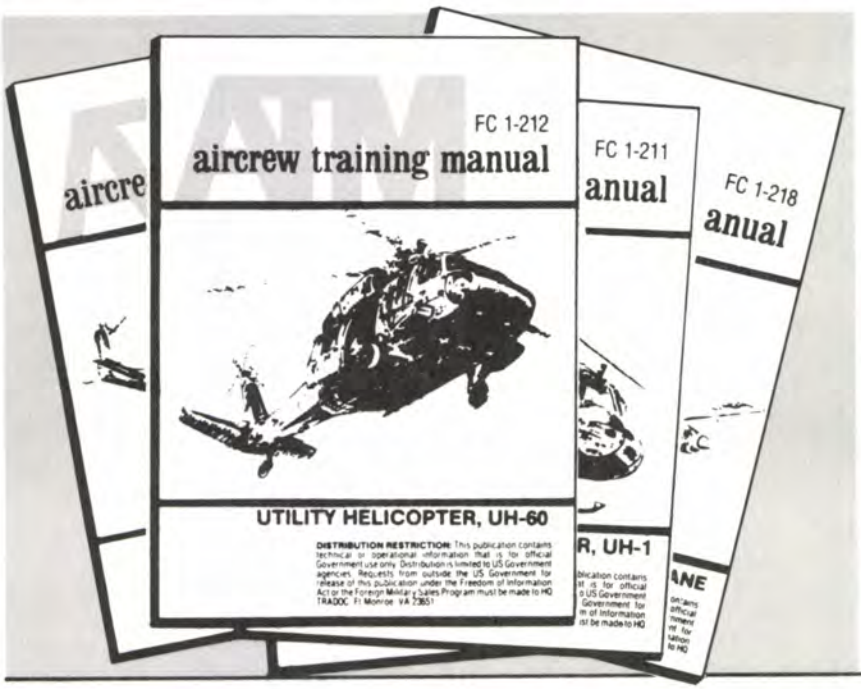
Coveralls for fuel handlers

Issue No. 30, 1984 Army Aviation Policy Committee meeting, requested fire retardant clothing be made available for fuel handlers. The Army Safety Center recommends that coveralls worn by explosive handlers be worn also by fuel handlers. The coveralls, explosive handler, are listed in DA Pam 385-3 and CTA 50-900, page 09-028, as line item number F 31850. The cost is $18.74 each.

SB 700-20 lists the coveralls with the following NSNs:

8415-00-280-2455	XS
8415-00-279-8719	SM
8415-00-279-8720	MED
8415-00-279-8721	LRG
8415-00-279-8722	XLG
or:	
8415-00-809-9401	XS
8415-00-577-4063	SM
8415-00-577-4064	MED
8415-00-577-4065	LRG
8415-00-809-9400	XLG

For more information, contact Paul Borges at the U.S. Army Natick Research and Development Center, AUTOVON 256-4689. ■



STACOM 112 9 Oct 1985
Prepared by the Directorate of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5000, AUTOVON 558-3589 during duty hours, 558-6487 after duty hours. Information published here generally precedes the formal staffing and distribution of Department of the Army official policy. This information is provided to all commanders to enhance aviation operations and training support.

Turner E. Grimsley

TURNER E. GRIMSLEY
LTC(P), Aviation
Director, DES

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - Dent was found on outboard leading edge of tail rotor blade. Screw was missing from FM antenna mount. Suspect screw vibrated free and fell through path of rotating tail rotor blade.

UH-1 Class D mishap

V series - Crew was responding to a rescue call for a downed aircraft. Suitable landing area was not available, so pilot decided to lower the medic and his equipment by means of the high performance hoist. The wind was unstable, but the medic was hoisted safely. Immediately after the medic unloaded his gear from the jungle penetrator, aircraft drifted forward and gained altitude because of a wind gust. The penetrator became tangled in the trees. Crew could not free the penetrator from the trees, so pilot cut the hoist cable.

UH-1 Class E mishaps

H series - Crew smelled JP4 after takeoff. Auxiliary tank was removed after landing and blister was found.

H series - N2 tachometer failed during landing. Caused by failure of tachometer generator.

H series - Transmission oil temperature rose to 90° C. Caused by faulty thermostatic switch.

H series - On final approach to 3,000-foot pinnacle at 40 knots and 65 feet agl, copilot abruptly applied collective and full aft cyclic to stop descent of aircraft and avoid rotor blade contact with large set of guy wires in approach path. Engine and rotor rpm bled to 6000, and aircraft entered uncontrolled spin to right. Torque gauge indicated 54 pounds. After three complete revolutions, pilot was able to reduce power and gain enough forward airspeed to stop the spin. Aircraft was landed and no damage found. Mishap occurred just after dusk and before moonrise. Landing- and searchlights were not used because of dusty conditions which created a halo effect. Personnel who set up the inverted "Y" in the direction of the prevailing winds did not take into consideration that the guy wires were in the approach path to the pad. Pilot and copilot knew the unmarked wires were there but felt they had enough clearance.

UH-60 Class E mishaps

A series - APU failed during runup. Bite indicator on APU was 2 white and 2 black. TM 55-1520-237-3 says to replace the ESU, acceleration control assembly, main fuel valve, and ignitor. On completion of parts replacement and MOC, fuel leak that could not be stopped was found. Mounting bolts in fuel pump had pulled mounting inserts out of gearbox. Fuel pump was also frozen.

A series - Postflight inspection revealed deswirl frame to No. 2 engine had separated from aircraft. Loop clamp broke at spot weld on engine, allowing duct to separate.

A series - No. 2 tail rotor servo did not pressurize and aircraft rotated to right during hover check. Crew failed to place backup pump selector switch to auto position before takeoff.

Attack helicopters

AH-1 Class E mishaps

S series - Master caution and transmission oil bypass lights came on. Failure of oil cooler drain valve caused 7 quarts of transmission oil to drain.

S series - Pedals stuck during right turn at a hover. Moderate pressure on left pedal caused them to release. Caused by faulty tail rotor servo cylinder.

S series - Copilot pulled excessive power to clear barriers during NOE flight. Overtorque light came on, and copilot saw torque descending through 100 percent. Aircraft was landed, and no damage was found.

Cargo helicopters

CH-47 Class E mishaps

C series - While climbing from 3,500 feet to 5,000 feet, pilot was notified over intercom that a fire was seen on top of aircraft. Pilot tried to confirm there was a fire and was told there was a fire on

No. 1 engine. After activating fire bottle, pilot was told there was no fire on engine. Pilot had mistaken a noncrewmember as his crew chief. The smoke was coming from the heater exhaust, not the engine.

C series - No. 2 engine trim would not respond to normal or emergency

Mishap briefs

engine beep trim inputs during hover. Caused by failure of N2 actuator.

B series - No. 1 engine chip detector light came on. Caused by internal failure of engine.

Observation helicopters

OH-6 Class D mishap

A series - Bird hit and broke both left windscreens.

OH-6 Class E mishap

A series - Loud snap was heard from transmission area, followed by transmission low pressure warning light. Caused by failure of main transmission.

OH-58 Class A mishap

C series - During NVG/NOE training mission, pilot got off the designated course and flew down a valley about 500 feet from the course. Aircraft hit three powerlines located 150 feet above the valley floor. One strand was cut by the wire strike protection system. Another cable struck the mast and severed the control tubes. Aircraft crashed into trees. Pilot and copilot were injured. 8558

OH-58 Class D mishaps

A series - During start, N1 rose to 15 percent in approximately 7 seconds. Throttle was opened to engine idle detent, and irregular engine noises were heard. PIC, who was outside aircraft, reached inside, saw TOT at 1,000° C., and closed throttle.

C series - Pilot was landing to lighted tactical landing zone. Landing light was turned on. Pilot felt he was not in position to make a normal approach and started a go-around. Pilot passed the lighted landing zone and lost all visual reference with the ground because of dust. Pilot applied excessive torque to miss known obstacles. Go-around was completed and aircraft landed.

OH-58 Class E mishaps

A series - Aircraft would not reach minimum N1 required for start. Battery was replaced twice, but N1 would still not reach 15 percent. Caused by failure of starter generator.

C series - As pilot, flying NOE, added power while moving forward at 59 knots to unmask, torque gauge went through 100 percent. Pilot lowered collective. Torque reached 110 percent for less than 1 second. Turbulence caused additional power requirements at various times and contributed to overtorque.

C series - IP smelled fumes during takeoff. Caused by leaking fuel pressure switch.

A series - Ignition circuit breaker popped out when starter button was pressed. Caused by malfunction of exciter box.

C series - Tachometer needles split during takeoff. Caused by dual tachometer failure.

Fixed wing

C-12 Class E mishaps

C series - No. 1 fire pull handle light came on during climb. No visual indication of fire was seen. Aircraft returned to home station and landed. Suspect flight into the sun at 7-degree nose-up pitch attitude activated fire warning system.

C series - Fuel was seen leaking from right nacelle during shutdown. Caused by failure of fuel filter O-ring.

Maintenance

AH-1 Class E mishap

S series - During fuel boost check, with both fuel boost pump circuit breakers out, engine rpm dropped from 6600 to 6200. Engine flamed out after about 3 minutes. Fuel hoses in both fuel cells were loose at the fuel line and vent line connection at the top of the cells. This caused the fuel pump to draw air, which cavitated the pump and caused the engine to flame out.

OH-58 Class E mishap

A series - N2 indicated 102 percent and would not beep to 104 percent during hover. N2 was adjusted incorrectly.

(continued on back page)

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	1-9 Oct	**0**	**0**
	November	4	3			
	December	5	5			
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**0**	**0**

Mishap briefs

Safety messages

• Safety-of-flight technical message concerning one-time inspection of UH-1H/V and EH-1 series aircraft for defective universal control levers (UH-1-85-06, 192330Z Sep 85). Summary: Defective levers are being received at CCAD without the lubricant groove being properly machined. Defective levers will be removed from use. Contact: Ken Luber, AUTOVON 693-1685, commercial 314-263-1685.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of aircraft records for compliance with contractor-initiated information service notes (AH-64A-85-05, 202235Z Sep 85). Summary: A number of one-time inspections have been recommended by the Apache manufacturer and concurred in by AVSCOM. These inspections will be accomplished in accordance with the detailed instructions of the individual service notes. Contact: Jim Linhares, AUTOVON 693-1582, commercial 314-263-1582.

• Maintenance information message concerning operational turbine engine washing (MIM-GEN-85-MEM-06, 192230Z Sep 85).

• Safety-of-use message concerning operational high performance hoist for UH-1D/H/V and UH-60A helicopters (SOU-UH-60A-85-01, SOU-UH-1-85-01, 202230Z Sep 85).

• Project Smart Message No. 64 from DA concerning an approved Value Engineering Proposal which permits units to apply a rubber covering to the fuel port of OH-58 helicopters (251913Z Sep 85).

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

Could this happen to you?

been discovered and the whole incident probably would never have happened. Once airborne, proper attention on my part would have averted the near miss. Instead, I was sleeping at the switch and a near disaster resulted.

I would never have believed that something like this could happen. While I was looking out the window, the airplane transitioned from a climb to a dive. I was unaware of any change in gravity. **I felt nothing!** Although the horizon was poorly defined, I was looking at the lights on the ground. Daydreaming? Perhaps, but I was looking at the lights on the ground while I was daydreaming. Yet **I saw nothing!** Certainly, as the airplane assumed a nose-down attitude and airspeed began to increase, there must have been a resulting increase in wind noise. Yet **I heard nothing!**

What were the major mistakes that contributed to this incident? The flight surgeon would probably conclude that fatigue and possibly smoking at night were contributing factors. I think that failure to use a checklist, gross inattention and, above all, complacency were major factors. Perhaps you feel that something else was to blame.

Could something like this happen to you? You better believe it can! Complacency is an indiscriminate killer. You can learn from my mistake. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

A fatal mistake

The two-man crew took off on a late-morning training flight in an OV-1C. The IP, in the right seat, was conducting a semiannual standardization ride. There was no sense of urgency, and both crewmembers had adequate time to prepare for the flight.

The pilot began standard upper air maneuvers, including stalls and altitude engine failures. Then he performed several landings and takeoffs. About an hour went by. The pilot made another normal takeoff and began a climbout. The aircraft was about 200 feet agl, flying at around 120 knots, when the IP simulated an engine failure by pulling the power lever on No. 1 engine to flight idle.

The pilot went through engine-out emergency procedures. Noticing the airspeed was low, he put the Mohawk's nose down, trying to gain airspeed. The aircraft then developed a sink rate, without gaining airspeed.

The IP took the controls and advanced the No. 1 engine power lever. The pilot heard the engine feather and told the IP. The IP replied with a positive comment, and the pilot repeated that the propeller on No. 1 engine had feathered. The IP replied, "Start it." The pilot reached up to start the engine, but when he looked at the engine instruments he realized they didn't look right for an engine-out.

By this time, the aircraft had begun to roll left. The pilot saw that they were very low and in serious trouble. He reached for the lower ejection handle. By the time he had his hand on it, the IP said, "Get out," and he ejected. About a second later, the IP ejected. The pilot landed safely, but the IP's parachute did not have sufficient time to open and he was killed. The aircraft rolled left and crashed, upside down, in a nose-low attitude.

This IP was one of the most respected aviators in his unit. He had an outstanding professional reputation. During this routine training flight, however, he made a mistake—a fatal mistake. The IP did not initiate the simulated engine failure as recommended in paragraph 4b, chapter 3, of FC 1-221. He didn't retard the propeller lever and power lever simultaneously.

The pilot reduced pitch attitude in an attempt to stop the decrease in airspeed, which was probably caused by the windmilling left propeller. When the IP took control of the aircraft, he advanced the throttle of the left engine to the full position. At that time, the propeller feathered because the autofeather system was engaged, the engine torque was below 9 psi, and the rapid advance of the throttle engaged the microswitch before the engine torque advanced above 9 psi.

The system operated as it was designed to operate. The IP apparently didn't have the knowledge about the system he needed to understand why the propeller feathered. At first, the IP didn't seem to believe the propeller had feathered and there was some discussion between the pilots about it. After he confirmed that the propeller had feathered, the IP thought the engine had failed, and told the pilot to start it. During this short period of time, the airspeed continued to drop gradually and the aircraft began a torque roll to the left. This was caused by the high power setting on the right engine, the low power setting on the left engine, and the feathered left propeller.

The IP apparently tried to unfeather the left propeller. The unfeathering, in conjunction with acceleration of the left engine, arrested the roll rate of the aircraft at just about the time the pilots ejected.

The following circumstance didn't contribute to the accident, but it probably explains why the pilot ejected successfully while the IP's parachute, although it came out of the pack as it should have, did not have time to open.

During initial training on the OV-1, crewmembers are given one successful ejection in the trainer. The OV-1 has an upper and lower handle, either of which can be used for ejection. During classroom training, students are taught that the lower handle should be used at low altitude and, or during, uncontrolled flight. During hands-on training, however, there is no reinforcement of

(continued on back page)

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Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - Aircraft was about 5 feet agl on approach to field site to deliver passengers. Field had apparently been watered down, but as aircraft approached, rotorwash caused the wet layer of dirt to break up, causing brownout. Pilot lost ground reference. Go-around wasn't possible because of wires and tall trees on three sides of the field. Aircraft went forward and down, landing hard. Landing gear rotated under aircraft. Broken aft crosstubes and saddle mount and channel damage resulted.

UH-1 Class D mishaps

H series - During attempt to hook up external load, soldier reached for hook without waiting for aircraft to be properly positioned over load. Aircraft hook was snagged with nylon doughnut of sling. Soldier's finger was fractured when it was caught between the doughnut and clevis.

H series - When pilot energized starter, there was a high-speed whining sound and no detectable N1 rotation. Failure of input gear splines and starter generator shaft splines prevented mechanical connection between starter generator and accessory gearbox.

UH-1 Class E mishaps

H series - While aircraft was on short final to pickup zone, marker panel flew up through main rotor. Improperly secured panel was blown loose by rotorwash.

H series - On liftoff to hover, pilot felt binding in cyclic control. Caused by internal failure of left cyclic servo.

H series - Transmission hot oil light came on. Temperature was 110° C. Caused by failure of transmission thermal bypass valve and oil pump.

Attack helicopters

AH-1 Class E mishaps

S series - Crew was conducting hovering turret firing during annual gunnery training. After right gun had been fired, left gun grenade launcher fired about 10 rounds, then jammed. Inspection showed a practice round had chambered without firing and then, during ejection, had fired while in the ejection chute. Only damage was deformed ejection chute. Caused by defective practice round. Other aircraft reported problems with double feeds, jamming of practice ammunition, and poor linkage on rounds.

S series - During takeoff for test flight after phase inspection, aircraft had suspected compressor stall. Records showed excessive consumption of engine oil. Caused by failure of engine turbine.

S series - Operation of emergency governor was being evaluated during PIC evaluation. After throttle was retarded to flight idle, governor switch was moved to emergency position. IP told pilot to advance throttle slowly, but pilot advanced it too rapidly. IP was late with corrective action, and temperature hit 1,000 degrees for 1 second.

S series - Two muffled bangs were heard during runup. Fire guard told pilot to shut aircraft down. Battery had expanded and lid popped off. Suspect battery was defective.

Cargo helicopters

CH-47 Class D mishap

C series - Aircraft was in cruise flight when, for no apparent reason, right windshield panel cracked.

CH-47 Class E mishaps

A series - No. 2 generator caution light came on. Caused by internal failure of generator.

A series - Crew was completing before-hover checklist. After HIT check of No. 1 engine, No. 2 engine failed to accelerate properly to flight position. Caused by internal failure of No. 2 engine power turbine section.

Observation helicopters

OH-58 Class E mishaps

A series - Aircraft was in cruise flight when pilot noticed unusual smell in cockpit. Failure of transmission input quill seal allowed oil to be lost.

C series - While aircraft was in cruise flight, small bird hit pilot's windscreen and was deflected into rotor system. Inspection showed pillow block retaining nut had slipped 150 degrees from original position.

C series - Aircraft began uncommanded right spin during out-of-ground-effect hover. Pilot applied left pedal and increased collective. As aircraft cleared trees, pilot saw torque was 105 percent. Pilot failed to anticipate loss of tail rotor effectiveness and when power had to be increased to avoid trees, engine overtorqued.

C series - During NOE flight, N2 dropped to about 96 percent when collective was increased. Warning light

and audio came on. N2 was out of adjustment.

Fixed wing

C-7 Class E mishap

A series - Standby inverter light came on. Main inverter failed internally.

C-12 Class D mishap

C series - While aircraft was in descent, at about 15,000 feet, pilots saw a bright flash near left prop. Postflight inspection showed lightning strike damage to left propeller blade, outboard flap panel, and left elevator.

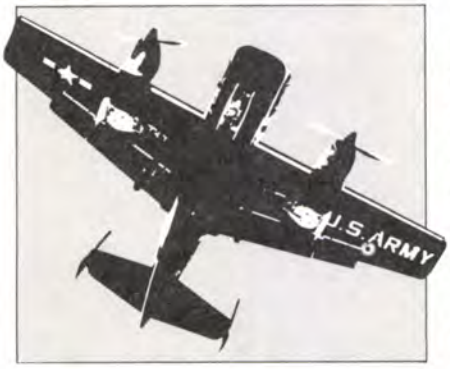
C-12 Class E mishaps

C series - No. 1 engine oil pressure fluctuated between 135 and 145 psi. Caused by failure of oil pressure transducer.

C series - No. 1 engine didn't achieve minimum takeoff power. Suspect torquemeter valve failed.

OV-1 Class E mishap

D series - Forward fuel boost pump failed while aircraft was taxiing for takeoff.



Maintenance

UH-1 Class C mishap

H series - During MOC runup/hover, transmission was checked for leaks at engine idle and full rpm. Mechanic made walk-around check. Maintenance Test Pilot (MTP) brought aircraft to hover for less than 30 seconds. Transmission pressure and master caution lights came on. As aircraft landed, MTP saw mechanic signal to cut throttle. Fluid was coming out of transmission area during coast-down. When right access panel was removed, bottom part of internal transmission oil filter gasket was protruding from cover. Quick disconnect coupling pins weren't fully engaged, preventing flow of fluid through coupling. Transmission oil filter gasket failed due to incorrect installation of oil quick disconnect, resulting in complete loss of oil and causing transmission and mast assembly to have to be replaced. Suspect nonqualified maintenance trainee displaced collar on quick disconnect, allowing pins to retract. With pins retracted and collar slightly displaced, fluid will flow through coupler. When aircraft was lifted to hover, line from transmission pulled on top end of coupler rotating collar, counterclockwise from top. This closed ends of quick disconnent, stopping flow of fluid. Separation of quick disconnect at operating rpm caused back pressure, which ruptured internal transmission oil gasket, pumping fluid out as rotor turned.

UH-1 Class E mishaps

M series - During startup, fire guard saw fuel leaking in engine section. Start fuel line had been disconnected on combustion chamber so that transducer for the vibrex could be installed. Line wasn't reconnected. Removal of start fuel line was not written up so as to require a technical inspector to check it, and that area isn't visible to pilot during normal preflight.

H series - Aircraft was at cruise flight when slingload was dropped. Retaining springs were improperly installed after phase maintenance. Rear spring was attached to forward clamp and eye bolt instead of rear clamp and eye bolt. One of the forward springs was attached to rear eye bolt. Rear spring came loose, allowing it to fall free. The spring then hooked around the release. Without a rear spring, the hook moved forward, putting enough tension on the arm to release the hook.

AH-1 Class E mishap

S series - During rapid refueling, transmission pressure segment light came on and transmission fluid was seen pouring out of transmission cooler drain. Caused by cracked drain valve.

CH-47 Class E mishap

C series - After aircraft landed, transmission hot light came on, indicating maximum temperature in the scan position. Caused by open circuit in temperature-sensing element. Wire pulled out of cannon plug.

OH-58 Class E mishap

A series - As aircraft began to level after climbout, pilot heard high-pitched buzzing and felt high-frequency vibration in the airframe and antitorque pedals. When collective was reduced, vibration became severe. Compressor mount bolts had loosened.

C-7 Class E mishap

A series - Left engine wouldn't rotate when pilot activated starter. Electrical cable connector broke at starter post, preventing power from reaching starter.

OV-1 Class E mishap

D series - Aircraft lost all hydraulics on landing and rollout. Caused by cracked hydraulic line.

Safety messages

- Safety-of-flight technical message concerning stabilator/automatic flight control system control panel retrofit

(UH-60-86-06, 171600Z Apr 86). Summary: Recent tests conducted on night vision goggle compatible stabilator control panels (P/N 70902-01070-046 or 70070-60054-043) by Sikorsky have indicated that under certain electrical fault (shorting) conditions associated with the panel switches or their light bulbs, erroneous stabilator-down signals can be generated. Sikorsky will redesign the panels to isolate the stabilator signals from the panel lighting circuitry. Sikorsky will also install a fuse to the lighting circuitry in order to prevent damage to the internal lighting circuit board should a short condition occur. Sikorsky will modify the aircraft wiring harness to accept the modified stabilator control panels and install the modified panels on the aircraft. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of rotor blades on CH-47A aircraft (CH-47-86-02, 272100Z Apr 86). Summary: Three instances have occurred where the leading edge of CH-47A rotor blade fairing skin unbonded from the spar. Two instances occurred in flight and caused severe vibrations that resulted in unscheduled landings. Laboratory examination showed fairings had not been properly installed. All three blades had been processed through NCAD in 1985. Review of NCAD records identified 19 aft and 7 forward blades suspected of having the same bonding problem. They have fairings that were replaced during the same timeframe as the three blades which developed bonding problems. Serial numbers of these blades are included in this message. Purpose of this message is to inspect all CH-47A helicopters to locate suspect blades and have them evaluated by a depot-level team to ensure integrity of the fairing to spar bond. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message concerning CH-47D cold weather procedures (CH-47-86-03, 272300Z Apr 86). Summary: Two separate problems have been recently identified on CH-47D helicopters as being aggravated in ambient temperatures below 32° F (0° C). The first, is malfunction of the overrunning clutch in the engine transmission. All four malfunctions reported occurred in cold weather. Reference C(1) of this message provides instructions on shutdown if a malfunction occurs. This message provides additional information for cold weather starting that may prevent the malfunction from happening. The second problem is cracking of the main generator housing. Several failures have occurred in cold weather operation. Failure can cause loss of the aft transmission main lubricating oil. Reference C(2) imposes a 10-flight-hour or 14-day inspection of the generators for cracks. However, this is inadequate in cold weather operation. This message directs a daily cold weather inspection. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of CH-54B pitch change link assemblies (CH-54-86-04, 272030Z Apr 86). Summary: Several CH-54B pitch change link assemblies recently were found to have internal corrosion. Laboratory analysis showed most corrosion was light, however, one link had corrosion pits to a depth of 0.017 inch. No cracks were found in any of the link assemblies, however, deep corrosion pits, if undetected, could eventually lead to cracking and perhaps failure of the link. The purpose of this message is to have all CH-54B pitch link assemblies inspected, and to remove all corroded links from service. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning stabilator bearing on UH-60A/EH-60A Black Hawk helicopters, part number KNOB12-25, NSN 3120-01-162-4791 (MIM-UH-60A-86-ME-04, 181700Z Apr 86).

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	1–7 May	**0**	**0**
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**20**	**19**

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Recap of AVSCOM messages

Following is a list of AIG 8881 addressed messages transmitted by AVSCOM (AMSAV-M) from 1 October through 31 December 1985.

SOF-GEN-85-01 Safety-of-flight maintenance mandatory message concerning one-time inspection of interference MS25224 switch guards and two-position switches on all aircraft and their supporting equipment, if applicable.

UH-1-85-08 Safety-of-flight technical message on one-time inspection of all UH-1C/M/H/V, EH and TH-1/TAH-1/AH-1 series aircraft for corrosion susceptible tension torsion straps.

UH-1-85-09 Safety-of-flight technical message concerning one-time inspection of AH-1/TH-1/TAH-1 and UH-1M main rotor hub for proper clearances between extension assembly and grip assembly.

UH-1-85-10 Safety-of-flight maintenance mandatory message on one-time and recurring inspection of alternator wire bundle at fuselage station 133 on EH-1 series aircraft.

UH-1-85-11 Safety-of-flight maintenance mandatory message concerning one-time inspection of connecting links on UH-1C/M/H/V and EH-1H/X helicopters.

UH-1-85-12 Safety-of-flight maintenance mandatory message on revision to one-time inspection of connecting links on UH-1C/M/H/V and EH-1H/X helicopters.

UH-1-85-13 Safety-of-flight technical message on revision to one-time inspection of AH-1/TH-1/TAH-1 and UH-1M main rotor hub for proper clearances between the extension assembly.

UH-60A-85-25 Safety-of-flight maintenance mandatory message concerning torque stabilization of main rotor pitch horn attachment bolts.

UH-60A-85-26 Safety-of-flight maintenance mandatory message correcting SOF message UH-60A-85-25.

UH-60A-85-27 Safety-of-flight maintenance mandatory message on revision to reporting downtime on UH-60A/EH-60A Black Hawk helicopters on DA Form 1352.

AH-1-85-06 Safety-of-flight technical message concerning one-time inspection of all UH-1C/M/H/V, EH-1, and TH-1/TAH-1/AH-1 series aircraft for corrosion susceptible tension torsion straps.

AH-1-85-07 Safety-of-flight technical message concerning one-time inspection of AH-1/TH-1/TAH-1 and UH-1M main rotor hub for proper clearances between the extension assembly and grip assembly.

AH-1-85-08 Safety-of-flight maintenance mandatory message on one-time inspection of AH-1 tail rotor hub/blade assemblies for cracked washers.

AH-1-85-09 Safety-of-flight technical message on revision to one-time inspection of the AH-1/TH-1/TAH-1 and UH-1M main rotor hub for proper clearances between the extension assembly and grip assembly.

AH-1-85-10 Safety-of-flight technical message concerning correction to revision to one-time inspection of AH-1/TH-1/TAH-1 and UH-1M main rotor hub for proper clearances between extension assembly and grip assembly.

AH-64A-85-06 Safety-of-flight technical message concerning one-time inspection of wire harness assembly.

CH-47-85-12 Safety-of-flight maintenance mandatory message concerning comprehensive safety inspection of CH-47A helicopters.

CH-47-85-13 Safety-of-flight maintenance mandatory message on comprehensive safety inspection of CH-47B helicopters.

CH-47-85-14 Safety-of-flight maintenance mandatory message concerning comprehensive safety inspection of CH-47C helicopters.

CH-47-85-15 Safety-of-fligh' maintenance mandatory message comprehensive safety inspection CH-47D helicopters.

CH-47-85-16 Safety-of-flight technical message concerning one-time inspection of spiral bevel gear in forward and aft transmissions in CH-47A, B, and C helicopters.

CH-47-85-17 Safety-of-flight technical message supplementing previous message, CH-47-85-16, on spiral bevel gear.

CH-47-85-18 Safety-of-flight technical message on inspection of CH-47D combiner transmission cooler fan and drive shaft.

CH-47-85-19 Safety-of-flight technical message concerning one-time and recurring inspection of vertical hinge pins in CH-47B, C, and D rotary wing heads.

CH-47-85-20 Safety-of-flight maintenance mandatory message on one-time contractor team inspection of vertical hinge pins in CH-47B, C, and D rotary wing heads.

CH-47-85-21 Safety-of-flight technical message on one-time and recurring inspection of CH-47D flight control mounting pallets.

OH-6A-85-02 Safety-of-flight technical message concerning inspection of all H-6 series helicopter antenna matching modules.

OH-6A-85-03 Safety-of-flight maintenance mandatory message concerning inspection of the T63-A-700 turbine engine compressor on all OH-58A and OH-6A helicopters.

OH-58-85-05 Safety-of-flight maintenance mandatory message on inspection of the T63-A-700 turbine engine compressor on all OH-58A and OH-6A helicopters.

U-21-85-03 Safety-of-flight technical message on one-time inspection of U-21A, RU-21A, U-21D, RU-21D series aircraft fan, van axial NSN 4140-00-936-5569, P/N 5G0702-2873.

Addressees requiring copies of messages should contact their higher headquarters. ■

A fatal mistake

this point. When a student goes through ejection training in the trainer, the student makes the choice of which handle to use. If an actual emergency later occurs, an aviator is likely to use the same ejection handle he chose during ejection training.

Tests show that ejection takes about 1 to 1 1/2 seconds longer if the upper handle is used instead of the lower handle. In a low-altitude, uncontrolled flight situation, that fraction of time becomes critical.

When this IP received his initial ejection seat training, only the upper handle could be used to initiate ejection in the trainer. When he encountered this actual emergency, he used the upper handle, just as he had done in the trainer.

By the time the pilot received his ejection seat training, the new training device could be activated by using either handle. He was taught that the lower handle should be used at low altitude and/or during uncontrolled flight. He reacted to the emergency as he had been trained to do. He used the lower handle to eject.

Although investigation shows the IP didn't initiate the simulated engine failure as recommended in the training circular, and that he apparently didn't understand the autofeather system well enough, it was a matter of chance that he received his ejection seat training when he did. The second longer it took him to eject might have cost him his life.

Halon 1211 fire extinguisher has gauge problem

While servicing a fire extinguisher, hydrostatic shop workers at Robins AFB found an agent-level gauge frozen in the charged position because of corrosion at the float pivot point. The agent-level gauge is used in the 150-pound Halon 1211 wheeled fire extinguisher, NSN 4210-01-140-2233. The dissimilar metals used in this gauge can lead to corrosion, which can cause it to freeze. A gauge locked in the charged position can result in an empty extinguisher being mistaken for a full one.

The fire extinguisher can be identified easily by its data plate: agent weight—150 pounds, manufacturer—Amerex, model 600. The body of the agent-level gauge has a round dial face and is mounted parallel to the tank top on the 150-pound Amerex extinguisher. The new style, triangular, dial-faced gauges, mounted perpendicular and read from the side, do not need to be replaced.

Check the gauges on your 150-pound Halon 1211 wheeled fire extinguishers. If you have any of the old style, round-faced, agent-level gauges, write the Amerex Corporation, who has volunteered to replace the units without charge.

- Write: Amerex Corporation, P.O. Box 81, Attention: Bill Martin/Janis Price, Trussville, AL 35173. State the number of replacement gauges you need. They will send you replacement gauges.
- Have replacement gauges installed by your support facility.
- Ensure your address is complete.

This procedure was designed to be simple and free of paperwork. Contacts at Amerex are Bill Martin and Janis Price, 205-655-3271.

This replacement offer terminates on 15 July 1986.

—CW3 R.J. Rendzio, Investigation Division, AUTOVON 558-3262

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14 May 1986

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Report of Army Aircraft Mishaps

Big problems start with small things

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 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 sight 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

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - During out-of-ground-effect hover, master caution and chip detector segment lights came on. Metal particles were found in gearbox.

H series - Right pylon soundproofing snaps came loose during descent after parachute mission. Soundproofing went through tail rotor, making 1½-inch hole above synchronized elevator and dent in leading edge of one blade.

V series - Aircraft was being shut down after MAST flight. Crew chief noticed quarter panel window in left jump door was broken. Window was apparently broken when aircraft's vibration caused cardiac monitor resting on top of medical equipment box to hit it. Flight crewmembers failed to properly secure monitor.

UH-1 Class E mishaps

H series - Transmission oil pressure rose above upper limits during flight. Caused by faulty oil pump.

H series - Aircraft was in flight when smoke and sparks were seen coming from copilot's attitude indicator. Caused by malfunction of attitude indicator.

H series - During instrument evaluation, IP simulated engine failure at altitude. Pilot reacted incorrectly by rolling throttle to full on position while lowering collective to enter autorotation. IP took controls. Rotor was at 339 rpm and N2 was between 6700 and 6900. IP failed to take corrective action in time to prevent rotor overspeed.

H series - During landing to 7,000-foot mountain pinnacle, with temperature at 20° C., engine compressor stalled. Gross weight was 6,800 pounds.

H series - Master caution and transmission oil pressure segment lights came on and transmission oil pressure began dropping. Caused by failure of transmission gasket internal filter.

H series - Controls became increasingly stiff during maintenance test flight. Caused by internal failure of hydraulic pump.

Attack helicopters

AH-1 Class D mishaps

S series - During simulated engine failure, pilot began right turn to align aircraft for landing. IP's attention was divided between outside and inside of cockpit. IP told copilot to perform power recovery, then saw rotor tachometer overspeed to 108 percent. Pilot allowed rotor to overspeed without taking timely corrective action.

S series - Aircraft was terminating approach from 5-foot hover. IP noticed fence, with short steel posts, in landing area. Aircraft climbed to safe altitude, and there was nothing to indicate aircraft had hit the fence. Later, hole was found in ADF antenna.

AH-1 Class E mishap

S series - Several dents were found in main rotor blades during postflight inspection. Suspect tree strike during NOE flight.

AH-64 Class E mishap

A series - While aircraft was hovering, No. 1 engine torque dropped to zero and NP dropped to 89 percent. IP lowered collective and allowed aircraft to settle to ground. After about 15 seconds, NP went back to 100 percent. Aircraft had previously had the same problem. Electrical control unit was replaced.

Cargo helicopters

CH-47 Class D mishap

C series - Aircraft was on takeoff and accelerating to cruise airspeed. Crew chief reported one blivet had fallen, then tower reported load had fallen. Pilot returned remaining blivets to pickup point. Grabhook keeper on sling leg holding the dropped blivet was missing. Rigger hadn't properly seated chain link in sling grabhook. After load was applied, chain broke through grabhook keeper, allowing 500-gallon blivet to fall, destroying blivet and spilling about 400 gallons of fuel.

CH-47 Class E mishaps

A series - During daily preventive maintenance inspection, bonding separation was found on No. 12 pocket of forward blade.

A series - No. 2 engine chip detector light came on when aircraft was lifted to hover. Chip was found on transmission, and transmission was changed. Same light had come on 5 times in 69 hours. Special oil samples showed normal. Transmission oil was changed and transmission was flushed, but light continued to come on.

C series - Crew felt severe lateral vibration after takeoff to hover. Caused by internal failure of forward transmission.

Observation helicopters

OH-6 Class C mishap

A series - Engine-out audio sounded while aircraft was in cruise flight at 500 feet agl. Aircraft turned 120 degrees left, into wind, and made autorotation into pasture. When aircraft landed on 15-degree slope, rotor blades flexed down and severed tail boom.

OH-6 Class E mishap

A series - Crew felt severe vibration during missed-approach climbout at 60 knots and 68 pounds torque. Caused by separation of abrasion tape on main rotor blade.

OH-58 Class D mishap

A series - After landing at refueling pad, pilot opened door to get out.

Rotorwash from taxiing UH-1 blew door out of pilot's hand, breaking it off at bottom hinge.

Fixed wing

C-7 Class E mishap

A series - With fuel mixture lever at prime position during engine start, No. 2 engine continuously backfired at 1000 rpm. When lever was advanced to rich mixture position, engine died. Caused by inoperative accelerator pump.

C-12 Class D mishaps

C series - Bird struck leading edge of left wing as aircraft took off. A 1-inch deep, 8-inch long, 2-inch wide dent was found on leading edge of left wing, 5 inches inboard of stall warning vane. Torn deice boot had to be replaced.

D series - Aircraft was in cruise flight at flight level 290 when it encountered visible moisture. As ice vanes were extended, No. 2 engine began series of suspected compressor stalls. All engine instruments were fluctuating and TGT exceeded 8500. When ice vane to No. 2 engine was retracted, compressor stalls stopped. Suspect malfunction of fuel control or engine bleed valve.

C-12 Class E mishaps

D series - No. 1 engine chip light came on at 13,000 feet and 220 knots. Suspect internal failure in reduction gear system. Particles were found on chip detector and finger screen.

D series - TGT began fluctuating, plus or minus 100 degrees up to 750 degrees, during cruise flight. TGT T5 bus bar failed, causing faulty indication.

OV-1 Class E mishaps

D series - During test flight for No. 1 propeller change, No. 2 generator light came on and generator failed. Dim light showed on No. 2 engine chip light. Starter generator shaft sheared.

D series - No. 2 engine chip light came on, then went out. Oil sample showed high iron content. Caused by failure/deterioration of internal bearing.

D series - During cruise flight, crew smelled smoke and saw smoke coming from under pilot's control panel. Caused by failure of KA-60 camera control.

U-21 Class D mishap

A series - Aircraft was at flight level 120, at 180 knots, when PIC requested vector around thunderstorm. While being vectored around cell, crew saw large flash of lightning off left side. No abnormal indications were noticed on radar, flight instruments, radios, or navigation equipment. When aircraft landed, stall warning horn wouldn't activate. Scorch marks were found on left propeller tip and there was an exit hole in the vertical fin.

U-21 Class E mishap

A series - While aircraft was taxiing for takeoff, cockpit filled with smoke. Caused by failure of electromagnetic relay for vent blower.

Maintenance

UH-1 Class E mishaps

H series - While aircraft was hovering with slingload, crew chief saw fluid dripping from hellhole. Postflight inspection showed no hydraulic fluid visible in sight gauge. Maintenance inspection showed hole in left side cyclic servo pressure line. Hole was caused by chafing from standoff clamp.

H series - When aircraft throttle was reduced to flight idle after flight or shutdown, transmission oil pressure dropped to 15 psi and master caution and transmission oil pressure segment lights came on. Caused by fitting on lubricant pressure relief valve.

H series - When aircraft engine was started for MOC on garlock seal, something exploded around starter generator and fragments of plastic hit crew chief's faceshield. Starter generator was improperly wired during installation, causing a short circuit when start was attempted.

H series - When starter was engaged, crew heard loud bang. Inspection showed battery in nose compartment had buckled cover. Evidence of arcing was found. Suspect loose attaching hardware on Cell 17 and corrosion caused explosion. Mechanic may not

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	1–14 May	**0**	**0**
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**20**	**19**

Mishap briefs

have tightened screw, or screw could have loosened after being tightened.

AH-1 Class E mishaps

S series - During battery start, TGT rose to 750 degrees at 20 percent N1. Fire guard saw smoke coming from battery compartment area. When battery access panel was removed, small flames were seen on battery relay. Two cables to TR terminal in battery relay weren't securely fastened, causing arcing and fire. Suspect cables were improperly installed when battery relay was changed.

S series - Master caution and engine oil bypass lights came on during cruise flight. Just before landing, engine oil pressure began fluctuating between 30 and 70 psi. During postflight inspection oil was running out of oil cooler compartment and engine oil reservoi had about 2 quarts of oil left. Caused by failure of ball valve in engine oil cooler drain. Fitting appears to have been overstressed during installation.

CH-47 Class E mishap

C series - While aircraft was on short final for pinnacle landing, No. 2 hydraulic system failed. Chafed hydraulic line caused reservoir to go dry.

OH-58 Class E mishaps

C series - Aircraft was at engine idle, flat pitch. DC amps fluctuated rapidly between zero and 110, then other system instruments began fluctuating. Jam nut on voltage regulator came loose, causing increase in amps.

C series - Transmission oil pressure light came on during cruise flight. Caused by loose wire to pressure sensor.

U-21 Class E mishap

J series - In cruise flight, fuel gauges showed greater consumption than fuel flow gauges. Fuel levels showed 150 pounds on each side, but when aircraft was refueled, there was at least 45 minutes of fuel remaining. Adjusting potentiometer locknuts on back of gauge were loose, allowing vibration to move adjustments.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Big problems start with small things

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. ■

U.S. ARMY SAFETY CENTER

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A $50,000 error

The UH-1 crew was scheduled for a training mission to practice nap-of-the-earth (NOE) flight and navigation techniques. The crew arrived at the airfield and the PIC completed the normal preflight planning while the copilot was preflighting the aircraft and the crew chief was making his daily inspection.

After the PIC filed the flight plan, he and the copilot were briefed on the mission by the detachment commander. When the aircraft took off around 1000 hours, there were two other people on board in addition to the three-man crew. They would drop the detachment commander off at the initial point of the NOE lane, but the other person, another crew chief, would stay on board during the NOE flight as an "extra pair of eyes."

The copilot, who was doing the flying, was in the left seat. The crew chief occupied the left side of the bench seat. The other enlisted man was on the right side of the bench seat behind the PIC, who was navigating. The first half hour of the mission was uneventful, but in the next few minutes the routine flight would no longer be routine.

The PIC had flown the route several times before and as the aircraft approached a wire obstacle shown on the map, he told the others that the wires would be extremely difficult to see. The aircraft was about 30 feet over a river, when the PIC heard the crew chief say, "wires." The PIC still hadn't seen the wires himself, and he told the pilot to stop until he could identify them.

The pilot immediately performed an NOE deceleration. The aircraft was leveling as the maneuver was completed, then everyone on board heard a loud bang from the rear of the aircraft. The UH-1 shuddered and the nose started a spin to the right. The pilot began a hovering autorotation by starting to roll off the throttle. The PIC took control and completed the autorotation. After turning about 230 degrees, the aircraft landed on the sandy river bottom in about 2 feet of water.

As the aircraft came to rest, the crew chief saw smoke coming from the tail rotor drive shaft covering, midway up the tailboom. He told the PIC, who completed an emergency shutdown of the engine. There was no fire, but a hole had been torn through the drive shaft covering. No one was injured, and about 15 minutes later another aircraft arrived to pick up the crew.

Crew qualifications

Both the pilot and copilot were qualified to perform the mission they had been assigned. They were both current in the aircraft, and had successfully completed a standardization ride, NOE evaluation, and all AAPART requirements within required timeframes. The copilot had accumulated 318 hours of flight time, with 20 hours flown in the past 3 months. The PIC had 1,993 hours of flight time, and had flown 34 hours in the past 3 months. Neither aviator had ever been cited for flight safety violations, nor was there any derogatory information in their files.

Unit environment

This unit consisted of a small, close-knit group of professional aviators. Professional standards and requirements were conscientiously applied throughout the unit structure and in standing operating procedures. Teaming the newly assigned and relatively inexperienced copilot with the more

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap

H series - Aircraft was in stabilized hover at about 90 feet agl. Rappeller left aircraft, came off rope, and fell about 30 feet to hard surface. 8629

UH-1 Class D mishaps

H series - Student pilot (SP) was performing navigator duties from centrally located jumpseat during landing. SP became disoriented and as aircraft made second pass over landing zone, he was still disoriented. IP took controls and attempted circling approach. He was critiquing navigator's performance as he made the approach and failed to monitor his own performance. The aircraft was flying too fast. IP began abrupt deceleration and aircraft developed vertical sink rate. IP chose to continue maneuver instead of making a go-around. He leveled aircraft and applied cushioning pitch, with little effect. Aircraft hit hard, bounced, and came to rest upright. Skids spread and sheetmetal buckled aft of attaching point for right rear crosstube. Cargo hook was bent and left greenhouse cracked.

H series - Rivets on tail rotor control cover stand-off mount were torn from cover housing during flight. Tail rotor control cover chain and sprocket cover plate were found missing on post-flight inspection. Suspect rivets failed, allowing cover plate to be torn off by slipstream.

H series - After completing topping check at power reduction, aircraft had three compressor stalls and developed slight yaw. Compressor stall caused excessive wear patterns and required replacement of 90-degree and 42-degree gearboxes and two hanger bearings.

H series - After termination to a hover in a confined area, ground guide positioned aircraft and signaled pilot to land. Pilot slowly lowered collective for stabilization check. Aircraft appeared stable. When collective was lowered to full down, pilots felt rocking motion. Right skid tube had been bent by a rock. Caused by failure of ground personnel to ensure area was suitable for landing.

H series - Aircraft was landing at field site at night when rotorwash blew pilot's door off parked OH-58. Pilot of OH-58 was preflighting aircraft and had left door unsecured.

UH-1 Class E mishaps

H series - After making pass over LZ for bundle drop, copilot maneuvered aircraft downwind to make a go-around. As wind lifted aircraft's tail, copilot increased power to counter sink rate and torque reached 55 psi. Caused by copilot maneuvering aircraft tail into wind at low speed, with high gross weight.

V series - While aircraft was being shut down, crew chief saw smoke coming from battery vents. There was no indication of electrical problem on aircraft instruments. Caused by overheated battery. Four cells had holes burned in them.

Attack helicopters

AH-1 Class C mishaps

G series - During maintenance test flight, N2 was erratic, going up to 6700, then down and stabilizing at 6400. EGT rose to 610 degrees, then went down to 510 degrees. After aircraft landed, engine parts were seen coming from exhaust system. N2 turbine failed, causing blade sections to come out of exhaust, damaging tail rotor blades, vertical stabilizer, and tail rotor drive shaft cover.

S series - While at out-of-ground-effect hover, aircraft maneuvered to evade simulated small arms fire from right side. Pilot made left pedal turn, lowered nose, and increased collective pitch. As pilot glanced down at torque gauge, he felt PIC push collective pitch down. Torque peaked at 65 psi. Pilot had applied excessive power, causing overtorque of transmission, drive train, main rotor head, and blade assembly.

AH-1 Class D mishaps

F series - Aircraft's main rotor blades struck small tree limb while flying NOE between, and parallel to, tree line and power lines. Pilot was concentrating on power lines and allowed aircraft to drift into tree limb.

S series - During ground operation of aircraft, scraping noise was heard and metal shavings began blowing through environmental control unit (ECU). As aircraft was shut down, crew heard loud noise (ECU wasn't in operation at the time). ECU blower fan failed, damaging fan housing and ECU duct.

AH-1 Class E mishaps

S series - After starting engine, pilot saw engine oil temperature was beginning to climb and would exceed operating limitations. Caused by failure of oil

cooler fan bearing. Accumulation and ingestion of sand and dust contributed to bearing failure.

S series - Left pedal stuck in position during hover/taxi. Caused by faulty servo.

AH-64 Class C mishap

A series - During NOE flight over sloping terrain, PNVS video deteriorated rapidly to the extent that it couldn't be used. As pilot applied power to get out of NOE environment, the crew heard a faint slap. There were no vibrations or warning lights. During refueling, a tree branch was found on right inboard missile launcher. Pilot was operating with degraded FLIR and copilot was performing cockpit duties, not serving as safety observer. These circumstances, and insufficient terrain clearance, allowed aircraft to hit a tree. Two main rotor blade sweep tips, four tail rotor blades, stabilator, and PNVS shroud were damaged.

AH-64 Class E mishaps

A series - Aircraft was at a 400-foot out-of-ground-effect hover. No. 1 nose gearbox (NGB) lost oil pressure. Fault detection/location system showed NGB had zero oil pressure. NGB seal assembly had failed.

A series - Aircraft was on takeoff at 500 feet agl and 80 knots. High rotor rpm light came on, and rotor tachometer showed rpm as 100 percent. Caused by failure of engine out/rotor warning unit.

A series - Master caution and utility hydraulic segment lights came on during short final. Hydraulic pressure gauge showed zero. Aircraft had broken hydraulic line.

Cargo helicopters

CH-47 Class D mishap

C series - During mission brief, PIC was told gun crew wanted the M101A1 howitzer placed in LZ, oriented to the east. When aircraft arrived, no ground personnel were there to position the howitzer, so aircraft landed and gun crew offloaded. As the howitzer was lifted off the ground, sling caught on left gunner's shield, tipping howitzer onto its right side. No damage was noticed until aircrew had returned to home station. Howitzer's right shield bracket was broken and elevation adjustment was bent out of tolerance.

CH-47 Class E mishaps

C series - Hydraulic line from oil fan to utility system failed during cruise flight.

C series - No. 1 engine N1 gauge wouldn't work during engine start. After cannon plug was removed and cleaned, gauge worked.

C series - After APU was started, flight engineer saw smoke coming from area of No. 2 boost pump. Caused by failure of No. 2 flight boost pump.

Observation helicopters

AH-6 Class B mishap

C series - Aircraft was 60 feet agl, at 60 knots, and 40 psi. Crew heard increase in engine/rotor rpm and nose pitched up and yawed right. Pilot increased collective and reduced throttle. IP said, "I have the controls—stay on the controls with me." Both pilots maneuvered aircraft to open area. IP reduced throttle to engine idle at 10 feet agl and attempted to control descent, but the tailboom severed and the airframe was damaged. Fuel control to regulator line broke at governor 90-degree elbow, just forward of fitting sleeve, causing engine to overspeed. 8630

AH-6 Class D mishap

E series - Aircraft was on inbound run to target. Pilot pulled trigger on minigun and flash suppressor on gun barrel came loose. Bullet fragments were deflected into cockpit, and one fragment hit copilot's right leg. This type flash suppressor is not used in any other unit.

OH-6 Class D mishap

A series - Aircraft was on maintenance test flight. During power performance check, crew heard growling, or sound of air rushing, from engine. Pilot lowered collective, reduced throttle to engine idle, and declared emergency. When collective was reduced, cockpit filled with smoke. Pilot shut engine down and pulled emergency fuel shutoff valve. He turned 180 degrees to line up on final, then shut off generator, inverter, ADF, and FM radios. After autorotation was completed, oil was seen on engine cowling, but there was no fire. Suspect power turbine failure.

OH-58 Class D mishaps

C series - While hovering out of hot refueling point, crew heard single popping sound from engine area. Engine lost power and pilot made hovering autorotation from 5- to 7-foot skid height. Aircraft was in an 8- to 10-knot tailwind. Gross weight of 2,650, density altitude of 1,900 feet, the tailwind, and skid height contributed to hard landing after engine failed.

Both crosstubes spread and made two small dents where they hit the bottom of the fuselage.

C series - Crew was conducting training in aeroscout tactics. Instructor was on his first flight as IP after completing aeroscout MOI training. After conducting NOE and terrain takeoffs and landings, student pilot (SP) made a low-level, low-airspeed autorotation. After refueling, and change of pilots, flight training continued. When SP was told to perform autorotation, he began maneuver at 90 feet agl and 60 knots, with wind from the right at 10 knots. SP pulled initial pitch at 15 feet with rapid motion which bled off rotor rpm severely. Aircraft touched down hard on heels of the skids, causing severe spike knock. Aircraft came to rest upright. Damage included wrinkle in aft tailboom section and 2-inch crack in tailboom fairing. Caused by pilot error. IP was too slow to react to student's rapid initial pitch pull.

OH-58 Class E mishaps

C series - Aircraft was flying along an air corridor that it had been using all day when pilot saw commo wire strung across the route. He wasn't able to avoid the wire, but it was cut by the aircraft's upper wire protection system. Caused by ground unit which violated regulations when wire was strung across helicopter NOE route.

A series - During cruise flight, rpm jumped to 110 percent. Rotor rpm reached 389 for about 7 seconds, without rotor rpm warning light coming on. Pilot beeped rpm down to 105 percent, then took manual control to get rpm down to 103 percent. Airspeed was 75 knots, torque 40 percent. Metal tube from governor to fuel control severed, causing fuel control to malfunction.

Fixed Wing

C-7 Class E mishap

A series - No. 2 engine had right magneto dropoff of 100 to 150 rpm. Caused by internal failure of magneto assembly.

C-12 Class E mishaps

C series - No. 2 engine fire pull handle light came on during takeoff roll. No. 2 forward fire detector failed.

C series - Gear warning lights in handle stayed on when pilot attempted to retract gear. Both left main and nose gear position lights indicated gear still down. Caused by loose pin in connector to emergency pump down switch.

D series - No. 2 fire light came on during descent. Caused by failure of fire detector element.

OV-1 Class D mishap

D series - No. 1 engine outside cowling came off in flight.

OV-1 Class E mishaps

D series - Number one inverter failed during cruise flight.

D series - Crew chief bumped hatch locking lever with his elbow, causing right side hatch to come open during takeoff.

U-21 Class C mishap

A series - Pilot was moving aircraft to pick up passenger. Left propeller struck a taxi light, damaging two blade tips of left propeller. Because of sudden stoppage, propeller and engine had to be replaced.

U-21 Class E mishap

H series - During cruise flight at 13,000 feet, No. 1 engine oil pressure began fluctuating and slowly decreasing. Deteriorated seal caused loss of oil and pressure.

Maintenance

UH-1 Class E mishaps

H series - Aircraft was conducting out-of-ground-effect hover at about 50 feet agl. PIC was at controls with copilot monitoring instruments. Transmission pressure gauge fluctuated from about 50 pounds, then started rapid drop. Master caution and segment lights came on and pressure continued to drop to zero. Caused by failure of transmission fluid return line from quick disconnect to sump. Retaining clamp had chafed through line.

H series - During approach, trans-

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	1–21 May	**1**	**0**
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**21**	**19**

Mishap briefs

mission oil pressure fluctuated, with no other abnormal indications. Caused by loose wire on cannon plug for transmission oil pressure transmitter.

H series - Hydraulic line on left cyclic servo irreversible valve burst. Line had chafed against cyclic push-pull tube.

H series - Inverter toggle switch failed due to corrosion from secondary leak around roof-mounted UHF antenna.

H series - Aircraft was on parachute jump mission at 8,000 feet agl when crew heard loud bangs from engine area, accompanied by left yaws. Inflight compressor stall was caused by FOD. Flush requirements were increased to 25 hours.

H series - Force gradiant spring was weak and caused binding and feedback in right forward quadrant. Replaced cylinder assembly.

OH-58 Class D mishap

A series - After 20-minute ground run at 103 percent N2 and 5-minute flight at cruise altitude, engine oil temperature rose to 110° C. When engine oil cooler was removed, a shop towel was found covering air inlet portion of the cooler. Appears towel was sucked through oil cooler blower months earlier. Aircraft has record of higher than normal engine oil temperature for past 4 months.

TH-55 Class C mishap

A series - Aircraft was at cruise flight, 700 feet agl at 50 knots. IP was demonstrating different engine sounds at 2900 and 2700 rpm when engine began losing power. IP took controls and found engine wasn't producing enough power at 2600 rpm to maintain flight. He began approach to land at a road intersection. At between 100 and 200 feet agl, he saw an MP vehicle arrive at the intended landing spot. He decelerated to steepen glide angle, resulting in high sink rate, then he saw a power line across his approach path. He slowed the aircraft to further reduce approach angle and rotor blades began striking tree branches overhanging roadway. The IP leveled the aircraft and applied collective pitch, but couldn't stop the high sink rate. The aircraft hit the pavement hard, bounced, and came to rest on its left side. Landing gear, main cabin, rotor system, tailboom, and tail rotor system were damaged. No. 2 cylinder fuel injector line connection at the fuel flow divider had vibrated loose, separating from the flow divider, and engine couldn't produce enough power to maintain flight. Suspect the fuel injector line connection wasn't properly tightened.

C-12 Class E mishap

D series - Aircraft was at cruise flight when copilot saw the No. 2 engine forward upper cowl was ajar. Cowl lock hadn't been properly secured during recent maintenance.

U-21 Class E mishaps

A series - Right main landing gear down indicator light didn't come on. Caused by dirty contact on switch.

A series - Pilot's right brake pedal moved all the way, with no braking action. Caused by air in brake system.

H series - Flaps stuck in full-down position. As copilot tried to recycle flap switch, he noticed electrical sparks and smoke under his dash panel. Maintenance personnel failed to cap off bare electrical wire on cannon plug of ADF control panel.

H series - Crew smelled fuel fumes in flight and IP took controls. Maintenance failed to resafety the drain valve.

Safety messages

• Safety-of-flight operational message concerning revision to message on cold weather procedures for CH-47D (CH-47-86-04, 072350Z May 86). Summary: Referenced message was incorrectly assigned number CH-47-86-02. Correct safety-of-flight message number is CH-47-86-03. Remainder of message stays the same. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Hazard alert

The following hazard alert message (03181400Z Apr 86) concerning midair collision resulting in Class A aviation accident had been dispatched by the Safety Center.

"A hazard has been identified during a U.S. Army Safety Center (USASC) investigation of a midair collision. The hazard concerns aircraft flight following and flight routes in and around installations and training areas.

"Most installations accomplish flight following in conjunction with range control operations without the benefit of resources (radar, multiple radios and school-trained controllers) available to air traffic control (ATC) elements.

"Written procedures exist at installations and training areas delineating transition routes between monitored airfields and training areas, from one training area to another, and between cantonment area and training areas. Procedures include checkpoints, reporting points, inbound and outbound altitudes for various training conditions (day, night, night vision goggle, terrain flight, etc.), radio communication frequencies for position reporting and monitoring, and ground-based personnel duties regarding position and time logs for reporting aircraft.

"These written procedures may appear adequate and inclusive when reviewed for face value or drawn on a map; however, in practice many slight deviations may be observed by flight crews for practical reasons which create the potential for converging air traffic.

"The USASC recommends that installations and units review written procedures regarding flight following and flight routes, and conduct inflight verification of the procedures to ensure they are practical and do not create the potential for aircraft traffic conflict.

"The USASC POC is Mr. Buchan or LTC McCammon, AUTOVON 558-4198/3901." ■

A $50,000 error

experienced PIC was common practice on all missions.

What happened?

All four witnesses were in general agreement on the sequence of events leading up to the first signs of an emergency, and from that point until the aircraft settled onto the river bed. The crew knew the wire hazard existed and as the aircraft approached the obstacle indicated on the map, they were all intent on searching for the wire. They also knew that the wires were hard to see, because the PIC and crew chief had flown the route before.

When the crew chief saw wires about 250 meters ahead, he said he told the pilot, "wire ahead." But not everyone on the aircraft heard the same thing. The PIC heard "wires," but he hadn't seen them, so he told the pilot to stop until he could see the wires. The copilot, on the controls, heard someone say "Stop, wires," and began a rapid deceleration. The other enlisted crew chief reported that the PIC told the pilot to "slow down."

The pilot began deceleration, then as the aircraft was coming close to a level attitude he heard a loud pop from the rear of the aircraft and felt vibration throughout the airframe. The nose tucked down and the aircraft began a spin to the right. There was no response from antitorque inputs, and he started to roll off the throttle to enter a hovering autorotation.

When the pilot began the abrupt deceleration, the PIC looked up from his map and about that time he heard the loud report from the rear of the aircraft. The aircraft shuddered and had turned about 45 degrees to the right by the time he dropped the map and took control. The throttle was already partially rolled off. He completed rolling the throttle to flight idle and made a hovering autorotation. After turning 230 degrees, the aircraft landed gently in the water.

The enlisted observer said he was looking towards the tail of the aircraft at the apex of the deceleration and saw a splash as the stinger entered the water. He couldn't see the tail rotor itself.

Lessons learned

The pilot of the aircraft failed to follow procedures while performing an NOE deceleration. He didn't maintain the altitude of the tail rotor, as required by FC 1-211, Task 1037. As a result, the tail rotor entered the water, restricting the entire drive train system. The tail rotor drive shaft twisted, shortening its overall length by 0.75 inches, and subsequently caused the male coupling to separate from the female coupling of No. 3 hanger assembly. This caused a loss of effective antitorque control.

As pilot-in-command of an aircraft on an NOE flight, the PIC didn't divide his attention properly. As a result, he allowed a less-experienced pilot to improperly perform an NOE deceleration, resulting in damage to an aircraft of nearly $50,000.

Although the location of the wires for which the crew was searching was marked on the map, there were no hazard marking aids such as balls or lights to help aircrewmembers spot the wires from an aircraft. The fact that everyone on the aircraft had their attention fixed on finding the wire hazard contributed to the mishap. ■

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Report of Army Aircraft Mishaps

Error-free performance

We all know, given error-free performance, most rules can be bent without large increases in accident risk. In Army aviation, we have manuals, pubs, and regulations that tell us exactly how to do our jobs. Most of this paper has been generated to describe and limit the risk the Army is willing to accept to accomplish its aviation mission. If we complied with this guidance 100 percent of the time, the accident rate would only be attributed to materiel failure or design deficiencies, with a small percentage charged to crew error. Those errors would be honest human errors and could be explained away by changes in design, training, or procedure.

Historically, human error has accounted for 70-plus percent of the accident cause factors yearly. Operationally, these factors include overconfidence, overmotivation, low proficiency, and poor technique. On the maintenance side of the house, they include poor supervision, failure to use by-the-book procedures, and lack of knowledge. All these can be lumped into one broad category called poor discipline.

The kind of discipline involved here is not blatant disregard of regulations and procedures, but something potentially far worse. This poor discipline is the subtle, insidious breakdown of good order and commonsense that begins not with the individual who gets caught making the error but with the commander or first-line supervisor who provides tacit approval to violate the rules. Unfortunately, our losses due to breakdown in discipline tend to mask the honest human errors and prevent the appropriate corrective actions.

By not acting decisively when faced with minor variances in policy, commanders and supervisors in effect promote deviations in practice that eventually become "unwritten policy" or "the way we do it here." In some cases, deviations in practice are even encouraged by commanders and supervisors for the sake of mission accomplishment. Soon, the approval to "do it this time" in order to get the mission accomplished or whatever pressure seems important at the moment becomes standard practice. Allowed to do it once, the individual figures it must be all right to do it again in other areas. In short, we reward the individual for being able to get the job done and no one questions procedures.

For instance, a helicopter participating in a field training exercise encountered marginal weather. The pilot decided to try to make it over a ridgeline into a valley. The aircraft hit trees on a slope and crashed.

The aviators in the unit had been operating in similar weather conditions for some time and, on numerous occasions, would search around until finding a hole through the weather to complete their missions. Each time an aviator stretched performance to the limits or deviated slightly from regulatory requirements and was not admonished for his actions, the resultant degradation to command safety emphasis was compounded. The end result was that such practices became commonplace and the accolades for such a high degree of mission accomplishment overshadowed the unsafe manner in which they were accomplished.

Another helicopter, flying at an estimated airspeed of 80 to 90 knots and 150 feet above the ground, hit and severed two wires. Control was lost and the aircraft crashed, killing the pilot and passenger. The detachment commander repeatedly emphasized the dominant consideration in mission

performance was keeping the supported personnel happy at any cost. He was aware of and consented to the scheduling of his pilots on single-pilot missions when they had received no special or refresher training for the terrain involved in the mission support. Morale in the detachment was low and behavior was undisciplined.

When an accident occurs, we ask ourselves questions like "Why didn't he follow the briefing?" or "Why was undocumented maintenance being performed?" The truth is that it was not a spur-of-the-moment decision on the part of the individual or simple human error, but rather the individual had seen or had done a similar action before and nothing happened. Since he did not have an accident and most probably was rewarded for getting the job done, his actions were perfectly acceptable.

If we don't like the rules, let's change them . . . not bend them. ■

—LTC Kenneth Boley, ARNG Liaison Officer, Army Safety Center

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps

H series - Aircraft had compressor stall during flight. Crew heard three loud reports and aircraft yawed. Fuel control was replaced.

H series - During cruise flight, pilot noticed engine oil temperature passing 110° C., and engine oil pressure dropping below 80 psi. Thermal relief valve had failed in closed position.

UH-60 Class D mishaps

A series - During roll-on landing, aircraft touched down and rolled about 25 feet when main landing gear brake locked, causing tire to blow. Brake assembly and tire replaced.

A series - About 15 seconds after takeoff, crew heard loud bang from aft portion of aircraft. Crew chief confirmed No. 1 engine cowling was open. Engine cowling was secure on preflight. Suspect vibration caused latchkeeper to slide aft or keeper wasn't fully engaged, allowing latch and then cowling to open.

UH-60 Class E mishaps

A series - Refueler didn't use correct procedure in removing CCR nozzle from port. Port broke off at retaining screws.

A series - During cruise flight, aircraft developed vertical vibration and yawing movement. Caused by defective No. 1 engine ECU.

Attack helicopters

AH-1 Class A mishap

S series - Aircraft was returning from field training site when it had an engine failure and crashed. 8631

AH-1 Class D mishaps

S series - Aircraft was on gunnery training evaluation flight. During runup, pilot's transmission chip detector light came on and then went out. IP elected to continue runup and chip light didn't come on again. IP then decided to relocate aircraft to accomplish armament checklist. As aircraft made final approach, IP decided to land on sod instead of hard surface. IP caught a glimpse of a segment light and directed attention inside cockpit. Rated student pilot (SP) in copilot gunner seat grabbed controls just as aircraft hit ground, nose and left skid low. SP brought aircraft to hover and IP saw one skid was lying on the ground. IP took controls and notified tower for maintenance to prepare pad for landing. Aircraft landed on pad of wooden pallets and mattresses. Landing gear was broken off and 20mm gun turret was damaged.

S series - Rated student pilot was performing standard autorotation. Cushioning pitch was excessive and initiated too high. Then SP changed attitude to wings level, and aircraft accelerated forward. IP saw rotor rpm was low and took control, trying to maintain remaining rpm. Aircraft fell from about 2 feet with excessively low rotor rpm, bounced once, and made a hard landing. Left transmission friction damper mount was broken and both main rotor control tubes were bent.

AH-64 Class E mishaps

A series - After aircraft landed to change crews for second part of training flight, No. 1 engine nose gearbox oil pressure light came on. Fault detection/location system showed gearbox oil pressure and temperature were within normal limits. Caused by failure of nose gearbox oil pressure switch.

A series - Three attempts to align heading and altitude reference system (HARS) during runup were unsuccessful. Fault detection/location system indicated HARS electronic unit had failed.

A series - During runup, No. 1 oil pressure light came on and low oil pressure was noted on oil pressure gauge. Engine oil pump had failed.

Cargo helicopters

CH-47 Class D mishaps

D series - During attempted slingload of M198 howitzer, under night vision goggles, aircraft hit M198. Postflight inspection showed damage to aft cargo hook and puncture of sheetmetal skin on bottom side of aircraft. Damage to howitzer was minimum.

D series - After landing, crew noticed No. 1 work platform had opened during flight, crushing No. 1 engine tail cone. Locking pin assembly showed evidence of old fatigue crack of about 1 inch. Remainder cracked during flight and wind forced rear pin out, resulting in damage to work platform and tail cone.

CH-47 Class E mishaps

A series - During postflight inspection, crew noticed No. 7 pocket on bottom side of forward blade appeared to be unbonded. Maintenance found aerodynamic filler was missing in area of pocket.

B series - While flying approximately 500 feet agl, crew chief noticed hydraulic fluid on ramp area. Indications were it was coming from utility cooler fan. Inspection showed hydraulic pressure line to cooler fan was cracked.

D series - While aircraft was picking up external load, No. 2 generator dropped off line and wouldn't reset. Caused by failure of No. 2 generator protection panel.

D series - Aircraft was fitted with three internally-mounted, 600-gallon fuel tanks so that it could perform refueling operation. First tank was filled

with fuel. As the second tank was being filled, about 40 gallons were spilled because fuel line fitting failed to seat and seal when coupled with 90-degree angle valve beneath the fuel tank. Crew stopped fueling operation and attempted to control fuel leak by closing emergency dump valve. Emergency dump valve actuator operated without difficulty but fuel spillage continued at a slightly reduced rate. Fueling operations were suspended until the first tank could be downloaded by defueling crew and aircraft cargo compartment and subfloor cavities purged of fuel.

Observation helicopters

OH-58 Class D mishap

A series - During cruise flight at 1,000 feet agl and 95 KIAS, large bird struck aircraft near upper portion of right door post. Bird entered cockpit directly behind pilot's head and went out through right passenger door window. Metal on upper portion of right door post was damaged and plexiglas on right passenger door was broken.

OH-58 Class E mishaps

A series - During three attempted starts, engine failed to produce rise in TOT. Carbon on fuel nozzle restricted fuel flow.

A series - Master caution and fuel filter lights flickered during cruise flight. As aircraft made approach to land, master caution and engine oil bypass lights came on. Oil had been lost because of hole in line between engine and oil cooler.

Training helicopters

TH-55 Class D mishap

A series - Student pilot was conducting autorotation. When aircraft was about 25 feet agl, SP began abrupt and excessive deceleration and aircraft developed near-vertical sink rate. IP attempted to level aircraft and cushion landing. Aircraft touched down slightly tail low in a near-level attitude. There was little or no forward movement. SP made another standard autorotation before landing. During postflight inspection, damage was found to both tail rotor blades and tail skid.

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	1–28 May	**1**	**0**
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**21**	**19**

Fixed wing

C-12 Class E mishaps

C series - Aircraft struck bird during takeoff climb. Bird hit lower part of pilot's windshield wiper arm but there was no damage.

D series - Aircraft was passing through 13,000 feet on initial climb when cabin door light came on. After landing, crew found all cam latches were locked but safety lock arm viewed through sight window had vibrated out of position.

F-27 Class E mishap

No. 1 engine fuel trim stuck at 78 percent during climbout. Pilot continued climb to 4,500 feet agl to troubleshoot problem and allow parachutist to jump. Fuel trim couldn't be restored. High TGT on No. 1 engine was caused by failure of fuel trim.

OV-1 Class E mishap

D series - Nothing happened when gear handle was put in down position during before-landing check. Gear was blown down. Caused by cracked flare on tube below fitting on hydraulic line.

U-21 Class C mishap

A series - Pilot failed to lower landing gear and executed go-around procedure as props touched runway. Aircraft landed without further damage.

U-21 Class E mishaps

A series - During takeoff, pilot noticed fuel siphoning from right wing filler cap. Fuel cap wasn't completely seated after refueling.

A series - Pilot got abnormal control response after lowering flaps to approach position. Caused by failure of left inboard flap actuator.

A series - Flaps wouldn't retract after being lowered for landing. Caused by failure of flap motor.

H series - During cruise flight, copilot saw fuel siphoning from right wing fuel filler cap. Center O-ring on fuel filler cap locking device had deteriorated.

Maintenance

UH-1 Class E mishaps

H series - Left fuel boost pump light

Mishap briefs

wouldn't go out. Cannon plug was improperly connected, causing plug to vibrate loose.

H series - While aircraft was in flight, pilot noticed hydraulic fluid dripping from collective servo. Preformed packing on collective servo irreversible valve was torn. Packing had been replaced the previous day.

UH-60 Class E mishap

A series - Stabilator failed on final approach. Caused by improper installation of cannon plug.

AH-1 Class E mishap

S series - Oil was seen dripping from bottom of aircraft as pilot hovered onto POL pad. Maintenance personnel failed to properly tighten hose assembly from oil cooler to engine deck.

CH-47 Class E mishaps

C series - No. 1 engine torque was unreliable during engine start procedure. Indications are that harness assembly had been crushed or chafed, allowing electrical bleed-over.

D series - Aircraft was on extended range ferry mission. During flight, fuel was being transferred from ferry tank system, located in cargo compartment, to aircraft's integral fuel system by means of ferry system's electrically driven fuel pumps. Fuel began leaking from fitting attachment between ferry system supply line and aircraft's main tank. Minor spill occurred before all pumps could be stopped. After landing, crew found right and left fuel lines from ferry tank system to aircraft main system had been reversed during installation of ferry tanks. Stresses on fuel line fitting during pressurization and in-flight vibration resulted in fuel spill.

D series - Crew under NVGs was transporting M198 howitzer externally. No. 2 hydraulic flight control, No. 2 AFCS, and master caution lights came on. Hydraulic fitting in flight control closet had backed off. Fitting may not have been tightened properly.

OH-58 Class E mishaps

C series - Maintenance operational check was being performed to check repair of fuel leak. Fuel was seen leaking from fitting on pressure line leading from fuel pump. Fuel line hadn't been properly tightened by mechanic.

C series - Engine quit when IP initiated simulated engine failure at hover. Fuel control filter was installed backwards.

U-21 Class E mishap

H series - Pilot saw fuel starting to siphon from left nacelle fuel filler cap during flight. Tension of fuel filler cap was improperly adjusted, allowing overpressurized cell to siphon.

Safety messages

• Safety-of-flight technical message concerning one-time inspection to ensure fuel line is not chafing against heat and vent duct behind instrument panel on T-42A aircraft (T-42-86-01, 052330Z May 86). Summary: During flight, fuel was found dripping inside cockpit. Heat and vent ducting settling on top of fuel pressure line and chafing line caused this condition. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

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Report of Army Aircraft Mishaps

Aviation safety progress report

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In *Flightfax*, we report to you on Army aircraft accidents and tell you about the things that have gone wrong and the things that have been done wrong. Perhaps we haven't been quite as faithful to tell you about the positive side—the things that have gone right and been done right. That's what this article is about.

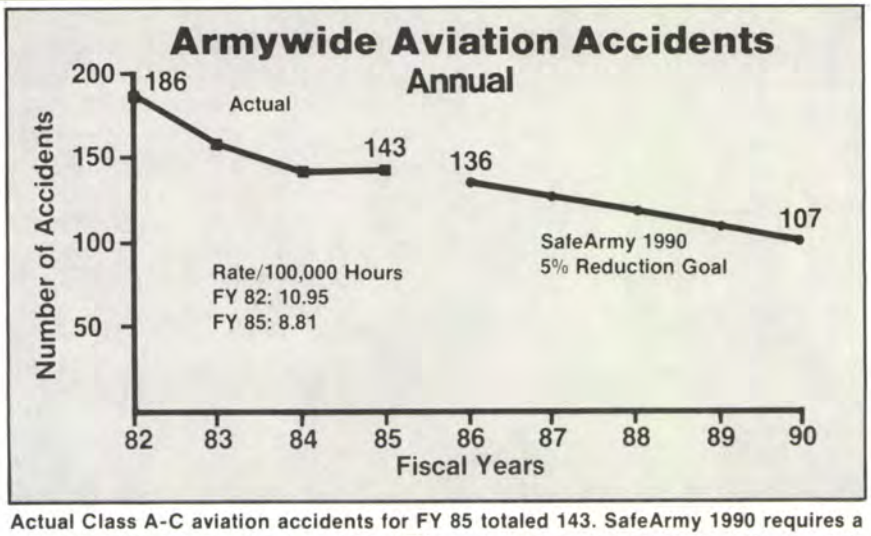
To understand where we are in aviation safety now, we need to take a look at where we've been. For a historical view of Army aviation safety, we go back to the year 1958, because that's the year we first began recording Armywide aircraft accident data.

For every 100,000 hours flown in 1958, we had 54.3 major accidents. In the 24 years between 1958 and 1982, the Class A aircraft accident rate was reduced to 3.23. In FY 85, the rate was 3.0, and it was down to 2.65 for the first half of FY 86.

The numbers certainly look better, but they don't tell us enough. Looking at accident rates alone, and trying to see where we are in Army aviation safety, is a little like looking at a human skeleton and trying to picture what a person looks like. We need some flesh on the bones.

In the first place, it isn't enough to look only at Class A accidents. Certainly they are important; they often cost lives. And, even if no one is killed or seriously injured in a Class A accident, the minimum is $500,000 in damage and injuries. All too often, an aircraft is destroyed.

The average cost of a Class A aircraft accident in FY 82 was just under a million dollars. By the end of FY 85, the cost had risen to one and three-quarter million dollars. Today, we are flying aircraft that cost $5 million a copy, and with the Apache coming on line at $13 million apiece, the cost of Army aircraft accidents will skyrocket. Every loss due to an aircraft accident directly impacts total Army readiness.



Actual Class A-C aviation accidents for FY 85 totaled 143. SafeArmy 1990 requires a reduction of 7 aviation accidents during FY 86 and 5 percent per year thereafter through FY 90.

But, unless we look beyond the Class A accidents we are still seeing only the bare bones of the problem. We have to also look at the Class B and C accidents to know what's causing the accidents. Prevention programs are targeted at causes rather than damage classification, and the trends in Class A, B, and C accidents tell us more about causes than Class A accidents alone.

We also have to look at the environment in which we fly and the risks involved in today's aviation operations. Nobody has to tell you there are a lot more risks involved in flying today than there were in 1958, or for that matter in 1982. Let's take a look backward at some of the years past and then take a look at where we intend to go in the next 5 years.

A look back

One of the hardest years for anyone in Army aviation to look at is FY 82. That year was Army aviation's 40th Anniversary, and it would prove to be a catastrophic year from an aviation safety standpoint. In one CH-47 accident alone 8 soldiers and 38 civilian members of an international parachute team were killed. By the time the year ended, 46 soldiers and 40 civilians had been killed, another 95 crewmembers and passengers injured, and 48 aircraft destroyed. Total accident costs that year were more than $62 million. It was the worst Army aviation safety record in 10 years.

Because of the 82 record, General Wickham, then Vice Chief of Staff of the Army, directed establishment of a Safety Coordinating Committee that would bring together those individuals responsible for all aspects of Army aviation safety. He also directed a

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - During postflight inspection, PIC found gash on underside of main rotor blade. Three missions had been flown that day. What the blade hit and where and when strike occurred are unknown.

H series - Bird hit front of medevac helicopter. Battery compartment door was cracked and dented.

UH-1 Class E mishaps

H series - N2 began fluctuating during cruise flight and aircraft yawed about 10 degrees off heading. Caused by internal failure of fuel control on N2 overspeed governor.

H series - Master caution and transmission hot oil segment lights came on in flight. Caused by failure of transmission oil temperature thermal switch.

H series - Transmission oil pressure and master caution lights came on when aircraft was brought to engine idle at hot refueling point. Transmission oil pressure regulator spring stuck, restricting oil flow.

H series - Pilot wearing day vision goggles asked crew chief to clear aircraft's tail during takeoff. Crew chief saw oil coming from 42-degree gearbox and oil on vertical fin. Caused by failure of input seal on gearbox.

V series - During cruise flight, master caution light came on and transmission oil pressure dropped to 10, then to zero psi. Quick disconnect malfunctioned, causing all oil to be blown from transmission.

V series - During NOE flight, crew heard sudden whining noise. Sound appeared to increase when power was applied and then slight high-frequency vibration was felt in pedals. Postflight inspection revealed impending failure of tail rotor drive shaft hanger bearing.

UH-60 Class D mishaps

A series - Aircraft landed on a rock, making 2-inch hole in bottom of aircraft.

A series - When aircraft encountered light rain, windshield wipers were turned on. Wipers moved to furtherest outward position and stopped. Hoping rain would free them, pilot left wipers on. Attention was diverted to radio calls and navigation. When aircraft landed about 5 minutes later, crew smelled and saw smoke. Windshield wiper motor had burned out. Wiper control knob wasn't attached. Pilot had picked it up from console and placed it on the shaft as he turned it on. Fact that knob didn't properly show that wipers were on may have contributed to incident.

UH-60 Class E mishaps

A series - Aircraft was on test flight. A few seconds after termination of approach to hover, engine failed. IPS blower blade broke off, damaging duct assembly.

A series - Aircraft was on medevac flight. Stabilator malfunctioned at 140 KIAS. After reset, stabilator failed again at 100 KIAS.

Attack helicopters

AH-1 Class D mishaps

S series - Pilot made approach to desert landing. Terrain was rocky and uneven and dust in LZ made approach to ground necessary. Later, 3-inch dent was found in right skid tube.

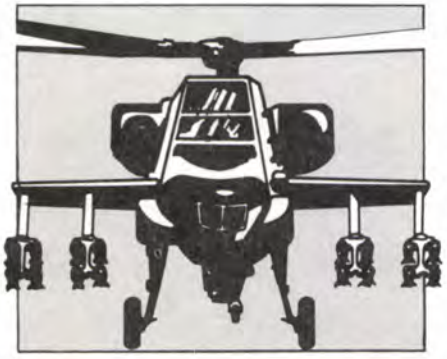
S series - During hot refueling in

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	1-4 June	**0**	**0**
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**21**	**19**

desert location, dust and sand caused refueling nozzle to stick in refueling port. POL handler tried to release nozzle by moving it up and down. Excessive force caused outer retaining ring around port to separate from closed-circuit refueling receptacle.

S series - Pilot allowed aircraft to strike a tree while hovering in confined area. Postmishap inspection revealed crack in old blade patch.



AH-64 Class E mishaps

A series - Rated student pilot was performing pilot cockpit checks and inadvertently activated wing stores jettison. Safety pins were still installed which prevented wing stores from leaving aircraft and causing damage.

A series - Aircraft was in cruise flight at 1,000 feet msl and 100 knots. Utility hydraulic oil bypass light came on. Crosscheck showed normal operation and light later went out. Caused by failure of utility hydraulic pressure switch.

Cargo helicopters

CH-47 Class E mishaps

C series - About 30 seconds after takeoff, flight engineer saw hydraulic fluid leaking from area of upper flight control closet. Caused by failure of O-ring at No. 1 hydraulic boost filter.

D series - Aircraft was in cruise flight over water. All cockpit indications were normal when flight engineer saw oil dripping from aft transmission area. Aft transmission auxiliary oil pressure sending unit had fractured and was leaking oil. As the aircraft turned back toward land, oil loss increased to 2 or 3 quarts per minute. The crew knew that continued flight depended on keeping the aft vertical shaft lubricated. They also realized that oil exhaustion would occur before the aircraft could reach land. Preliminary preparations for ditching at sea were begun. The pilots declared an emergency, a chase aircraft prepared to rescue personnel, and the Coast Guard was alerted. At the same time, the flight engineer and crew chief began attempting in-flight service to increase transmission oil level, using on-board oil stock. With pilots monitoring oil pressure and temperature, the in-flight servicing was sustained at a rate approximating the rate of oil loss. Oil pressure was about 9 psi when the aircraft made an emergency landing with no damage to the aircraft. No oil could be seen in aft transmission sight glass during postflight inspection. Emergency caused by failure of external housing of auxiliary oil pressure switch located on left side of aft transmission case.

D series - Aircraft was in cruise flight. When power was increased to accommodate change in airspeed, No. 1 engine responded with a spontaneous uncommanded acceleration. N2 actuator failed in full acceleration mode, producing high-side beep failure.

CH-54 Class C mishap

B series - Aircraft was on night VFR training flight. At 2,000 feet msl and 80 KIAS, the crew heard muffled sound of an engine spooling down. No. 2 engine oil pressure light and voice warning came on. No. 2 engine flameout light and voice warning were followed by voice warning of "rotor drooping." Pilot lowered collective and increased No. 1 engine rpm to maintain rotor rpm. T5 was 800°C and N1 was 20 percent. N1 lever and fuel lever to No. 2 engine were shut off and T5 decreased. Aircraft made single-engine landing. Engine flameout was caused by bird ingestion. Engine air particle separators were not installed.

CH-54 Class E mishap

B series - Crew was conducting aft pilot hover training with aft pilot controlling aircraft. Aft torque indicator was operating normally when glass face on torque indicator suddenly exploded, showering aft pilot and cockpit with glass fragments. Smoke began coming from torque indicator and there was a smell of burning wire. Caused by electrical short.

Observation helicopters

OH-58 Class D mishap

C series - During low-level training mission at about 60 feet agl and 70 KIAS, aircraft hit ¼-inch, single-strand telephone wire strung across water. Wire wasn't on local wire hazard map and poles weren't visible because of trees in background. Wire was cut by wire cutter device, but left support strut to upper wire cutter assembly was bent and six attaching rivets sheared. Copilot's greenhouse was gouged and transmission cowling had ½-inch hole.

OH-58 Class E mishaps

A series - Aircraft was downwind in NOE flight, about 25 feet agl, when it began an uncommanded spin to right. As aircraft nose faced into wind, pilot reduced pitch with slightly forward cyclic and entered forward flight. Aircraft again entered uncommanded spin to right. Pilot added full left pedal with cyclic slightly forward and aircraft stopped spinning. Pilot allowed aircraft to enter conditions conducive to loss of tail rotor effectiveness, and then was slow to use proper procedures.

C series - Pilot began hovering autorotation. Touchdown was rough and noise was heard above cabin roof. Suspect cause was spike knock. IP failed to take corrective action.

Fixed wing

C-12 Class E mishaps

C series - Aircraft was taxiing for takeoff. As left rudder was depressed to make left turn, crew heard loud bang and all nose wheel steering capability was lost. Retaining clip on steering spring broke, allowing the two pieces of steering rod to separate.

D series - Right brake pedal went full forward when brakes were applied at end of landing roll. Caused by failure of O-ring.

OV-1 Class E mishaps

D series - Aircraft was on photo mission. During cruise flight, pilot and technical observer smelled fumes from electrical system. Transistor failed, causing two load resistors to overheat and smoke.

D series - Fuel pump light came on in flight. Caused by failure of fuel pump.

U-21 Class E mishap

A series - While aircraft taxied for takeoff, copilot tested his toe brakes. Left brake gave more than right. As more left brake was applied, crew heard snap and pedal went all the way to the floor. Caused by broken shaft to brake cylinder.

Maintenance

UH-1 Class E mishap

H series - During runup, crew chief found fuel leak at filter on fuel control. Suspect O-ring was cut because it was improperly installed.

AH-1 Class E mishap

S series - Rpm audio and warning light came on during takeoff. Maintenance found loose cannon plug on rpm warning box.

OH-6 Class E mishap

A series - Pilot and crew chief noticed oil on windshield during flight. Investigation showed main transmission was leaking. New type main transmission seal was not seated properly.

OH-58 Class E mishap

C series - While aircraft was parked at hot refueling point, pilot saw smoke coming from battery vents. Caused by overheated battery.

U-21 Class D mishap

A series - During ground maintenance runup, crew chief removed upper forward engine cowling and placed it about 18 feet from propeller and outside wing tip. A few seconds after engine start, wind gust blew cowling into propeller. Prop assembly and nose landing gear door were damaged.

C-12 Class E mishap

D series - Aircraft was preflighted in hangar. Oil in No. 2 engine was low. Aircraft was towed outside and run up. Crew chief added oil to No. 2 engine then checked oil level in No. 1 engine. He failed to secure oil cap on No. 1 engine and as aircraft climbed through 13,000 feet, smoke began filling passenger cabin.

OV-1 Class E mishap

D series - During runup, dc voltage showed 29 volts. Caused by out-of-adjustment voltage regulator.

Safety messages

• Safety-of-flight technical message concerning replacement of UH-60A/EH-60A stabilator actuators (UH-60A-86-08, 072355Z May 86). Summary: Recent analysis of stabilator system reliability identified potentiometer in older configuration stabilator actuators as a primary cause of actuator replacement. New high reliability potentiometer incorporated into latest configuration actuator assemblies has been proven to eliminate about 90 percent of these reliability failures. Purpose of this message is to require replacement of all stabilator actuators with improved actuator. Contact: Roger Heidenreich, AUTOVON 683-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of tail rotor drive shaft nuts on UH-1/EH-1 series aircraft (UH-1-86-05, 111800Z May 86). Summary: A Category 1 Equipment Improvement Report has indicated a defective nut installed on a helicopter. Purpose of this message is to purge defective nuts from the system. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of trunnion bearings on UH-1/EH-1 series aircraft (UH-1-86-06, 111815Z May 86). Summary: A Category 1 Equipment Improvement Report has been received on a trunnion starting to disengage from its mating bore in the swashplate and support assembly. The white drive link on the scissors and sleeve assembly was hitting the swashplate inner ring horns while rotating. The trunnion disengagement has been attributed to misalignment of the trunnion in the swashplate bore. This message directs one-time inspection of trunnion bearings and associated hardware. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning comprehensive safety inspection of AH-1, TAH-1, and TH-1 series helicopters (AH-1-86-03, 111830Z May 86). Summary: Recent safety review was conducted on AH-1, TAH-1, and TH-1 series helicopters by AVSCOM with input from U.S. Army Safety Center, and the prime contractors. As a result of this review, this message provides inspections and maintenance actions for these series helicopters to enhance safety. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

Mishap briefs

• Safety-of-flight technical message concerning laser boresight safety on the AH-64A Apache aircraft (AH-64-86-09, 081800Z May 86). Summary: Safety-of-use operational message 312315Z Jan 86 regarding laser boresight safety on the AH-64 aircraft stated that a potential laser hazard has been detected during TADS internal boresight procedures and corrective actions were underway. This message prohibited conducting airborne internal boresight procedure and required use of dust cover nose bag when ground boresight procedures are conducted. A laser baffle to correct the hazard has been fabricated and tested. An urgent ECP has been approved for incorporation of this baffle. This ECP requires the contractor, Martin Marietta, to retrofit all earlier TADS, serial numbers 1 through 177, and all spares. Retrofit will be accomplished by adding laser baffle, part number 13076631-009 to TADS lower support assembly, part number 13076335, in accordance with contractor installation procedure number 0228. The baffle will be installed in production on all future TADS delivered. Any TADS with a serial number other than 1 through 177 will have baffle incorporated in production. Purpose of this message is to remove restrictions of above safety-of-use operational message for aircraft with modified TADS installed. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Training film available

The following aviation training film is now available from your local Audio-visual Support Center: TF (VT) 46-6326, "Helicopter Dynamic Rollover Characteristics."

The purpose of this film is to help Army helicopter aviators understand how dynamic rollover accidents happen, to prevent it from happening, and to correct rollover instantly. ■

Potential hazard exists for aviators flying with NVG

The U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL, has been conducting a study for the past year using a new type of spectacle lens material. This lens is made from polycarbonate, which has great impact resistance. The purpose of the study is to evaluate the potential of this material for protecting aviators' eyes from possible injury as a result of wearing night vision goggles. Should the goggle tubes accidentally be driven toward the eyes, the spectacle-wearer is at risk because the impact-resistance properties of standard-issue glass lenses are inadequate.

To date, over 625 aviators who fly with night vision goggles and wear corrective lenses have responded to requests to participate in this study (see *Flightfax*, 17 April and 21 August 1985, and letter signed by MG Ellis D. Parker, Commanding General, U.S. Army Aviation Center, subject: Aviation Branch Update, 1 October 1985). These volunteers have been furnished a pair of polycarbonate spectacle lenses made to their prescription requirements.

Recently, one of these participants was involved in an incident which could have easily caused serious eye injury. This aviator is an instructor pilot who was conducting night-phase training during the pilot night vision system aircraft qualification course in the surrogate AH-64 (a specially-equipped AH-1 helicopter).

These instructors are provided with aviation night vision imaging system (ANVIS) goggles which mount to the SPH-4 helmet. When not in use, the goggles are rotated upward for stowage. In this instance, the aviator had stowed the goggles and was running the aircraft up prior to takeoff. After updating the doppler and leaning slightly forward to read coordinates from his kneeboard, he straightened up. The stowed goggle tubes struck the canopy, which caused them to release

and rotate downward beyond the normally-worn position. The back side of the tubes struck his spectacles forcefully. The goggles then broke away from their mount and fell to the length of their safety cord.

The impact of the tubes on the spectacles was so great that the spectacle frames bruised the IP's face and nose. He stated that if the lenses had been the standard-issue glass material, instead of the polycarbonate, they likely would have shattered and he would have received serious eye injury. As it was, the lenses weren't damaged in any way and he continued to wear them.

This incident illustrates three important points:

• Aviators wearing standard-issue spectacles and flying with night vision goggles risk eye injury.

• Polycarbonate lenses have greater impact resistance than glass lenses and provide greatly-improved protection from eye injury.

• As the ANVIS goggles are introduced into Army aviation, aviators should be aware that they may be dislodged from the stowed position by striking something overhead. The aviator involved in the incident just described was of average height (5 feet, 10 inches). Taller aviators might be even more likely to encounter this problem.

Note: Both the ANVIS aviation combat developer and the Night Vision and Electro-Optics Center have been notified of this incident.■

—Dr. John K. Crosley, U.S. Army Aeromedical Research Laboratory, AUTOVON 558-6824, commercial 205-255-6824

Aviation safety progress report

quarterly in-process review (IPR) of aviation safety progress, which he would personally chair.

In those first years, the IPRs were indepth accounts of all Class A human-error accidents. Accidents caused by breaches of flight discipline were highlighted for special attention. Those IPRs presented only one side of Army aviation—the dark side. Class A through C accident trends were not included, although the causes of accidents are much the same regardless of damage classification.

FY 83 showed a dramatic improvement in Army aviation safety. Military fatalities were reduced by half and Class A accidents by a third. The Class A through C rate showed a marked improvement in overall safety performance. That year, however, 61 percent of our accidents occurred during terrain, night, or NVG flight, or a combination of the three. That shows the increasing demands being made as a result of the high-risk mission profiles we were flying.

Although there was no improvement in the Class A rate in FY 84, the Class A through C rate showed continued overall improvement. In 1985, there was a slight increase in the overall Class A through C rate and in the Class A rate. The increase in the Class A rate was driven by an increase in materiel-related causes. Materiel-related factors were involved in 31 percent of the Class A accidents as opposed to 11 percent in FY 84.

There was also a sharp increase in Class A human-error accidents in high-risk environments. A human error committed in a high-risk environment is far more likely to result in an accident and the probability of the accident resulting in Class A damage is doubled.

Another factor bearing on the increase in accidents in FY 85 was the increase in night flying. Thirty-four percent of all rotary wing accidents, less those with materiel implications, happened at night. Half of the accidents occurring during tactical training happened at night. About 25 percent involved use of night vision devices. Human error was also a major factor in Class A accidents, but the percentage of willful violations of rules and procedures dropped from 41 percent in FY 82 to 31 percent in FY 85.

A look forward

In an effort to improve safety throughout the Army during the next 5 years, a plan called SafeArmy 1990 was developed. The plan, endorsed by General John A. Wickham, Jr., Army Chief of Staff, establishes a 5-percent reduction goal in Army aircraft accidents for FY 86 and each of the next 4 years. That means that while the Army reduced the 186 accidents in 1982 to 143 in 1985, it still must reduce its accidents to 107 by 1990. Reaching this SafeArmy 1990 goal will give Army aviation its best Class A through C safety record since 1975.

The SafeArmy 1990 accident ceiling for the first half of FY 86 was 69 Class A through C accidents; the actual number of accidents was 70. Sixty-one percent of those 70 accidents were the result of human error. Materiel accounted for only 13 percent.

SafeArmy 1990 is a good roadmap, but as MG Donald E. Eckelbarger, Director of Army Safety, told MACOM safety directors, it is still only a guide; implementation has to happen in the same place the accidents happen—at post, camp, and station level. The first half's success is an indication it can be done, but the future depends on the aviation units: commanders, operations officers, safety officers, and, above all, you people in the cockpits. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

Report on first half FY 86 aircraft accidents

There has been an overall downward trend in Class A through C accidents since FY 82, and this downward trend continued through the first half of fiscal 86. These reductions have been achieved while Army aviation mission profiles have become increasingly more demanding and overall risks have risen.

Class A through C accident trends are a more valid measure of aviation safety performance since accident prevention programs are targeted at accident causes rather than damage classifications. The causes are generally the same regardless of classification.

Seventy Class A, B, and C accidents occurred during the first half of this fiscal year. These accidents resulted in 11 fatalities and more than $35 million in costs. Nineteen of these accidents were Class As, 5 were Class Bs, and 46 were Class Cs. Sixty-one percent of these accidents involved human error, 13 percent involved materiel, and, at this writing, 24 percent had unknown or suspected causes.

The Class A, B, and C rate at the end of the first half was 9.22, compared to 9.80 for the first half of FY 85. Sixty of the accidents involved rotary wing aircraft, while 10 involved fixed wing aircraft. The UH-1 was involved in 19 accidents and the OH-58 in 11. One midair collision occurred between two OH-58s and one between an OH-58 and an AH-1.

Following are synopses of selected accidents.

• As a flight of six aircraft was in loose trail formation, the No. 5 aircraft (an AH-1) collided with the No. 4 aircraft (an OH-58).

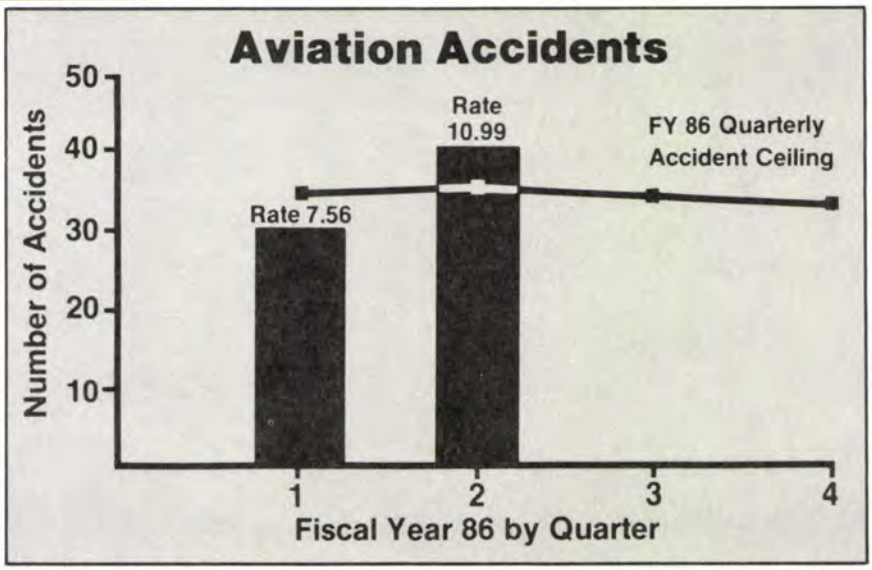
• Two OH-58 helicopters operating in a training area collided about 50 feet above the ground.

• A UH-1 pilot was repositioning in a snow-covered field site. The pilot lost visual reference because of blowing snow. The UH-1 drifted left when the pilot tried to land. The left skid hit the ground, and the aircraft rolled over. Caused by failure to follow procedures.

• A T-42 pilot was making a powered approach precision landing. When he determined his airspeed was high, he reduced power to idle and flared at 20 feet agl. The T-42 began to settle to the runway. The IP realized the sink rate was high and tried to go around. The aircraft hit the ground just as power was being applied and the IP was taking control. A go-around was made, and the aircraft was then landed with a blown left tire, bent left propeller, and broken landing gear support fitting.

• Five helicopters were in a formation approach for landing at an LZ. The lead aircraft turned base to final and established an approach angle which would have it touch down midfield in the LZ. On short final, the lead aircraft abruptly steepened its approach angle, terminating earlier than anticipated by the other aircraft. The No. 2 aircraft had to decelerate quickly to remain in proper position behind the lead. The No. 3 and No. 4 aircraft had to decelerate even more dramatically, and aircraft No. 5 had to halt its approach in midair (20 feet agl) to keep from flying into No. 4. Because the No. 5 aircraft, a UH-1, was below effective translational lift and had descended below the obstacles, there was no chance to go around. The pilot increased torque in an attempt to

(continued on back page)



Bars indicate actual accident experience for first two quarters of FY 86. Line indicates ceiling necessary to achieve year-end SafeArmy 1990 5-percent reduction goal. Cumulatively, the Army was one Class A-C accident over its SafeArmy 1990 ceiling for aviation accidents in the first half of FY 86.

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps

H series - As aircraft was making approach to land, crew heard unusual noise and felt aircraft shudder. Caused by blade strike.

H series - During rappelling mission, one rappeller's rope was between aircraft fuselage and skid. As rope was being pulled back into aircraft, rappeller became tired. He was past pivot point on skid and couldn't maintain his position. He made a rapid descent, apparently without braking. When the rappeller hit the ground, he fell forward onto his rifle and was injured.

H series - Rappeller slipped, struck aircraft's skid, and fell 40 feet, injuring his back.

UH-1 Class D mishap

V series - During PIC training, pilot became disoriented. IP decided to land so pilot could reorient himself. IP misjudged landing clearance and right skid landed on sharp rock, causing 1½-inch dent in skid tube.

UH-1 Class E mishaps

H series - Engine fire light came on in flight. Caused by malfunction in warning system control box.

H series - Main rotor tachometer generator failed during approach to landing.

H series - Engine inlet air and master caution lights came on during flight. Caused by failure of inlet air pressure switch.

H series - During descent from 6,000 to 2,800 feet, engine-out light came on. Engine N2 tachometer generator shaft sheared.

M series - Aircraft was at cruise flight when crew heard loud growling noise from engine compartment. Master caution and hydraulic pressure caution lights came on. Caused by split in nipple elbow tube at line fitting in lower pylon.

M series - Master caution and hydraulic pressure caution lights came on in flight. Caused by ruptured hydraulic pressure line from No. 2 hydraulic pump to hydraulic module.

UH-60 Class E mishaps

A series - Stabilator failed during takeoff and again during cruise flight and landing. Dead spot in potentiometer of stabilator actuator caused system to go out of automatic mode.

A series - No. 2 engine chip detector and master caution lights came on in flight and crew felt high frequency vibration. Aircraft landed, chip detector was inspected and MOC completed. Same thing happened during return flight. After borescope examination, engine was replaced.

A series - Aircraft failed HIT check by average of more than 40° C., on three separate attempts. Engine was inspected and cleaned but tgt didn't improve. Aircraft had record of increasing tgt during HIT checks. Engine replaced.

Attack helicopters

AH-1 Class E mishaps

S series - Aircraft was on downwind leg for landing when master caution and forward fuel boost lights came on. Caused by failure of fuel boost pump.

S series - During landing, master caution and engine oil pressure lights came on. Caused by failure of oil pressure switch.

S series - During flight at 60 knots in shallow right turn, aircraft experienced numerous roll oscillations, plus or

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	1-11 June	**1**	**0**
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**22**	**19**

minus 15 degrees. Caused by failure of sensor amplifier unit.

S series - Master caution light came on during flight but no segment panel light came on. Master caution box malfunctioned.

AH-64 Class E mishaps

A series - While crew was performing hovering tasks, master caution and No. 1 engine chip caution light came on. Caused by normal fuzz on chip plug.

A series - During takeoff after rearming, caution light for No. 2 nose gearbox oil pressure came on. Caused by failure of oil pressure switch.

Cargo helicopters

CH-47 Class D mishap

A series - Postflight inspection showed signs of rubbing on No. 3 drive shaft. No. 2 and 3 shaft tunnel covers had numerous cracks and, apparently, wind flow over the cracked covers caused them to flex down and rub on the drive shaft.

CH-47 Class E mishaps

B series - Master caution and transmission oil pressure lights flickered during takeoff. Aircraft landed but no problem could be found. Aircraft took off and lights flickered on again. No. 2 engine transmission oil was low.

C series - While torque matched at 32 percent, No. 1 and 2 engines had high N1 of 93.5 percent. Caused by failure of torquemeter power supply.

C series - No. 2 flight boost caution light came on during landing and flight engineer told pilot fluid was coming out of No. 2 flight boost pump area. Caused by failure of flight boost pump.

CH-54 Class E mishap

A series - No. 1 engine fire light came on in flight. Moisture caused cannon plug to fail.

Observation helicopters

AH-6 Class D mishap

F series - During ground slide, aircraft began drift to right. Due to low rotor rpm, left cyclic correction didn't stop drift. Aircraft slid to right side of concrete pad, stopping on a built-up pad light. Stop was violent, but aircraft didn't rock. No damage was found after incident or during inspection following subsequent autorotations. Aircraft wasn't flown again until two days later. Crack in skid and broken diagonal brace in engine compartment were found during daily inspection.

OH-58 Class D mishap

A series - On postflight inspection, crew found two shallow grooves about 7 inches long, less than 1/16 inch deep, inboard of blade tip cap. Other blade had 6-inch shallow groove and tip cap was dented. Tip cap skin had separated about 5 inches at extreme outer edge. Residue from pine tree was found on both blades. Crew had been flying low-level, contour, and NOE, reconnoitering enemy locations in support of ADA unit. Crew noticed no indications of tree strike during flight.

OH-58 Class E mishaps

A series - Transmission low oil pressure light came on during hover. Caused by failure of transmission oil pressure switch.

C series - Drop in N2 occurred after takeoff from forward area refueling point. Rpm light and low rpm audio came on. Dirty fuel control unit filter and fuel pump filter were found. Aircraft had been operating in dusty desert environment. Fuel cell was deteriorating from inside out. Suspect fuel contamination due to fuel cell deterioration.

C series - N2 gauge fluctuated from zero to 100 percent during landing. Caused by failure of N2 tachometer generator.

Fixed wing

T-42 Class E mishap

A series - Landing gear wouldn't extend electrically during prelanding check. Caused by burned-out motor in landing gear actuator.

Maintenance

UH-1 Class D mishap

H series - Air Force maintenance personnel were swapping inverters that were taped off of nonessential bus relay. A hot wire was dropped, arced, and burned pinholes in floorboard. PIC cut power and terminated mission.

UH-1 Class E mishap

H series - During hover checks before instrument flight, IFE noticed that engine rpm fluctuated plus and minus 100 rpm when collective pitch was increased or decreased. Maintenance check showed droop compensator was incorrectly rigged.

AH-64 Class E mishaps

A series - While in flight, CPG cyclic had about 2 inches of lateral play before aircraft would respond to a control input. Bolt at base of CPG cyclic stick was loose.

A series - Pilot couldn't get aft fuel boost pump switch to latch on after repeated attempts. Front seat copilot/gunner switch worked. During installation of pilot's fuel panel, a wire to the fuel boost pump switch was disconnected and went undetected. No inspection was made to ensure each fuel panel switch was properly functioning.

CH-47 Class E mishaps

C series - No. 2 engine torque needle on copilot's side started spinning slowly in clockwise direction while pilot's torque needle remained fairly steady. Cannon plug on back of torquemeter wasn't seated properly.

C series - After landing, rotor rpm and No. 1 engine torque were low. Engine wouldn't react to normal or emergency beep. No. 1 engine came off line with power turbine inlet temperature showing 800° C. No. 1 engine bleed band was out of adjustment.

SD-3-30 Class E mishap

During maintenance test flight, left low-fuel-pressure light came on, followed about 10 seconds later by engine shutdown. Engine quit because of fuel starvation when engine fuel filter became clogged.

Safety messages

• Safety-of-flight operational message concerning MILES/AGES

Mishap briefs

equipment installed on OH-58A and C series aircraft (OH-58-86-03, 232300Z May 86). Summary: Review of Category I EIR has revealed that installation of MILES/AGES equipment on OH-58A and C series aircraft has created the following conditions. 1) MILES cockpit kill indicator, as currently installed in the OH-58, restricts vision of both pilot and copilot. 2) Vibrations caused by aircraft kill indicator/smoke indicator mounted on the landing gear are causing cracking of aft crosstubes under left-hand mounting strap. All affected aircraft will be inspected to identify presence/installation of MILES/AGES equipment. Aircraft with MILES/AGES installed will comply with paragraph 10 of this message before next flight. Units operating OH-58A and C series aircraft should emphasize daily visual inspection of landing gear crosstubes, particularly at the outboard strap area on left aft location. Look for cracks progressing from under the strap. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of wing attachment fittings on U-8 aircraft (U-8-86-01, 222200Z May 86). Summary: During wing bolt inspections, incorrect washers were found which could cause grooves in the fitting and erroneous torque values. Instances of incorrect installation of correct washers were also noted. Affected aircraft shall be inspected as soon as practical, but no later than the task inspection suspense date. Contact: CPT William Knight, AUTOVON 693-3300, commercial 314-263-3300.

• OV-1 maintenance information message concerning status of wire-wrapped main system oxygen cylinder and valve assemblies and pneumatic actuator assembly (MIM-OV-1-86-ME-01, 211600Z May 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Report on first half FY 86 aircraft accidents

cushion the landing. Torque demanded was limited to 45 psi. At 2 feet agl, torque jumped momentarily to 60 psi and then went back to 45 psi. The UH-1 was landed without further incident.

• A chamois rag left in the engine inlet section of a UH-1 caused $73,000 damage.

• Sparks and flames were seen coming from UH-1 tailpipe during engine start, and explosions were heard from engine. Snap-on socket left in engine intake particle separator was ingested through engine intake.

The Army met its SafeArmy 1990 5-percent reduction goal in aviation accidents, including Class As, during the first quarter of this fiscal year. The Class A through C goal was narrowly missed the second quarter, primarily because of an increase in Class C accidents. Cumulatively for the first half of FY 86, the Army was one Class A through C accident over its SafeArmy 1990 ceiling and six Class A accidents under its ceiling. ■

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Report of Army Aircraft Mishaps

Army aviation 44 years old

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The sixth of June 1986 marked the 44th Anniversary of Army aviation. During this month, we have taken a look at some of the progress made in aviation safety since the Army began keeping accident statistics in 1958. The progress is certainly significant, especially when we look at it in light of the increased high-risk mission. But we haven't done enough; not when 31 soldiers and Army civilians died as a result of aviation accidents in FY 85 and there have been 21 fatalities this year.

We also told you about the Army's 5-year plan called SafeArmy 1990. Among other goals, the SafeArmy 1990 aviation goal is to continue to reduce Army aviation accidents over the next 5 years. We were one Class A-C accident over our SafeArmy 1990 goal for the first half of this fiscal year. The number of Class A accidents was six less than forecast. That's excellent, but we can't afford to let up even for a minute. To reach the goal set for 1990, the 143 Army aviation accidents in 1985 must be reduced to 107. Reaching that goal is going to take concerted effort, from DA level to the MACOMs, right down to the units in the field.

In the following article, we digress briefly from Army aviation to take a look at another great group of aviators. These aircrews had an absolutely vital role in the outcome of World War II. They are the people who airlifted supplies over the Himalayas and they did it in some of the worst flying conditions that could be found anywhere in the world. ■

L-19

AH-64

Wartime safety

Safety professionals report that in spite of today's emphasis on safety by the Army's top leadership, there is still a perception among some young Army leaders that safety is something you have to consider in peacetime missions, but in wartime safety becomes a luxury. If that is true, and if it is also true that when things get tough the first things to go are the luxuries—then when war comes, we can no longer afford safety. The question really is, "Can we afford not to consider safety during wartime?"

One military officer who recognized the importance of safety in aviation operations was General William H. Tunner, who was responsible for the India-China airlift in the last year of World War II. In an article published in *Flying Safety* in April 1986, Dr. Richard W. Huling, an Air Force historian, tells about General Tunner's experiences during one of the first attempts to supply an army by air.

The airlift had been in existence for about 2 years when General Tunner took command in 1944. It had been reluctantly called into existence by a ground-oriented command because a deadly combination of Japanese and geography made moving supplies over the Burma Road all but impossible. Those supplies were crucial because they meant the Chinese forces in Western China could continue to keep 2 million Japanese troops tied down and out of action against U.S. forces in the Pacific.

The same treacherous geography that plagued ground troops was also a problem for pilots who were trying to keep the Chinese supplied. The high

(continued on next page)

Wartime safety

peaks and jungles of the Himalayas weren't the only problems, however. In his book, *Over the Hump*, General Tunner describes what he found when he arrived in India in the summer of 1944.

"Here, in a strange land far from home, on the fringes of a mysterious backward civilization, were all the conditions that bring hazardous flight: Fog, heavy rains, thunderstorms, dust storms, high mountains, a necessity for oxygen, heavy loads, sluggish planes, faulty or no radio aids, hostile natives, jungles, and one-way airfields set in mountainous terrain at high altitude."

In January of 1944, the accident rate for the airlift was *1.97 per 1,000 flying hours*. Every 200 trips over the Hump cost one airplane; for every 100 tons of supplies flown into China, 3 Americans died. Most of the accidents were total losses. Aircraft either hit mountain peaks or were lost in the jungle, and the few crewmembers who were able to parachute simply vanished and were never seen again.

General Tunner soon found that all efforts had been directed toward increasing tonnage the airlift could transport, but as tonnage gradually increased, so did the mishap rate. Safety had been ignored. Night flying had been introduced, although radio communication and navigational facilities were nonexistent except at the terminals. Weather was virtually ignored and many planes flew in violation of standard Air Corps specifications.

General Tunner issued a challenge: Increase tonnage *and* lower the accident rate. Even today, in peacetime, some people will tell you that you have to choose between the mission and safety, yet General Tunner's command managed to meet both of those seemingly contradictory actions in a wartime environment.

What did they do? The safety program they instituted consisted of the basics, still being used in safety today, distilled into four main points:

- Analysis of existing flight and maintenance procedures and practices.
- Statistical investigation and analysis of accidents.
- Recommendations for the correction of faults revealed in the foregoing analyses.
- Prompt action and followup on that action.

General Tunner and his staff also investigated pilot training and made up for any gaps before sending them over the Hump. They began to take weather and communications seriously, attacking conditions such as icing and turbulence, and becoming more familiar with navigational equipment and how to best deal with its absence.

Another major area was pilot discipline. General Tunner was very specific about the importance of using the checklist. Exact procedures, from starting the engines to cutting them off at destination, were emphasized.

Briefing and debriefing, according to General Tunner, lay at the heart of the program. In his own words—

"Briefing and debriefing proved to be of the greatest importance. Briefing involved not only a thorough preparation of the pilot for the route he was to take, but a check to make certain that the crew was competent to make the proposed flight safely. Debriefing would show up incompetent flight procedures, indicating the necessity for corrective action and additional training. Debriefing also provided our best weather reports."

Did all of this work? In August of 1944 (just before General Tunner's arrival), 23,000 tons were airlifted over the Hump to China. The accident rate hovered around 2.0 per 1,000 flying hours. In January 1945 with close to 40,000 tons airlifted, the accident rate dropped to .301. By July 1945, total tonnage jumped to 71,042 with an accident rate of .239. During August 1945, the last big month of the airlift, 20 planes were lost during 135,000 flying hours, bringing the accident rate down to .154 per 1,000 flying hours. General Tunner makes the statistics come to life by looking at them another way:

"If the high accident rate of 1943 and early 1944 had continued, along with the great increase in tonnage delivered and hours flown, America would have lost not 20 planes that month, but 292, with a loss of life that would have shocked the world."

Thirteen years after World War II ended, Army aviation was still in its infancy. That year, 1958, was the first that Armywide aircraft accident data was collected and those numbers are also shocking. There were 54.3 accidents per 100,000 flying hours. But by the first half of FY 85, the Army had cut its Class A-C rate to 9.80. The Class A-C rate for the first half of FY 86 was 9.22. These reductions have been achieved while Army aviation mission profiles have become increasingly demanding and overall inherent risks have risen.

Many of the strategems used to achieve these reductions are the same as those used by General Tunner in 1944: analysis of flight and maintenance procedures and practices, statistical investigation and analysis of accidents, recommendations for corrections of faults revealed in the analyses, prompt action and followup on that action, improved training, emphasis on pilot discipline, and thorough mission briefing.

We have seen vast improvement in Army accident rates, but what would these rates have been like under wartime conditions? In Vietnam, aviators flew in conditions not unlike those on the India-China border, and again losses were high. By the end of 1968, Department of Defense reported 2,228 aircraft had been lost through enemy action, but during the same period, 2,540 aircraft were lost through accidents.

Can we afford the luxury of a safety program during wartime? History tells us we can't afford not to have one. Safety has to be part of the mission, in wartime and in peacetime. We simply can't get the job done without it. ■

—Portions of this article on the India-China airlift were taken from the article by Richard W. Huling, Ph.D., AFISC Historian.

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - Mishap aircraft were No. 1 and 2 in flight of four. Lead aircraft landed at refueling site, moved into position, and went to flat pitch. No. 2 aircraft landed and waited for CE of No. 1 aircraft to ground guide. When CE was in position to ground guide, PIC

picked up to hover and following ground guide's directions hovered forward, then right, then forward again. Main rotor blade of No. 2 aircraft struck main rotor blade of No. 1 aircraft. Aircraft blew sand and dust into ground guide's eyes, obscuring his vision.

UH-1 Class E mishaps

H series - Transmission oil pressure gauge and replacement gauge malfunctioned. Third gauge had to be installed before continuous fluctuation could be stopped.

H series - Pilot was repositioning aircraft for takeoff. Eight to 12-foot hover was required to clear obstructions. When pilot reduced power, aircraft had series of compressor stalls. Rolling terrain wasn't suitable for landing. Engine continued to run and surge with compressor stalls as pilot maneuvered toward level terrain. About 8 seconds after first incident, aircraft began yawing excessively. Suspect malfunction of variable inlet guide vane actuator. Inspections are being conducted to determine if surging power damaged power train system.

H series - Pilot applied power for takeoff at night. PIC monitored power at 32 psi torque. At about 10 feet agl, and 10 to 12 knots forward airspeed, crew heard three reports from engine area and engine began losing power rapidly. Pilot made autorotation. Egt after touchdown was 680 degrees and decreasing; torque was 30 psi and decreasing. Caused by engine compressor stall. Preliminary investigation indicates failure of fuel control resulted in not enough fuel being supplied to maintain engine power.

H series - Engine failed when throttle was rolled off for practice hovering autorotation. Fuel pressure was 40 pounds at 10 percent N1, not 100 pounds as specified by TM. Caused by defective fuel control.

H series - During flight, crew heard grinding noise and felt stiffness in controls, followed by violent surges in controls. Vibration apparently caused end fitting to work loose, causing hydraulic leak and resulting in loss of hydraulic control assistance.

H series - Master caution and engine inlet filter segment lights came on in flight. Caused by internal failure of caution panel assembly.

V series - Master caution light began flickering in flight. Hydraulic pressure caution light flickered for several seconds, then burned steadily. Pilot reported stiffness in controls. En route to landing, pilot told copilot to switch hydraulic control switch off to conserve fluid. Pilot made uneventful hydraulics-off running landing in translational lift. Caused by failure of hydraulic pressure switch.

UH-60 Class D mishap

A series - During NOE quick stop, aircraft settled and tail wheel and

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	1-18 June	**2**	**2**
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**23**	**21**

stabilator hit the ground. Pilot misjudged tail wheel height above the ground.

UH-60 Class E mishaps

A series - Stabilator failed twice during flight. Caused by failure of No. 2 stabilator amplifier.

A series - While aircraft hovered, antiflap assembly stuck in up position, causing vibration in rotor system.

A series - Crew noted excessive vertical vibration during takeoff. Bushing in antiflap assembly failed, causing binding of antiflap stop in static position.

A series - No. 2 engine fire light came on in flight. Caused by faulty cannon plug in deck-mounted fire detector.

A series - No. 1 tail rotor caution light and backup pump advisory light came on in flight. Caused by moisture condensation in cannon plug.

Attack helicopters

AH-1 Class D mishaps

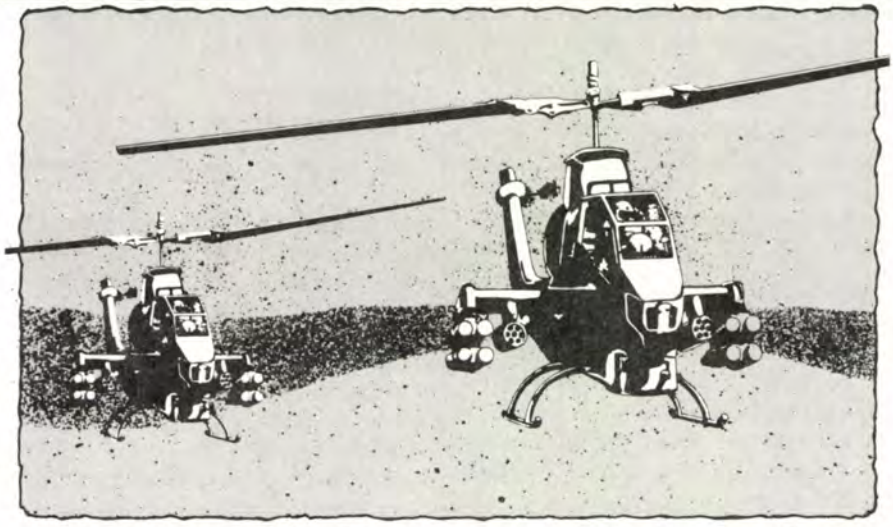
F series - During preflight, small dents were found on each main rotor blade, approximately 4 feet outboard from root. Dents couldn't be repaired locally and blades were replaced. Unable to determine when damage occurred.

S series - Copilot was maintaining 15-foot hover over sloping terrain. He allowed aircraft to drift to rear, striking trees and damaging both tail rotor blades.

AH-1 Class E mishaps

F series - Transmission oil pressure gauge fluctuated but master caution and transmission oil pressure segment lights didn't come on. Caused by failure of pressure transmitter.

G series - Aircraft was on normal approach to landing with 10 percent fuel. Aft fuel boost lights came on. At approximately 60 KIAS and 150 feet agl, aircraft lost some engine power. The low rpm audio came on, rpm decayed, and collective was slightly lowered. Throttle reduction started when cushion was applied for autorotation to the taxiway. As aircraft slid to a stop, the engine surged, causing



the nose to yaw about 40 degrees right. Throttle was retarded to engine idle stop, with about ½-inch maximum travel. IP failed to adequately monitor fuel. When aircraft reached critical fuel stage, IP continued mission instead of landing. Failure to follow regulations and SOP resulted in fuel starvation on final approach and made autorotation necessary.

AH-64 Class E mishaps

A series - During shutdown, transmission No. 2 caution light wouldn't come on. Caused by failure of transmission oil pressure switch.

A series - Fuel panel crossfeed switch was placed in aft position during taxi to departure. About 15 seconds later, No. 1 engine failed. Maintenance repaired wire on No. 2 crossfeed valve.

A series - Hot battery light came on during taxi operations. Battery was replaced. QDR has been submitted on design deficiency in all AH-64A batteries.

Cargo helicopters

CH-47 Class E mishaps

C series - Master caution light came on and No. 2 flight boost pressure dropped to zero during flight. Hydraulic fluid could be seen leaking in flight closet. Caused by failure of cylinder actuating extensible link.

C series - Aircraft was in traffic pattern when No. 2 hydraulic boost segment light came on. All other indicators were normal. Caused by internal failure of No. 2 hydraulic pressure switch.

C series - During landing, master caution and transmission chip detector lights came on. Internal failure of C-box caused high metal content on chip detector and in combining transmission oil filter.

C series - Transmission temperature gauge failed internally during landing, causing master caution and transmission oil hot segment lights to come on.

Observation helicopters

OH-6 Class A mishap

A series - Aircraft had just taken off and climbed to 1,000 feet at 70 KIAS. There was a loud bang from rear and aircraft yawed, nose tucked down, and pilot had control problems. Pilot began a powered descent. Aircraft hit the ground hard and rolled over onto its right side, causing major damage. The tail rotor gearbox housing had fractured and the tail rotor separated from the aircraft. 8632

OH-6 Class E mishap

A series - Crew smelled odor of electrical fire during flight. Gauges showed normal readings. Caused by short circuit in attitude indicator.

OH-58 Class D mishap

A series - During preflight, pilot saw

Mishap briefs

bleed air valve was closed. He instructed observer on procedures to use to make sure it opened during start. After start, pilot told observer to close engine door and observer verified that he had closed it. After flight, pilot saw engine door wasn't secured and found several small cracks in engine panel door.

OH-58 Class E mishaps

A series - During hot refueling operations at night, POL handler disconnected CCR nozzle, allowing fuel to spray all over the right and underside of aircraft, in the cockpit, and on himself. Refueler couldn't see what he was doing and broke CCR nozzle.

C series - Aircraft had partial power failure during runup. Caused by failure of fuel control.

Fixed wing

OV-1 Class D mishap

D series - Flames began coming from behind No. 2 propeller cone during flight and large bubble formed on aft end of spinner. Cockpit filled with fumes. Fire went out when pilot turned off engine deice. Suspect failure of propeller deice.

OV-1 Class E mishap

D series - During cruise flight at 14,000 feet, aircraft encountered light to moderate icing. Pilot noticed electrical arcing coming from No. 1 engine lower cowling deice element. FOD caused short in electrical element.

T-42 Class E mishap

A series - Landing gear wouldn't extend electrically during pre-landing check. Caused by burned-out motor in landing gear actuator.

U-21 Class E mishaps

A series - During after-takeoff check, pilot saw fuel siphoning from right wing fuel filler cap. Cap wasn't seated properly.

A series - Left forward engine accessory latch was found unsecured after landing. PIC had secured latch, but it came loose during flight. Latch was broken at bend in hook.

J series - Aircraft struck large bird during cruise flight.

Maintenance

UH-60 Class E mishap

A series - During NOE flight, aircraft was in approach attitude at about 20 KIAS. Stabilator failed, was reset, and failed again 1 hour later. Stabilator actuator bias was out of adjustment.

CH-47 Class E mishap

C series - After completing start on both engines, FE told pilots there was a severe hydraulic leak in vicinity of aft gearbox. About that time, pilots received cockpit indication of loss of both generators and rectifiers. Unknown person had incorrectly installed utility hydraulic pressure line. Line chafed against sheetmetal

ridge on airframe, causing line to rupture. Clamp used to secure line concealed chafed area during preflight and daily inspections.

OV-1 Class E mishaps

D series - During level-off at 16,000 feet msl, pilot felt aircraft vibrate and noted increase of egt on No. 2 engine. When pilot reduced power, egt decreased and vibration stopped. Vibration returned when propeller rpm was reduced from 1600 to 1450 and pilot attempted to increase N1 to 92 percent. When N1 was decreased to 85 percent, vibration again stopped. Variable inlet guide vanes were out of adjustment.

D series - On final, pilot obtained in-transit indication during before-landing check on right main gear. Gear was recycled twice with good indications. Aircraft landed and during taxi, in-transit indication on right main gear was received again. Aircraft was stopped and gear blowdown handle was pulled. Gear indicator microswitch was sticking.

SD-3-30 Class E mishap

During maintenance test flight, left low-fuel-pressure light came on. About 10 seconds later, left engine shut down. Caused by fuel starvation when engine fuel filter became clogged with foreign matter.

Safety messages

- Safety-of-flight maintenance mandatory message concerning inspection of oil cooler assembly in UH-60A and AH-64 helicopters (UH-60A-86-09 and AH-64-86-10, 292300Z May 86). Summary: There have been quality control problems with the current Black Hawk/Apache engine two-piece oil cooler and a commercial T700 engine had a power loss. Problem arises when engine oil and fuel mixes, and/or leaks are caused by improper torque. Purpose of this message is to direct one-time inspection of an odd lot of engine oil coolers (installed and spares) and to direct contractor representatives to correct suspected oil coolers. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.
- Maintenance information message concerning increase in elevator horn retirement life on UH-1H aircraft (MIM-UH-1-86-ME-04, 272030Z May 86).
- Maintenance information message concerning manual changes for T63 engines on OH-58A, OH-58C, and OH-6A aircraft (MIM-OH-58A-86-ME-03, 031500Z Jun 86). Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Improved ladder available

A ladder system offering safety and flexibility improvements over conventional ladders is now available through the General Services Administration (GSA). The ladders, basically A frame with telescoping legs, are manufactured of heavy gauge extruded aluminum, with high strength steel pivot locks and fittings. Their lightweight portability makes them handy for flight line, shop, and remote site uses.

This particular ladder system offers multiple selections for various heights and configurations. For example, the Model 22 can be configured as a 5-, 6-, 7-, 8-, or 9-foot step ladder, an extension ladder adjustable to 22 feet, a staircase ladder, or two 5-foot scaffolding trestles.

These ladders can be ordered through GSA under the following numbers:

NSN	Nomenclature	PN
5440-01-049-3398	Ladder, Adjustable, 13'	M-101
5440-01-048-8638	Ladder, Adjustable, 17'	M-102
5440-01-092-1894	Ladder, Adjustable, 22'	M-103
5440-01-092-1812	Work Platform	WP-104

Information needed on reorganized units

If your unit is one of those being reorganized under the J series TO&E, please let the Army Safety Center know your correct address and unit identification code (UIC). Your old address and UIC should also be included for cross reference purposes.

This information is needed to ensure continued services on such things as recording of mishap data, safety awards, and mailing lists for publications like *Flightfax*.

Send the information to: Commander, U.S. Army Safety Center, ATTN: PESC-M, Fort Rucker, AL 36362-5363. ■

U.S. ARMY SAFETY CENTER

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A. E. Hervey, Jr.
Colonel, Aviation
Commander, Army Safety Center

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Report of Army Aircraft Mishaps

A save for CH-47 crew

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An Army helicopter crew has earned a much-deserved "well done" for their actions in averting what would almost certainly have been a total loss of a CH-47 aircraft and possibly of the crew as well.

CW2 Paul D. Marshall and CW2 Guy A. Pearce were piloting the aircraft which was flying as lead in a flight of six CH-47s. The aircraft were redeploying to the continental United States after extended field duty on the island of Puerto Rico. Three enlisted crewmembers were on board: SGT Jonathan S. Gyuran, SP4 Russell H. Crocker, and SP4 William B. Cradick. All five men are assigned to B Company, 159th Aviation Battalion, at Fort Campbell, KY.

The aircraft was about 60 nautical miles off the coast of Puerto Rico when the flight engineer, SGT Gyuran, spotted oil coming from the aft transmission area. An auxiliary pressure switch in the aft transmission casing had fractured and transmission fluid was streaming from the cracked switch.

The aircraft turned back toward the nearest land, a small uninhabited island, about 25 miles west of Puerto Rico. When the PIC told the flight engineer they were 50 miles from the island, SGT Gyuran replied that oil exhaustion would occur before they could reach land.

They all knew that survival of the aircraft, and possibly their lives as well, depended on keeping the aft vertical shaft lubricated. If the oil in the aft transmission was exhausted before the aircraft reached land, they would have to go down in the water. CW2 Marshall decided to continue flying until the transmission oil pressure dropped to zero. When that happened, they would have to ditch at sea. Another of the CH-47s had turned back with the damaged aircraft. The PIC notified the crew of the chase aircraft what he had decided to do and then he radioed the Coast Guard station at Borinquen.

One of the crew chiefs, SP4 Crocker, told the pilots there was a case of transmission oil on board. If they could service the aft transmission in flight, they might be able to save the aircraft. The company maintenance officer was on the chase aircraft and he told them to give it a try, but he also warned them of the possible hazards at the fill port from overpressurization.

With the pilots monitoring the transmission pressure from the cockpit, the three enlisted crewmembers began the servicing attempt. Pressure was already at the bottom of the green arc on the gauge, and decreasing. Hot transmission oil was constantly spraying the men and the area where they were working, making their every movement hazardous, but they kept at it. The transmission oil pressure began slowly rising. When the pressure reached 55 psi, they could breathe a little easier. Now they could stabilize the pressure by putting more oil in at just about the same rate it was leaking out. That way they could keep the transmission pressure at a safe level—as long as the supply of oil held out.

During the long 20-minute flight to safety, the enlisted crew worked to keep the transmission serviced and the CH-47 in the air. The pilots were busy flying the aircraft and monitoring the aft transmission oil pressure, but they were also preparing to land in the water, if necessary.

By the time land was sighted, eighteen quarts of oil had gone into the leaking transmission. When the aircraft was safely on the ground, no oil could be seen in the aft transmission sight gauge. It was a close call, but this aircraft crew's ability to carry out in-flight servicing under emergency conditions, and to work as a team, prevented what might have been a catastrophic accident. Well done! ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps

H series - Engine failed in flight and aircraft autorotated to landing. Caused by failure of No. 3 and 4 bearing packs.

H series - Aircraft was in flight at 2,000 feet agl when crew heard whistling sound. Scarf tape on one main rotor blade had begun separating.

UH-60 Class E mishaps

A series - Crew felt unusual vibration on short final. Caused by cracked antiflap adapter.

A series - Stuck antiflap bushing caused severe vibration on takeoff.

Attack helicopters

AH-1 Class A mishap

S series - While conducting simulated suppression fire during NOE flight, aircraft made sharp left descending turn and crashed, coming to rest on its right side. 8633

AH-1 Class C mishaps

S series - Pilot brought aircraft to 40- to 50-foot hover to observe enemy during MILES engagement. Aircraft was engaged, and pilot took evasive action by decreasing collective and turning right. Fearing he would fly into an OH-58, pilot rolled out and increased power to stop descent. Torque went to 63 psi for half a second. Pilot failed to anticipate effects of transit torque when he rolled out from right turn without decreasing power.

R series - Aircraft was started and was at about 40 percent N1 when an unattended two-man electric scooter moved forward and ran into tail rotor. Scooter operator had failed to place forward/reverse selector in neutral and hadn't engaged parking brake. Both tail rotor blades were damaged and vertical fin was punctured.

AH-1 Class D mishaps

S series - While performing gunnery qualification, one of the aircraft's minigun barrels exploded, damaging right front turret fairing.

S series - Pilot and crew chief worked late to repair and preflight aircraft. Aircraft was moved outside hangar, and pilot failed to notice unsecured drive shaft cover during walk-around. After aircraft was running, crew chief heard noise and found the unsecured cover. Cover was worn through and drive shaft coupling clamps were scratched.

AH-1 Class E mishap

S series - Main inverter failed, causing aircraft to have total electrical failure during flight.

AH-64 Class E mishaps

A series - Crew was performing flight control check during runup. They heard a heavy clunk from transmission area when collective cycled. Caused by failure of forward mixer support assembly.

A series - Utility hydraulic light came on during taxi. Utility hydraulic pump had failed.

A series - Intermediate gearbox hot caution light came on in flight. Intermediate gearbox was replaced.

A series - Rotor began turning during rotor brake lock start. IP put rotor brake switch in off position and rotor brake locked. Rotor brake assembly was replaced.

Cargo helicopters

CH-47 Class E mishaps

B series - Crew smelled hydraulic fluid during flight. Utility hydraulic pressure gauge began decreasing and flight engineer saw fluid leaking from aft transmission area. Caused by crack in utility hydraulic pump case.

B series - HIT check on No. 1 engine

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	1-25 June	**3**	**2**
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**24**	**21**

had just been completed. No. 2 engine condition lever was brought to flight position and egt went to 840° C. Pilot returned lever to ground position to check high egt. PIC turned on engine anti-ice system switch and put engine condition lever back to flight position. Engine anti-ice needed to be turned on before advancing engine condition lever to flight position from ground. This is contrary to normal startup procedures in TM. Hot end inspection will be made.

D series - Aircraft was on ground awaiting takeoff. No. 1 engine transmission oil pressure dropped to 10 psi with engine at flight position. Caused by failure of oil pressure transducer.

CH-54 Class C mishap

A series - Aircraft picked up howitzer and completed hover check at 10 feet agl. After normal takeoff, aircraft was 60 feet agl and passing through effective translational lift when it suddenly began uncommanded right yaw. Pilot applied full left pedal, but aircraft continued to yaw about 120 degrees. At about 15 feet agl, pilot told crew chief to jettison load. Pilot regained control and landed. Suspect wake turbulence from a second aircraft. Damage to howitzer was nearly $27,000.

Observation helicopters

OH-6 Class C mishap

A series - Aircraft was in flight at 90 KIAS when crew heard loud bang from engine compartment. Noise stopped and pilot saw No. 1 needle on tachometer decaying rapidly. As pilot began autorotation, he saw smoke in rear compartment. After excellent autorotation was completed, crew put out fire in engine compartment. Engine had exploded in flight, damaging engine compartment, tail rotor drive shaft, and rotor blade.

OH-6 Class D mishap

A series - Aircraft was scheduled for MOC after periodic inspection, engine reinstallation, and installation of rebuilt tail rotor gearbox. During MOC, engine started normally and no unusual vibrations were felt at engine idle. When throttle was advanced, shudder was felt in airframe and antitorque pedals. After engine was retarded to engine idle there was still unusual noise and vibration. Engine was shut down. Outside observers heard the grinding noises but noted no abnormal readings on engine or tail rotor analysis equipment. Inspection showed tail rotor drive shaft had come out of its normal plane of rotation and contacted three bulkheads in tail boom, causing drive shaft to sever in two places. All parts and hardware were correct and installation procedures for tail rotor gearbox and drive train were by the manual. Suspect internal malfunction of rebuilt gearbox.

OH-58 Class C mishap

A series - After passing through effective translational lift on terrain flight takeoff, pilot noticed two tanks to his front. He made a left turn to avoid the tanks and main rotor blades struck a sand dune. Aircraft continued in left turn with minimal rotor rpm and landed hard, deforming aft cross tube.

OH-58 Class D mishap

C series - While aircraft was in flight, rated passenger allowed strap to fall from rear seat and hook on right rear crosstube. Strap made five dents in fiberglass outer skin. Pilot failed to supervise loading of passenger and equipment.

OH-58 Class E mishaps

A series - During NOE deceleration, low rpm audio warning came on and engine and rotor rpm began to droop. Caused by deteriorated O-ring on air line overspeed governor.

A series - Rpm warning light and audio came on as aircraft was hovering from parking ramp to takeoff pad. Caused by failure of tachometer sensor.

Training helicopters

TH-55 Class D mishap

A series - Crew was conducting end-of-stage checkride. First standard autorotation was within limits until deceleration and application of pitch. Deceleration was high and pitch was excessive, causing aircraft to develop near-vertical sink rate. IP attempted to level aircraft and make power recovery, but excessive sink rate caused aircraft to hit runway. Landing gear, landing light, and anticollision light were damaged.

Fixed wing

C-12 Class D mishap

C series - Aircraft was at 13,000 feet agl when it was struck by lightning, causing ¼-inch holes in right wing tip and left elevator trailing edge.

C-12 Class E mishaps

C series - Right main fuel tank check valve malfunctioned in flight. Fuel siphoned through cap.

C series - Left fuel flow transmitter failed during climbout. Left fuel flow gauge indicated 574 pounds; right fuel flow gauge showed 450 pounds.

C series - Landing gear wouldn't retract electrically after practice of landing gear emergency extension procedures. IP failed to cycle and verify completely stowed alternate landing gear extension handle.

D series - Crew smelled electrical odor during flight. Brush in forward evaporator blower had burned.

OV-1 Class D mishap

D series - When aircraft landed and power levers were put in reverse, props failed to reverse. As aircraft began accelerating with forward thrust, one prop started into reverse, causing asymmetric yaw. Pilot put levers in reverse, then ground idle, while applying maximum braking and both main tires blew. Caused by failure of reverse microswitch.

OV-1 Class E mishap

D series - No. 2 engine torque dropped below 40 percent on takeoff. Caused by failure of power inverter.

T-42 Class E mishaps

A series - Landing gear wouldn't retract. Landing gear motor assembly malfunctioned.

A series - No. 2 engine began running

Mishap briefs

rough during flight. Right magneto malfunctioned.

U-8 Class D mishap

F series - At 8,500 feet msl, medium-sized bird struck leading edge of right wing.

U-21 Class D mishaps

G series - Left avionics access door opened in flight and avionics protective curtain was shredded. Curtain zipper protruded from door, causing minor damage to paint aft of avionics door. Caused by failure of forward latch rod cotter pin.

H series - After test flight for adjustment to autopilot system, avionics repairman noticed damage to propellers. Pilot didn't monitor area for possible FOD, allowing debris to be ingested into propeller.

U-21 Class E mishaps

A series - Right horizontal stabilizer deice boot detached in flight. Deicer boot adhesive separated.

A series - Failure of landing gear electromagnet relay caused gear motor to continue to run after gear indicator was down and locked.

Maintenance

UH-60 Class E mishap

A series - Aircraft was on ground in confined area when stabilator malfunctioned. Stabilator bias adjustment lock nuts on stabilator amplifiers had become loose, causing stabilator actuators to receive different signals from stabilator amplifiers. Bias on both stabilator amplifiers had to be readjusted.

OH-58 Class E mishap

C series - During hover, landing, and shutdown engine oil temperature gauge showed maximum temperature. Loose wire in cannon plug shorted out on engine oil temperature sensor at engine oil reservoir.

OV-1 Class E mishap

D series - Crew chief saw fluid leaking from No. 2 propeller during runup. Magnetic plug came loose, allowing hydraulic fluid to leak.

U-21 Class E mishaps

A series - Forward bolt for upper cowling on No. 1 engine rotated about 20 degrees, causing 2-inch gap at latching point. Right rear latch on top forward cowling vibrated loose.

A series - Following single-engine cruise demonstration by IP, engine wouldn't start. Fuel control linkage was out of adjustment.

Safety messages

• Safety-of-flight emergency message concerning immediate grounding of OH-6 series aircraft and commercial variants (OH-6-86-02, 130115Z Jun 86). Summary: An OH-6 aircraft has experienced a serious mishap attributed to loss of tail rotor blade abrasion strip. Development of corrective action to preclude tail rotor abrasion strip separation is in process and required corrective actions will be provided in a subsequent message. Contact: Robert A. Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning UH-1/EH-1 series aircraft component update (MIM-UH-1-86-ME-05, 091800Z Jun 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

What if . . .

The following incident didn't happen to an Army helicopter crew, but it did happen. It didn't result in disaster, but it could have. This is another case of work not being properly recorded and a lack of communication between maintenance crews. It's the kind of incident that makes your stomach give a lurch when you read it and think, what if...?

The UH-60 took off at 0800 on a cross-country mission. It was a beautiful spring day; a good day to be alive and doing something you like to do, like flying. Before the day was over, however, this aircrew would come dangerously close to catastrophe—much, much too close.

After flying for about 2 hours on the first leg of the flight, the helicopter landed for refueling. After the aircraft was shut down, the crew chief noticed a nut, resembling those used on the pitch rod, on the ground next to the aircraft. When the rotor system was inspected, they found the pitch rod was missing the nut, washers, and cotter key! The bolt had worked itself out approximately one-third of its length. If the bolt had worked itself completely out during flight, the main rotor blade would have become uncontrolled and the helicopter and its crew could have been lost.

During a pre-runup check 3 days before this flight took place, the pilot experienced ratcheting in the flight controls of this same helicopter. The flight was cancelled. A mechanic went to get a technician to help him troubleshoot the problem. On the way, he met the manufacturer's technical representative and asked him to help them with the troubleshooting. The tech rep is authorized to provide technical aid and assistance and he agreed to help.

During troubleshooting, all three people were on top of the helicopter. The main rotor blade pitch control rod was disconnected at the spindle horn by the tech rep, with the help of the flight engineer. The helicopter mechanic saw the tech rep remove the upper pitch control rod bolt but he didn't document the disconnected rod end on the aircraft's forms.

The flight control system was operated through full travel and the troubleshooters decided that the spindle droop stop bearing was dirty. It was now time for a shift change and the mechanic gave the washers for the pitch control rod to the next shift's helicopter mechanic. This mechanic gave them to the shift supervisor. Some time after that, the supervisor installed the washers on the bolt to keep from losing them. The correct procedure to torque and install a cotter key wasn't performed.

Later that evening, the shift supervisor returned to clear the discrepancies for the ratcheting problem. He didn't remember installing the pitch rod bolt and, since there was no documentation in the aircraft forms, other people on the shift were unaware that the pitch rod had been disconnected.

When the flight engineer performed his preflight of the aircraft on the morning of the flight no discrepancies were noted, including the missing cotter key and loose nut on the pitch control rod. The crew took off, unaware that anything was wrong.

We can't emphasize enough how important it is to document maintenance in an aircraft's records so that this kind of incident can't possibly happen. Imagine that you were responsible for that aircraft. What if...? ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

H series - Dynamic rollover. 8634

UH-1 Class B mishap

H series - During landing attempt, aircraft came to 5-foot hover then began an uncommanded right turn. Crew heard a loud bang from the rear of the aircraft and it spun to the right about 2½ times. Pilot attempted hovering autorotation. Aircraft continued to turn right as it struck the ground. Two soldiers received lower back injuries. 8635

UH-1 Class C mishap

H series - While on short final, crew heard several loud bangs and rpm dropped to about 5200. Aircraft was about 30 feet agl at 25 KIAS. When power was reduced to land, engine quit. Autorotation ended in hard landing, resulting in more than $14,000 damage.

UH-1 Class D mishaps

H series - During terrain flight, crew was temporarily blinded by headlights from truck. They felt a slight bump and thought the aircraft might have struck a tree top. Four inches of outboard right section of synchronized elevator was found missing.

H series - N1 hung at 42 percent during normal start attempt. Suspect internal failure of fuel control.

H series - Aircraft was between 1,800 and 2,000 feet msl at 80 KIAS. IP's attempts to evade large bird in flight path failed. Bird struck windscreen, shattering it into cockpit.

H series - Crew was conducting poncho parachute resupply to tactical field site. Member of supported unit improperly deployed bundle, throwing it out and up. Chute deployed, but trajectory carried it into aircraft's right synchronized elevator, causing small cut in elevator.

H series - During hover taxi for take-off, master caution and transmission hot oil segment lights came on. Transmission temperature showed 77° C. Transmission temperature sending unit failed.

M series - Crew noticed increase in aircraft vibration during flight. Main rotor blade was cracked completely through honeycomb, from trailing edge to spar, about 8 feet inboard of tip.

UH-1 Class E mishaps

H series - Rpm warning light came on and N2 tachometer dropped to zero during flight. Tachometer generator drive shaft sheared.

H series - Shortly after aircraft leveled off, crew heard whistling noise from rotor system and felt one-to-one vertical vibration. From blade tip inward, about 10 inches of main rotor blade skin had separated from honeycomb. Tip showed 4- to 6-inch separation.

H series - In-flight compressor stall was caused by malfunction of fuel control.

H series - Right fuel boost caution light came on during flight. Caused by failure of right fuel boost pump.

H series - Puddle of oil was found under belly of aircraft during postflight inspection. Oil was coming from primary hell hole. When aircraft was run up, hydraulic oil was seen streaming from thermal relief port of collective irreversible valve. Caused by failure of collective irreversible valve.

H series - After level off, engine oil temperature went to 93° C., with OAT 28° C. Caused by malfunction of engine oil cooler flow control thermostat.

H series - During cruise flight at 1,000 feet agl and 100 KIAS, master caution and transmission oil pressure segment

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	5	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	1-2 July	**0**	**0**
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**23**	**21**

lights came on. Transmission oil pressure gauge showed 25 psi. Manifold assembly threads were stripped and pressure forced loosening of transmitter, resulting in loss of transmission oil.

H series - During transition from climbout to cruise, aircraft began vertical vibration. Ball bearing in elevator linkage was worn out of tolerance, allowing trailing edge to move up and down.

H series - Egt gauge fluctuated between zero and 400° C, during OGE hover check. Caused by corrosion on egt coupling.

H series - During landing from hover, controls became stiff, hydraulic light came on, and loud squeal came from transmission area. Leaking irreversible valve allowed hydraulic fluid to be depleted.

UH-60 Class E mishaps

A series - Failure of antiflap stop caused excessive vibration during hover.

A series - During cruise flight, No. 1 engine torque indicator began fluctuating between zero and 102 percent. Malfunction of No. 1 engine power cable assembly caused erroneous torque reading.

A series - Crew felt excessive vertical vibration during takeoff. Failure of bushing in antiflap assembly caused binding of antiflap stop in static position.

Attack helicopters

AH-1 Class D mishaps

S series - AH-1 was rigged for aerial recovery after total electrical failure caused emergency landing. Recovery officer and CH-47 PIC and CP inspected rigging and deemed aircraft ready for pickup. AH-1 was picked up from slope with normal minor difficulties, and load assumed a 13-degree angle. After about 10 minutes of flight, recovery officer decided AH-1 had assumed unacceptable nose-low attitude and requested that CH-47 land so load could be re-rigged or disassembled for vehicle transport. Movement of sling on AH-1 caused minor sheetmetal damage.

S series - Suspect FOD damage to tail rotor blades during OGE hover was caused by debris from TOW missile launch motor nozzle.

S series - During hover to arming pad, rotorwash blew copilot's door off parked OH-58.

S series - Rotorwash from taxiing aircraft blew left rear door off parked OH-58 causing sheetmetal damage in hinge area of door.

AH-1 Class E mishap

S series - During ferry flight, front-seat passenger inadvertently put emergency governor switch in emergency position. Pilot saw master caution light come on and heard engine speed increase. Pilot verified overspeed with N2 tachometer and increased collective pitch, reducing throttle. Initially, pilot suspected short shaft failure because governor emergency segment light didn't come on. He began autorotation and made distress call. Then the pilot slowly increased throttle, joined the needles, and continued flying to isolate problem. When the pilot questioned the passenger, he learned the governor switch had been moved. The pilot reduced throttle and had passenger return governor switch to automatic. Passenger had been told to flip a TCS switch and had hit emergency governor switch by mistake.

Cargo helicopters

CH-47 Class E mishaps

B series - During cruise flight at 100 KIAS, 2,500 feet msl, copilot couldn't decrease No. 1 engine with normal engine trim. Emergency trim was used to return engine to normal setting. When thrust was decreased, No. 1 engine decelerated 60 percent momentarily, then continued to 31 percent. Caused by spline failure of No. 1 engine fuel control/gearbox.

C series - During takeoff system check, aircraft was passing through 40 knots with 13,000-pound external load. No. 2 PTIT fluctuated 200 degrees. Caused by failure of temperature indicator.

D series - During ground taxi, cyclic had heavy forward pull. Centering button was pressed and controls recentered with no effect. Caused by failure of pitch centering balance spring mount bracket adhesive.

Observation helicopters

OH-6 Class E mishap

A series - Torque gauge dropped to zero during takeoff. Caused by ruptured torque pressure line.

OH-58 Class E mishaps

A series - During climbout after takeoff, torque gauge showed 40 psi. Internal deterioration and swelling of hose from engine to engine deck restricted torque indication.

C series - N1 tachometer generator failed during OGE hover. When collective was reduced, N1 tachometer showed rpm in excess of maximum limits.

C series - Main rotor struck small bird during climbout from FARP.

Fixed wing

C-7 Class E mishap

A series - Left engine misfired twice after level off and began vibrating. Caused by failure of No. 1 cylinder on left engine.

C-12 Class E mishap

C series - No. 1 engine chip detector came on during climbout. Excessive metal found in reduction gearcase. Suspect failure of gearcase.

U-3 Class E mishap

B series - Right engine quit abruptly during flight and small amount of fuel was seen coming from right cowl. Brass

fitting on main fuel line going into fuel injector cracked, allowing fuel to be pumped overboard instead of going to engine.

U-21 Class D mishap

C series - Gear-handle light stayed on when gear was raised. When gear was placed in down position, crew heard loud thud and gear took about 10 seconds to lock and give safe gear indication. Right main gear-door actuator cam failed, causing damage to right main gear inner door when gear was retracted and extended.

U-21 Class E mishaps

A series - No. 2 engine started without incident. After loadmeter indicated less than 5 percent on right engine, left engine start was attempted. With starter switch on, left ignition indicator light came on. Clicking sound came from engine vicinity, but starter wouldn't motor. Caused by failure of starter generator and starter relay.

F series - During start of No. 2 engine, smoke came into cockpit through power quadrant. After shutdown, crew saw smoke coming from No. 1 nacelle. Caused by internal failure of No. 2 engine starter generator.

Maintenance

EH-1 Class E mishap

X series - Aircraft began descent to runway. At 1,200 feet agl, 90 KIAS, aircraft yawed and surged. N1 and N2 torque and egt fluctuated. Out-of-adjustment bleed bands caused compressor stall.

UH-1 Class E mishaps

H series - At 1,500 feet msl, 95 KIAS, master caution and transmission hot oil segment lights came on. Jam nut on left side of main transmission oil hose came loose in flight.

H series - During flight, torque was 20 pounds, N1 93 percent, and egt gauge showed 350° C. Resistor spool soldering on egt gauge came loose.

UH-60 Class E mishap

A series - APU failed to start during runup. Personnel washing aircraft previous day didn't know excessive water entering APU inlet would cause APU to fail.

CH-47 Class E mishap

C series - No. 2 engine fire light came on as aircraft hovered. Caused by chafing of fire sensing element.

C series - During NOE flight, No. 1 engine chip light flickered on and off three times. Caused by wire from engine chip plug shorting out on airframe.

OH-58 Class E mishap

C series - During OGE hover, engine-out light and audio came on and N1 gauge went to zero. Caused by broken wire in cannon plug to N1 tachometer.

U-21 Class E mishaps

H series - Aircraft was maneuvering during tactical IFR training. When power on right engine was reduced, torque would stick at 800 pounds then, after a few seconds, it would slowly creep off. Fuel control power rod was hitting fuel line and sticking momentarily. Problem stopped when fuel line was repositioned.

M series - During flight, crew felt increasing feedback in cyclic control. Cyclic fore and aft servo was loose at its mounts. Torque was lost on holddown nuts.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time and recurring inspection and correction of CH-47 series aircraft corrosion problems (CH-47-86-05, 130100Z Jun 86). Summary: Field reports have identified many instances of corrosion in bilge area of CH-47 fuselages, with some causing structural damage to airframe. Extensive corrosion also has been found in high frequency radio antenna mounting plates. Removal of corrosion and repair/replacement of affected parts often require extensive downtime and high expenditure of funds and maintenance manhours. Purpose of this message is to provide information on reducing occurrences of corrosion and to ensure early identification and correction of the problem. Contact: CPT William Knight, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message concerning one-time maintenance test flight and hydraulic systems check procedures for AH-1S series aircraft (AH-1-86-04,121330Z Jun 86). Summary: Over the last year, there have been four reports in which AH-1S helicopters experienced a restriction or an inability to increase collective when one of the hydraulic systems had been turned off at a hover. This restriction was detected during test flights when increased collective was desired during a power cylinder check. In every case, a systematic check of the flight control system using the troubleshooting guide in the maintenance test flight manual, or replacement of rotor system components resolved the anomaly. There is no record of anyone experiencing this restriction in collective movement during an actual hydraulic system malfunction. Purpose of this message is to require one-time maintenance test flight and provide procedures until such time as technical manuals are revised. Changes and procedures in this message are effective upon receipt and until receipt of the manual changes. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning revision to reporting ungrounding of UH-60A/EH-60A aircraft (UH-60A-86-11, 161500Z Jun 86). Summary: Safety-of-

Mishap briefs

flight message UH-60A-86-07, 292220Z Apr 86 concerning requirements for ungrounding UH-60A/EH-60A aircraft requires that a priority message providing the status of ungrounding be forwarded to AVSCOM at 10-day intervals. Command emphasis on compliance reporting makes provision of more frequent reports necessary. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of remote circuit breaker/relay K3 on AH-64 aircraft (AH-64-86-11, 121345Z Jun 86). Summary: Confirming verbal field alert, it is possible that a series of remote circuit breakers/relays K3 (PN HS 5004-3140) may be defective. If the defective circuit breaker/relay K3 is installed on an aircraft, damage to the power distribution panel and aircraft wiring can occur when power is applied to the deice controller. This damage could result in a complete loss of the aircraft's primary electric power. All affected circuit breakers/relays K3, installed and spares, must be removed from service. Purpose of this message is to direct inspection of all installed and spare remote circuit breakers/relays K3, PN HS5004-3140, and to remove those having serial numbers listed in paragraph 5 from service and/or spares stock. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Followup to safety-of-flight emergency message concerning immediate grounding of H-6 series aircraft and commercial variants (OH-6-86-03, 140121Z Jun 86). Summary: Safety-of-flight emergency message OH-6-86-02, 130115Z Jun 86, grounded H-6 series/OH-6 series aircraft worldwide as a result of recent OH-6 accident involving loss of tail rotor abrasion strip. This message updates AVSCOM efforts to get the fleet ungrounded. Contact: LTC Carl Hill, AUTOVON 693-1353/1360, commercial 314-263-1353/1360.

• Followup to safety-of-flight emergency message OH-6-86-02 and followup message OH-6-86-03 concerning immediate grounding of H-6 series aircraft and commercial variants (OH-6-86-04, 140040Z Jun 86). Summary: This is a two-part message. Part 1, for all addressees having H-6 series aircraft, establishes requirement for a one-time inventory check of all affected tail rotor blades by part number and establishes procedures for inventory and reports. Part 2, for HQDA, ODCSOPS, and Chief, NGB, requests establishment of distribution priorities for returning certified blades back to H-6 series users.

• Safety-of-flight maintenance mandatory message concerning recall of certain serial-numbered tail rotor blades on H-6 series aircraft and commercial variants (OH-6-86-05, 170100Z Jun 86). Summary: It is necessary to recall certain tail rotor blades as part of the investigation to resolve problems which led to the grounding of OH-6 aircraft and commercial variants in AVSCOM message OH-6-86-02, 130115Z Jun 86. This message directs removal and shipment of specific serial-numbered blades. Removal and replacement of these blades do not unground the aircraft. Contact: H-6 series AVSCOM Red Team, AUTOVON 693-1351/1352, commercial 314-253-1351/1352.

• Maintenance information message concerning stabilator incident reporting on UH-60A/EH-60 series aircraft (MIM-UH-60-86-ME-06, 171800Z Jun 86).

• Maintenance information message concerning tail rotor drive shaft washer on OH-58A/C series aircraft (MIM-OH-58-86-ME-04, 161500Z Jun 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Recap of AVSCOM messages

Following is a list of AIG 8881 addressed messages transmitted by AVSCOM (AMSAV-M) from 1 January through 31 March 1986.

UH-1-86-01 Safety-of-flight maintenance mandatory message concerning one-time inspection of collective lever assembly.

UH-1-86-01 Safety-of-use message concerning adapter reaction torque of rotorhead mast nut on AH-1/UH-1 aircraft.

UH-1-86-02 Safety-of-flight maintenance mandatory message concerning correction on inspection of collective lever assembly.

UH-1-86-03 Safety-of-flight maintenance mandatory message concerning one-time inspection of T53-L-13B series engines in UH-1/EH-1 and AH-1G series aircraft.

UH-60A-86-01 Safety-of-flight technical message concerning replacement of tail rotor drive shaft bearings.

UH-1-86-04 Safety-of-flight maintenance mandatory message concerning revision on one-time inspection of T53-L-13B series engines.

UH-60A-86-02 Safety-of-flight technical message concerning inspection of tail rotor drive shaft nuts.

UH-60A-86-03 Safety-of-flight technical message concerning revision on one-time inspection of tail rotor drive shaft.

UH-60A-86-04 Safety-of-flight technical message concerning revision on replacement of tail rotor drive shaft bearings.

UH-60A-86-05 Safety-of-flight emergency message concerning immediate grounding of UH-60/EH-60 series aircraft.

AH-1-86-01 Safety-of-flight maintenance mandatory message concerning one-time inspection of T53-L-13B series engines in UH-1/EH-1 and AH-1G series aircraft.

AH-1-86-01 Safety-of-use message concerning adapter reaction torque of rotorhead mast nut on AH-1/UH-1 aircraft.

(continued on next page)

Recap of AVSCOM messages

AH-1-86-02 Safety-of-flight maintenance mandatory message concerning revision on one-time inspection of T53-L-13B series engines.

AH-64-86-01 Safety-of-flight emergency message concerning verification of steel pin installation.

AH-64A-86-02 Safety-of-flight technical message concerning daily inspection of main rotor blades.

AH-64A-86-03 Safety-of-flight emergency message concerning immediate grounding of all AH-64A aircraft.

AH-64A-86-04 Safety-of-flight technical message concerning one-time and daily inspection to provide ungrounding of all AH-64A aircraft.

AH-64A-86-05 Safety-of-flight maintenance mandatory message concerning inspection of main rotor head assembly.

AH-64A-86-06 Safety-of-flight emergency message concerning immediate grounding of all AH-64 aircraft.

AH-64-86-07 Safety-of-flight maintenance mandatory message concerning correction to previous message on AH-64 series aircraft.

CH-54A-86-01 Safety-of-flight technical message concerning one-time inspection of CH-54A input couplings.

CH-54-86-02 Safety-of-flight technical message concerning one-time inspection of CH-54B upper link assembly.

CH-54B-86-03 Safety-of-flight technical message concerning inspection of primary servo pressure switches on all CH-54B helicopters.

OH-6A-86-0I Safety-of-flight maintenance mandatory message concerning revision on inspection of the T63-A-700 turbine engine compressor.

OH-58-86-01 Safety-of-flight maintenance mandatory message concerning revision on inspection of the T63-A-700 turbine engine compressor.

OV-1-86-01 Safety-of-flight operational message concerning aircraft restricted flight maneuvers.

Addressees requiring copies of messages should contact their higher headquarters. ■

Use and release of information from safety investigation reports

AR 385-40: Accident Reporting and Records is under revision. The pending revision will give safety offices specific guidance on how to process requests for information from safety investigation reports.

In the meantime, a pamphlet titled "Use and Release of Information from Safety Investigation Reports" has been prepared by the Army Safety Center Judge Advocate. The pamphlet covers information requests from the public, members of Congress, government agencies other than DOD, and DOD agencies. It covers safety office response to requests for information and to subpoenas for accident reports.

Copies of the pamphlet have been sent to each MACOM safety office. Copies can also be obtained by writing to Commander, U.S. Army Safety Center, ATTN: PESC-M, Ft. Rucker, AL 36362-5363. ■

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Report of Army Aircraft Mishaps

"It's an ill wind . . .

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If you think wind is something only fixed-wing aviators need worry about, you obviously aren't one of the helicopter pilots who has experienced firsthand what wind can do to a rotary-wing aircraft. We aren't even talking about the kind of winds found in extreme weather, such as thunderstorms. We're talking about your everyday variety that can occur just about anywhere, at any time.

Of course in places where winds almost always prevail, caution is even more important. A helicopter was making an approach to a ridgeline to the northeast. About 10 feet from touchdown, the nose tucked and spun to the right. The pilot applied full left pedal, with no effect. He allowed the aircraft to continue forward and added additional forward cyclic. As the aircraft continued to spin right, both the low rpm audio and warning light came on. The aircraft spun around twice and the tail rotor hit the opposite slope. The aircraft crashed and rolled down the slope.

A wind gust from the southerly quadrant caught the aircraft in a downwind condition during high power demand, on a day when pressure altitude was relatively high. The pilot's corrective actions—left pedal, forward cyclic—were too little, too late, or both.

If it's been a while since you read FM 1-202: Environmental Flight, a quick review of some basic principles might be in order. In chapter 4, the manual says:

"Determination of En Route Winds. Every effort should be made to determine the wind condition both before takeoff and while en route. Weather forecasters can provide general information, but accurate information for the specific area of concern is not available through this source. Where ground communications exist with units in the area of operations, contact should be made to ascertain the existing wind conditions. Aviators who have recently flown in the area can provide a valuable source of information concerning wind conditions. However, sources of wind information are not always available. Therefore, you must learn to use certain visual cues when estimating wind direction and velocity. The cues are divided into two categories.

"Ground indicators. When using ground indicators to determine the wind condition, remember that surface winds are being indicated for that specific location. The wind characteristics a short distance away may be different.

• "The upwind part of a small body of water is indicated by smoothness. It may be wavy or turbulent on the downwind side. Wind velocity is indicated by the turbulence of the water. A whitecap will occur on an unprotected body of water when the wind velocity reaches 20 miles per hour.

• "Smoke provides the most accurate indication of wind direction. Wind velocity is indicated by the pattern the smoke forms on the ground. In light wind, smoke will rise vertically with little horizontal movement. In strong wind, the smoke will disperse horizontally with little vertical movement.

• "A flag or any material that is free to blow in a breeze will indicate both wind direction and velocity. The angle a flag forms with the ground indicates wind velocity.

• "The color of the leaves on deciduous trees provides an indication of wind direction. If the leaves appear light in color (silver), you are flying downwind. If you are flying into the wind, the leaves will appear darker in color.

• "Wind blowing over tall grass growing in open fields appears like waves on an ocean. Wind direction is indicated by the movement of the swells. The more frequent the swells, the greater the wind velocity.

• "Man-made indicators, such as wind sock tetrahedron, or smoke grenades, provide the most accurate information concerning wind direction and velocity. A wind sock should be installed at landing zones where repeated operations are conducted.

"Aircraft indicators. As you become more proficient in mountain flying, you will develop the ability to determine wind conditions by the feel of the helicopter and its apparent movement over the ground. Aircraft indicators that you can use to determine the wind direction and velocity are as follows:

• **"Aircraft drifts from the desired ground track.** This condition indicates a crosswind condition. The amount and direction of the crab required to maintain the desired ground track gives an indication of wind direction and velocity.

• **"The apparent ground speed appears to be either faster or slower than the indicated airspeed.** This condition indicates the aircraft is being flown parallel to the wind."

We aren't implying that if you are aware of these indicators you will always be able to avoid problems with wind gusts such as the one in the accident described, but you will certainly know more about what wind conditions you are likely to encounter

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

V series - Aircraft was being loaded onto lowboy trailer by 5-ton wrecker. Swedged fitting on end of hoist cable failed and aircraft fell about 4 feet, causing $83,000 damage to the helicopter.

UH-1 Class D mishaps

H series - Tail stinger hit ground during NOE deceleration, causing rivets in stinger to pop. Pilot didn't compensate for the downslope of terrain during abrupt maneuver.

H series - During level flight, cabin door vibrated forward and blew off aircraft, causing sheetmetal damage to cargo door rails.

UH-1 Class E mishaps

M series - After maneuvering down a draw, copilot began left turn into larger valley. As aircraft began turn, full left pedal was required to maintain direction. Aircraft began uncommanded, rapid spin to the right. IP took controls and attempted to regain control of aircraft. Due to low altitude, collective pitch was held constant. Forward cyclic was applied and there was a simultaneous reduction in N2 rpm. Aircraft, in nose-low attitude, continued to spin rapidly to the right about 6 turns. With ground contact imminent, IP applied collective to cushion impact. Aircraft touched down, into slope, on forward portion of landing gear, rocked back, and slid about 1 foot to the left. Even with 35 KIAS as maneuver was begun, density altitude of 7,500 feet and wind conditions placed the aircraft in a downwind OGE situation.

H series - Crew heard rumbling noise during flight and saw egt rise. Heavy sand ingestion in desert environment caused bleed band actuator to stick in open position.

H series - During touchdown from hovering autorotation, master caution and hydraulic pressure segment lights came on. Caused by broken rigid line.

UH-60 Class E mishap

A series - During takeoff from field site, pilot felt unusual vertical vibrations. As aircraft landed, torquemeter fluctuated between 40 and 65 percent, then master caution and left chip input module lights came on. Metal fuzz was found on left input module and main transmission chip detectors, but transmission impending bypass filter had popped and metal particles were also found on filter. Teardown analysis of main transmission showed vibrations were caused by faulty No. 1 engine ECU.

Attack helicopters

AH-1 Class D mishap

S series - While aircraft hovered in firing position loose debris was ingested into main rotor system, damaging blade abrasion strip.

AH-1 Class E mishaps

S series - Following range firing mission, 20mm gun wouldn't stay in stowed position. While aircraft hovered, weapon was manually stowed by maintenance crew. Caused by faulty turret control assembly.

S series - During runup at 100 percent rpm, N2 needle went to maximum deflection then dropped to zero. Caused by failure of N2 tachometer generator.

AH-64 Class E mishaps

A series - When No. 1 engine was started, power lever wouldn't advance past idle, indicating rotor brake switch was in locked position. Switch was actually in off position. After rotor brake switch was cycled several times, switch was placed in brake position,

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	1-9 July	**2**	**0**
	August	2	1			
	September	3	2			
	Total for Year	45	31	Total to Date	**25**	**21**

and rotor began to turn. When switch was placed in off position, rotor locked again. Caused by failure of pilot quadrant assembly.

A series - Transmission oil was seen on aircraft's left side during taxi. Caused by failure of oil seal on No. 1 generator.

Cargo helicopters

CH-47 Class C mishap

A series - During external load hookup, aircraft's underbody hit and slightly injured soldier who was attempting to connect cargo net load to aircraft's cargo hook. Pickup was being made on upslope. Crew misjudged aircraft's height above load and soldier.

CH-47 Class D mishap

D series - During upslope landing, crew heard crunch as thrust lever was lowered to put aft gear on ground. Aircraft yawed slightly to right and thrust was increased to lift to hover. IP failed to provide adequate ground clearance and antenna struck ground.

CH-47 Class E mishaps

C series - During training flight, crew chief reported broken lorde mount between No. 8 and 9 drive shaft. Lorde mount failed in flight.

D series - Aircraft was climbing when forward transmission oil pressure dropped to 10 psi. Oil pressure sending unit failed.

Observation helicopters

OH-6 Class C mishap

A series - During climbout, at about 400 feet agl and 70 KIAS, pilot heard loud noise, accompanied by immediate yaw and forward shift in aircraft's center of gravity. Pilot lowered collective, pulled full aft on cyclic, and managed to maintain control while making descending right turn toward open field. At about 50 feet agl, pilot increased collective to slow rate of descent but was unable to keep aircraft level or maintain directional control during landing. Aircraft came to rest on its right side. Caused by apparent tail rotor failure.

OH-58 Class E mishaps

A series - Aircraft was landed at field site after completing stability check. Pilot reduced throttle to engine idle and copilot got out to assist passenger entering aircraft. As passenger boarded, aircraft rocked back on its tail stinger and the crew heard a loud metallic banging sound. Pilot suspected mast bumping and shut aircraft down. Crew didn't adequately ensure stability of aircraft before loading passenger.

A series - Crew was performing hover before putting on goggles for NVG currency evaluation. IP was demonstrating hovering autorotations. Throttle was retarded to engine idle and aircraft touched down, then engine died. Worn throttle control parts allowed engine to be shut down inadvertently.

Fixed wing

C-12 Class D mishap

C series - Aircraft was being vectored around thunderstorm at 5,000 feet msl. While flying in clouds, it encountered hail, mixed with rain, for about 15 seconds. Postflight inspection showed $3,000 damage to radome and vertical stabilizer fairing. Weather radar, which could have identified the area of intense rain and hail, had malfunctioned and wasn't operating. Radar had been on order for 10 days before the mishap occurred.

C-12 Class E mishap

C series - During level-off, left forward cowling came up at left rear corner. Pilots failed to ensure cowling lock was secured during preflight.

OV-1 Class C mishap

D series - Aircraft flew into rainshower and pilot turned windshield wipers on. Left wiper blade flew off, striking one blade of No. 1 propeller, causing large dents and gouges. Wiper blade then hit the upper portion of left wing, inboard of nacelle, making 12- x 1-inch tear.

Maintenance

UH-1 Class E mishaps

H series - As aircraft lined up for formation takeoff, crew smelled electrical smoke. Loose washer had vibrated over contacts of center pedestal circuit breaker, causing electrical short.

H series - During postflight inspection, fuel fumes were coming from left engine access compartment and fuel was seen coming from base of overspeed governor at fuel control. O-ring between overspeed governor and fuel control wasn't installed properly at depot, causing pinching of O-ring.

CH-47 Class E mishap

B series - On final approach with external load, rpm increased with thrust reduction and decreased rapidly with thrust increase. Engine torques remained matched. Howitzer was placed in position and released. During attempt to land and offload troops, rpm increased rapidly, requiring increase in thrust to maintain rotor rpm within limits. Gradual increase in thrust allowed aircraft to land. Inspection showed upper attaching bolt on drop eliminator potentiometer had fallen out in flight. Caused by use of washer which was too thick to allow proper thread engagement of self-locking nut, causing nut to back off the bolt.

OH-58 Class E mishap

A series - During runup, altimeter indicated 100 feet above field elevation. Maximum allowable difference is 70 feet. Caused by altimeter out of tolerance.

OV-1 Class E mishap

D series - Autofeather system was being checked during runup. P3 light wouldn't go out at takeoff power. Maintenance personnel had disconnected P3 line while aircraft was being washed. When line was reinstalled, P3 fitting was overtorqued and threads stripped, causing fitting to leak.

U-21 Class E mishap

A series - Aircraft made second takeoff while performing traffic pattern training. No. 1 propeller couldn't be increased above 2115 rpm. Propeller wouldn't go to low-pitch setting because maintenance personnel had improperly adjusted interconnect cable on No. 1 engine.

Mishap briefs

Safety messages

• Safety-of-flight technical message concerning change in serial numbers specified in previous laser boresight message on AH-64A aircraft. (AH-64-86-12, 252000Z Jun 86). Summary: Safety-of-flight technical message AH-64-86-09, 081800Z May 86, specified the TADS to be retrofitted by their serial numbers. Message erroneously specified serial numbers 1 through 177. Message should have specified serial numbers 1 through 65 and 200 through 311. (Serial numbers 66 through 199 are unassigned to production TADS.) Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning incorrectly torqued nuts on UH-1/EH-1 series aircraft (MIM-UH-1-86-ME-06, 202000Z Jun 86).

• Maintenance information message concerning stabilator bias rigging on UH-60A/EH-60A aircraft (MIM-UH-60-86-ME-07, 201300Z Jun 86).

• Maintenance information message concerning correction of previous maintenance information message on one-time inspection of pylon bolt in AH-1 series aircraft (except AH-1G) (MIM-AH-1-86-ME-02, 201700Z Jun 86).

• Maintenance information message concerning status of ungrounding of H-6 series aircraft and commercial variants (MIM-OH-6-86-ME-02, 252330Z Jun 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

"It's an ill wind . . .

and be able to plan what to do to minimize their effects on your aircraft.

In another incident, three Army helicopters were engaged in fighting a forest fire. One aircraft was diverted to another fire. After making a reconnaissance of the fire, the aircraft flew northeast to pick up water from a pond. As the aircraft descended, its rate of descent became excessive. The copilot, who was on the controls, pulled collective to stop the rate of descent. He said later that he hit the left pedal stop. As the pilot got on the controls, he saw the torquemeter gauge going back down through 65 pounds of torque. The pilot reduced collective, flew to the nearest available landing area, and landed. The pilots said it "felt like the bottom fell out" during the descent.

The aviators said winds appeared to be from the northeast (judging by smoke and ripples on the water). A flight service station reported that winds at that time of day were 230 degrees at 11 knots. It appears the aircraft may have been in a downwind condition and the copilot allowed an excessive sink rate to develop, going below barriers.

Early aircraft designers were careful observers of the original pioneers in flight—birds. Birds don't take off and land downwind and neither do prudent aviators. If a bird is flying with the wind, it will overfly the landing point, circle, and land into the wind.

We've learned a lot since man first took to the skies but some things don't change. Know what to look for and how to identify wind conditions—and fly according to those conditions. ■

U.S. ARMY SAFETY CENTER

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Snow alert

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Snow is a winter phenomenon that causes aircraft accidents year after year. When a pilot encounters sudden and complete whiteout, too often the result is disorientation and an accident. Lack of experience or training in a snow environment is the biggest contributor to these accidents.

A UH-60 pilot was unable to attend mandatory snow operations training conducted by his unit. He was not required to attend makeup classes or engage in hands-on snow landing operations. The pilot was assigned to the No. 3 aircraft in a flight of five on a tactical training mission. The mission called for inserting troops into unimproved landing areas following false insertion landings en route. Weather was 7 miles visibility and 1,000-foot ceilings outside scattered snowshowers.

The flight of five helicopters made one successful landing and encountered some light blowing snow on top of a packed layer of snow. The next landing zone selected for a false insertion was found to be unsuitable, so an alternate site was selected by the pilot of the lead aircraft. The flight leader did not brief the other members of the flight about the change of landing zone and proposed course of action.

An approach was begun in a snowshower, with visibility at about 1 mile. The landing zone was a large, open, snow-covered field with an upslope in the direction of landing. Winds were forecast at 25 to 30 knots. The flight lead did not pass on information to the other aircraft about the terrain based on his map reconnaissance or any anticipated course of action.

The crew of the No. 3 UH-60 saw snow circulating through the rotor systems of the first two aircraft. The No. 3 pilot selected a touchdown point downslope and to the left rear of the lead aircraft. On short final, the crew chief told the pilot to slow the rate of closure. As the pilot continued the approach, a snow cloud enveloped the aircraft as effective translational lift was lost about 20 feet above the ground. The UH-60 was in a complete whiteout condition when it touched down hard on an upslope to the front and downslope to the left. The helicopter rolled left and came to rest on its left side.

The unit training classes which the pilot missed covered correct snow-landing techniques and reviewed the procedures in FM 1-202, Environmental Flight.

A UH-1 pilot also crashed because he did not use the correct snow-landing technique. The pilot made an approach to an unlighted airport. Instead of continuing the approach to the ground, the pilot stopped the aircraft at what he thought was a 15-foot hover. Actually, he was about 10 feet off the ground. With no lights or other visual cues, the pilot allowed the aircraft to continue to descend. Blowing snow generated by rotorwash caused the pilot to lose outside reference, and the descent

(continued on back page)

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	1-16 Oct	**2**	**0**
	November	4	3			
	December	5	5			
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**2**	**0**

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - Pilot felt vertical vibration and light shudder in cyclic. Skin debonding occurred on upper surface of main rotor blade 16 inches from blade tip.

H series - Postflight inspection revealed No. 2 drive shaft clamp scored by drive shaft cover. Suspect someone pushed drive shaft cover during refueling stop, causing it to hit clamp.

H series - Buzzard hit radio compartment door and then shattered copilot's windshield.

UH-1 Class E mishaps

H series - Pilot felt feedback in cyclic, and master caution and hydraulic pressure lights came on. Caused by punctured hydraulic pressure line.

H series - Main d.c. generator would not come on line during runup. Caused by failure of voltage regulator.

V series - Crew smelled hydraulic fluid. Master caution and hydraulic lights came on, and hydraulic pressure was lost. Left cyclic irreversible valve pressure line had burst.

V series - Master caution and right fuel boost caution lights came on. Caused by malfunction of fuel cell ejector pump.

UH-60 Class C mishap

A series - Copilot noticed main transmission oil temperature at 140 degrees C. Five minutes later oil temperature was back in green range. Segment lights did not come on. Postflight inspection revealed oil seeping from No. 1 input module where engine drive shaft enters. Main transmission oil level was within limits. Complete transmission system may have to be replaced.

UH-60 Class D mishap

A series - Hovering UH-60 blew door off parked UH-60.

Attack helicopters

AH-1 Class D mishap

S series - Aircraft hit tree during flight. MILES system was damaged.

AH-1 Class E mishaps

S series - Master caution and transmission oil hot lights came on. Caused by failure of oil cooler fan.

S series - Crew became disoriented during night flight and had to land because of low fuel.

AH-64 Class E mishap

A series - No. 2 nose gearbox chip detector light came on. Running landing was made. Caused by failure of nose gearbox.

Cargo helicopters

CH-47 Class C mishap

D series - Caution lights for forward, center, and aft cargo hooks came on during takeoff. Cargo fell from hook and was destroyed.

CH-47 Class D mishaps

D series - Jeep was being backed onto aircraft. Vehicle driver did not respond to flight engineer's directions, and jeep hit aft four seat positions on right side of aircraft.

C series - Pilot allowed aircraft to descend and hit water trailer during hookup. Hookup man failed to follow procedures, and crew chief failed to provide pilot with hover instructions.

CH-47 Class E mishaps

C series - Transmission oil pressure light came on. Caused by failure of oil cooler O-ring.

C series - Utility pressure gauge indicated zero. Caused by failure of hydraulic line under C box area.

D series - No. 2 engine oil temperature gauge fluctuated during approach for landing. Caused by failure of temperature transmitter.

Observation helicopters

OH-58 Class D mishaps

A series - Ground guide positioned aircraft to land. Aircraft was lowered onto stick, puncturing hole in fuselage.

A series - As aircraft was flying NOE down a hollow at approximately 10 feet above the trees and 20 knots, right turn was made to follow a turn in the hollow. Cracking sound was heard and flash was seen about midway up the center support brace of the windshield. Marks on copilot windshield were seen and wire strike was suspected. Aircraft was landed without further incident. Wires were oxidized and almost impossible to see.

OH-58 Class E mishaps

A series - Engine failed during runup. Caused by water in fuel. Pilot did not see contamination in fuel sample.

A series - Pilot, noticing that fuel gauge was not moving, tapped on casing. Gauge went to 600 pounds. Inspection revealed glass face on gauge had been cracked and part of the glass had released to the point where it made contact with fuel quantity indicator needle.

A series - Pilot noticed oil on floor by copilot's pedals during thru-flight check. Further investigation revealed leaking oil line to torquemeter.

A series - Engine chip detector light came on. Caused by broken wire to chip detector.

Fixed wing

C-12 Class D mishap

A series - No. 1 engine prop was struck by lightning during climb. Pilot noticed small hole on left outboard flap and returned to base.

C-12 Class E mishap

D series - Vibrations were felt

through airframe during takeoff. Nose wheel damper assembly was low on fluid.

T-42 Class D mishap

A series - Right main gear collapsed during landing, allowing right wing tip and right propeller to hit runway.

U-21 Class E mishap

H series - High frequency vibration was felt in airframe during flight. Caused by failure of No. 2 inverter.

OV-1 Class E mishaps

D series - Crew noticed loss of No. 2 hydraulic pressure. En route to landing, No. 1 pressure went to zero. Caused by hydraulic leak from right brake assembly.

D series - When landing gear handle was raised, left main gear indicated down. Caused by failure of microswitch.

Maintenance

UH-1 Class D mishap

H series - During postflight inspection, pilot noticed oil on tail boom in vicinity of 42-degree gearbox. Sight glass was empty. Crew chief had taken oil sample before flight and did not completely secure cap. Retaining bracket in gearbox cover also had the wrong rubber bushing installed.

UH-60 Class E mishaps

A series - No. 2 engine chip detector light came on. About 3 minutes later, engine failed. Caused by incorrectly installed power-available spindle.

A series - No. 2 tail rotor advisory and backup pump advisory lights came on. About 20 seconds later, No. 1 reservoir low and tail rotor caution lights came on. Packing on tail rotor pressure switch was not installed.

AH-1 Class E mishaps

S series - Pilot noticed engine oil temperature rising during hover. Engine oil line quick disconnect fitting was not fully seated, preventing oil from flowing through engine oil cooler assembly.

S series - Compressor stall occurred during pass over gunnery range. Control rod to variable inlet guide vane was out of adjustment.

AH-64 ground mishap

A series - Individual tasked to perform TM validation was not trained in AH-64 procedures. With external power and pressurized air provided to the aircraft, an attempt was made to motor the engine. Blades began to turn. During shutdown, crewmember bumped cyclic. Four main rotor blades hit the sunshade canopy before stopping.

CH-47 Class E mishap

C series - No. 2 engine failed during hot refueling operation. Caused by improperly filtered and recirculated fuel. Fuel contained 20 gallons of water.

OH-58 Class E mishaps

C series - Master caution and engine oil bypass lights came on. After landing, crew noticed oil covering right side of aircraft. Caused by pinched preformed packing on engine oil filler cap.

A series - N2 rpm would not increase beyond 102 percent during hover. N1 and N2 settings were out of adjustment.

OV-1 Class E mishap

D series - No. 1 propeller did not feather during engine runup. Hydraulic seal in propeller assembly failed and fluid leaked onto brushes and retainer. Housing assembly for brushes was misaligned during installation.

Safety messages

• Safety-of-flight message concerning inspection of all H-6 series helicopter antenna matching modules (OH-6A-85-02, 031900Z Oct 85). Summary: Message requires inspection of the CU-1894A units for corrosion and of the antenna mounting flange securing screws for looseness and/or corrosion. Contact: David Giratos, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight message concerning one-time inspection of all UH-1C/M/H/V, EH-1, and TH-1/TAH1/AH-1 series aircraft for corrosion susceptible tension torsion straps (UH-1-85-08, AH-1-85-06, 022045Z Oct 85). Summary: Message requires inspection of DA Form 2408-16 and component records at all levels of stock by serial number, regardless of part number, to purge the corrosion susceptible tension torsion straps from use. Contact Jesus Rodriguez, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of OH-58A and C main rotor hubs for loose bolts (OH-58-85-04, 272230Z Sep 85). Summary: It was recently reported that the pitch horn to grip mounting bolts on some main rotor hubs were improperly torqued. About 0.125 inch relative shift between pitch horn and grip was found. This shift is believed to be due to excess lubricant used when assembling the packing to the pitch horn. Contact: CPT Alan Yeske, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning main rotor hub pillow block hardware (OH-58-85-03, 272215Z Sep 85). Summary: AVSCOM notified users of maintenance procedures for subject hardware and supplied information on new hardware. This information is causing confusion in the field. This message clarifies the use of this hardware. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• UH-1 maintenance information message concerning change of retirement life for elevator horn assembly (MIM-UH-1-MEM-85-09).

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

Snow alert

continued until ground contact.

But snow doesn't have to engulf an aircraft for a pilot to become disoriented. Its presence alone can do the job when it blankets the ground, hiding all visual cues. More than one pilot has found this out the hard way.

"I shot a long snow landing just past the radar dome to the runway. I was cleared to hover taxi to the refueling point, pulled power in, and flew out of the snow cloud. I was moving along at what I thought was a 5- to 6-foot hover, just above effective translational lift, to stay ahead of the snow cloud. I was using a POL point and hangars 4 and 5 for my reference points. At one point, I looked to the right for a closer reference point than just white, but there was nothing there. I came back to the POL point, and the next thing I knew we were upside down. I had the sensation we were moving forward, I was at a 5- or 6-foot hover, and everything was just the way it was supposed to be."

This UH-1 pilot was hovering across a snow-covered field when he misjudged the height of the hover. He lost visual depth perception because of the lack of any close visual reference cues. The left ski of the helicopter hit the snow. The UH-1 continued forward for several feet, with the ski pushing up the snow. The ski then caught in the accumulation of snow, and the aircraft rolled over.

In another case, an AH-1 pilot and IP flew their aircraft to a designated area. The IP reconnoitered the area, then landed about 400 feet from a wood line ahead of him. Both pilots put on night vision goggles.

After making a before-takeoff check, the IP lifted the aircraft to a 3-foot hover before allowing the pilot to assume control. He began to feel uneasy and told the pilot he didn't believe the area was suitable for the training mission. The IP decided to land the aircraft and remove the night vision goggles before returning to the airfield.

Because a small ditch was below them, the IP moved the aircraft forward toward more level ground. As he did, he noticed—by looking at the tree line ahead—that the aircraft was drifting left. As he turned his head to the left to pick up some midrange cues he had previously identified, he found that the rotorwash had either blown them away or covered them with snow. When he looked back toward the tree line—his only remaining reference point—he noticed the aircraft was tilted to the left. As the IP applied right cyclic and lowered the collective to land, the main rotor blades hit the ground, tearing the main rotor system and transmission free from the aircraft.

In this case, the problem lay with the training area selected. It was virtually devoid of visual cues, causing the IP to become disoriented.

Pilots lose some of their winter flying proficiency during the summer months. With winter weather just around the corner for most parts of the world, units should be giving refresher training that will ensure their pilots are knowledgeable and capable of safely operating aircraft over snow-covered terrain. The point is, do it now. After an aviator finds himself in trouble, it's too late.

If you will be operating an aircraft this winter in areas where there is snow, get a copy of FM 1-202. It contains excellent information on cold weather flying. You should also be familiar with appropriate training and operator's manuals. ■

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Report of Army Aircraft Mishaps

The lake was like a mirror

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It was late evening on a summer's night. Millions of stars shone in the sky and were reflected in the lake below. The kind of night, in fact, that dreams are made of. But before this night ended, two Army aviators would find themselves involved not in a dream but in a nightmare of tangled wreckage and floating debris.

The story actually begins quite routinely. The crew completed their flight planning, checked the weather, and finished the mission briefing. The preflight showed the aircraft was in good shape and from all indications the aircraft was operating faultlessly at the time of the mishap.

Before the aircraft left the ground, however, both crewmembers made a serious mistake. Although they knew they would be flying over water, neither pilot was wearing a personal flotation device (PFD) as required by AR 95-17, the unit SOP, and the commander's flight briefing. It wasn't that they weren't aware of the regulations, or even that they forgot. Neither aviator thought he needed a PFD, and they didn't wear them. Of course, they never imagined that before the night was over they would spend more than 4 hours in the water waiting to be rescued.

The purpose of the mission was to conduct training needed to reestablish the pilot's elapsed night vision goggle currency. The pilots were well-qualified for the mission. The IP had more than 2,400 hours of flight time in rotary wing aircraft with 70 hours in night vision goggles. The pilot was no novice either; he had 2,350 rotary wing hours and 30 hours of NVG time.

Both aviators were wearing night vision goggles when the UH-1H took off in a northwestern direction and headed toward a lake and an island where the pilot would practice approaches. That area had been chosen because it was dark and quiet (a good place for NVG training). Besides, the terrain outside the valley was mountainous. The aircraft was at about 5,400 feet msl (1,200 feet agl). As they approached the island landing area, the IP turned the controls over to the pilot.

The pilot terminated his first approach at a hover, made a right pedal turn, and landed. The takeoff was uneventful until the pilot turned right, crosswind over the water. When he looked out his right window at the water, he experienced an illusion effect of stars and sky all around. The surface of the lake was like a mirror, and the stars and clouds above were reflected in the water. He had a slight case of vertigo, but then he saw the lights from a nearby city, cross-checked his instruments through his goggles, and returned the aircraft to a near-level attitude.

He told the IP what had happened. The IP asked him if he felt all right, and he said he did. The IP allowed the pilot to continue flying, but commented that he was too low and to stop his descent. The pilot didn't respond. After another turn and further descent was made to the right, the IP said he told the pilot not to descend anymore. Again, there was no response. The IP became concerned as he perceived his altimeter to indicate about 4,280 to 4,300 feet msl. As he told the pilot to pull up, he was reaching for the controls. The aircraft hit the water at about 80 KIAS, in a slightly nose-low, right-skid-low attitude.

The main rotor system and part of the transmission system separated from the fuselage. The fuselage came to rest upside-down in water about 12 feet deep. There was considerable damage to all major components. The IP and pilot later said they felt around for open holes and worked their way out of the fuselage without much difficulty. After they reached the surface, they climbed onto the aircraft's skids, which were about 18 inches under the water, and tried, without success, to make contact with their AN/PRC-90 radios. (There was a civilian airport about 7 nautical miles away and in line of sight, but the survival radio they had can't transmit beyond 1 mile and is restricted to the UHF frequency band which is generally not compatible with civilian aircraft.)

A scheduled radio position report was due from the aircraft about 15

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps

H series - Passenger crossing in front of aircraft hit and broke copilot's chin bubble with his M-60 machinegun.

H series - Tail rotor control was lost about 20 miles from airfield. IP took control, flew to airfield, and made running landing. Caused by failure of tail rotor pitch change control nut assembly.

H series - Engine oil was pumped overboard during NOE flight. Caused by failure of oil scavenge pump outlet hose.

H series - Crew noticed egt at 610-615 during flight. Failure of engine deice switch caused deice valve to stay in open position.

H series - Engine oil pressure and egt dropped during landing. Caused by failure of oil pressure transmitter.

UH-60 Class C mishap

A series - Left cargo storage compartment access panel came off in flight and appeared to fall clear. Pilot saw door falling and followed it down. At no time was any impact felt or heard. When aircraft was landed, panel was retrieved in two pieces and decision was made to return to takeoff point. Postflight inspection then revealed damage to main rotor tip cap and tail rotor blade.

UH-60 Class D mishap

A series - Copilot allowed aircraft to drift into trees during training flight. Main rotor tip caps were damaged.

UH-60 Class E mishaps

A series - Stabilator failure was reported on six different UH-60s this week. One stabilator failure happened during takeoff, one during runup, three during flight, and one during landing and shutdown.

A series - Four mishaps were reported involving the anti-flap. In one case, the yellow main rotor blade anti-flap stuck, causing excessive vibrations. In another case, two main rotor blade anti-flap stops were found cracked and stuck in the static position. In the third case, the anti-flap stop did not retract as rotor rpm increased during takeoff. The fourth case involved dirt buildup on the anti-flap stop, causing it to stick.

Attack helicopters

AH-1 Class D mishap

G series - Inspection revealed dent in tail rotor blade. Apparently caused by foreign object hitting blade.

AH-1 Class E mishaps

G series - Master caution and transmission oil bypass and pressure lights came on just before takeoff. Inspection after shutdown revealed oil running down both sides of aircraft. Caused by failure of elbow that connects main transmission oil return line to transmission sump.

S series - Pilot's and copilot's N1 tachometers dropped to zero. Caused by failure of tachometer generator.

AH-64 Class E mishaps

A series - Rubber grommet at CCR adapter failed during hot refueling operation. When nozzle was removed, fuel ran out of CCR port.

A series - Oil low hydraulic light came on during hover. Caused by failure of hydraulic pump.

A series - No. 2 engine fuel bypass light came on during runup. Caused by failure of caution panel.

A series - Environmental unit went to full hot setting during hover power check. Loud squeal was heard from transmission area and smoke began to fill both cockpits. Caused by failure of environmental unit fan.

Observation helicopters

OH-58 Class E mishaps

A series - Aircraft developed severe lateral vibration during runup. About three-fourths of the red main rotor blade tip weight was missing. Aircraft had been run up in front of maintenance hangar, and pieces of tip weight were found on parking ramp about 200 meters away. Tip weight breakage may have been caused by

corrosion which was present in tip weight bolt holes, or by overtorquing of the tip weight bolts, or by a defective tip weight.

C series - N1 registered slightly high during flight. Caused by failure of N1 tachometer generator.

A series - Pilot felt cyclic feedback and saw hydraulic pressure and master caution lights come on. Caused by excessively worn drive splines on tachometer generator and hydraulic pump.

Fixed wing

T-42 Class B mishap

A series - Aircraft was on currency training flight. During single-engine approach, pilot put gear up for checklist callout. IP could not get gear down before impact with runway. Fire resulting from impact caused damage to cockpit area and passenger area. 8636

U-21 Class E mishap

A series - Pilot saw fuel siphoning from left nacelle cap. Cap was not correctly seated by civilian refueler but appeared to be secure when pilots checked it before flight.

OV-1 Class D mishap

D series - Pilot was waiting on runway for takeoff. As he rechecked the aileron trim position, his finger caught on the stores release handle. Left drop tank dropped to runway and was damaged.

Maintenance

UH-1 Class E mishap

H series - Right fuel boost pump light stayed on during runup. A paper parts tag was left in fuel cell during previous maintenance procedure. As tag and string deteriorated, remnants blocked ejector pump orifice.

UH-60 Class E mishaps

A series - Left storage compartment door came off and blew out of aircraft during takeoff. Caused by failure to properly seat retaining pins.

A series - Postflight inspection revealed broken tail wheel axle. Caused by lack of lubrication.

OH-58 Class E mishaps

A series - Pilot had to maintain 50 to 60 knots to avoid overtemp during flight. Suspect maintenance personnel incorrectly torqued air line to engine. Line from diffuser was loose.

C series - Engine oil bypass light came on during landing. Caused by pinched O-ring.

A series - Engine would not maintain rpm during flight. Caused by loose PY line on governor.

A series - Postflight inspection revealed transmission input or seal was leaking grease. Caused by incorrect seal installed in transmission input quill assembly.

T-42 Class D mishap

A series - Crew noticed fore and aft oscillation of control yoke during climbout. Oscillation increased until it reached full travel of the yoke. Aircraft entered steep diving turn. Crew was able to recover by reducing power, lowering landing gear, and applying pressure to yoke. Aircraft was landed at nearby airport. Suspect left elevator trim tab clevis bolt came out because of incorrect installation, allowing tab to oscillate to fully deflected position. Upon reaching full deflection, tab actuator rod became jammed inside elevator.

OV-1 Class D mishap

D series - Crew chief was taxiing aircraft and checking the brakes. Crew chief used incorrect taxiing techniques, causing brakes to overheat. Ground personnel saw fire and used fire extinguisher to extinguish the flames.

Safety messages

- Maintenance information message concerning status of the ungrounding of H-6 series aircraft and commercial variants (MIM-OH-6-86-ME-04, 272130Z Jun 86).
- Maintenance information message concerning status of the ungrounding of H-6 series aircraft and commercial variants (MIM-OH-6-86-ME-05, 022000Z Jul 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	1-16 July	**4**	**3**
	August	2	1			
	September	3	2			
	Total for Year	45	31	Total to Date	**27**	**24**

The lake was like a mirror

minutes after the accident happened. When the crew failed to report, the facility commander began trying various ways to contact the aircraft. He was unsuccessful. About 1½ hours later, a search aircraft was launched and made radio contact with the downed crew.

By this time, the Army pilots had been in the water almost 2 hours without life preservers. (There was one life preserver in the aircraft, but they decided trying to reach it through the tangled wreckage was too dangerous.) Both aviators were slightly injured, but their worst problem by this time was hypothermia. In addition, fuel from the aircraft was floating on the surface of the lake. Fortunately it hadn't ignited, but it was beginning to burn their legs.

To add to their dilemma, a thunderstorm had taken place while they were waiting for someone to find them. The 3- to 5-foot waves it caused dashed any hope of swimming to the island. Even after the first rescue aircraft located the downed pilots, winds from the storm hampered rescue efforts. It would be at least 2 more long, cold hours before an aircraft, equipped with a hoist unit and with a diver on board, could reach the site and pull them out of the water. By that time, they were suffering from severe hypothermia. After treatment at a local hospital, both pilots were released.

Accident causes

The UH-1 was on the downwind leg of a night vision goggle traffic pattern, over water, and 200 feet above the highest obstacle (AHO). The pilot failed to monitor his instruments to ensure altitude was maintained in accordance with FM 1-204. His concern with overwater visual illusion and his recent recovery from spatial disorientation distracted him to the extent that he failed to notice the aircraft had descended from a safe altitude. As a result, the aircraft was lower than he thought it was.

The IP failed to take corrective action and allowed the pilot to gradually descend from 200 feet AHO to impact with the water, even though he twice directed the pilot to stop the descent. The IP's decision was a direct result of overconfidence in the pilot's ability to correct the descent and his own inadequate attention to indicated altitude.

It isn't certain whether the pilot actually heard the IP tell him to stop his descent. The IP had been talking to the pilot about what to him was a new type of optical illusion caused by stars in the sky being mirrored in the water. Then the pilot looked down, saw the clouds in the water, and suffered vertigo. When the IP asked the pilot if he wanted him to take the controls, he replied that he was okay. But when the IP twice told the pilot to stop his descent, there was no actual verbal response. During the turn from downwind to base, the pilot looked at his instruments through the night vision goggles (the cockpit lights were turned down very low and apparently there wasn't enough light to read the instruments by looking under the cutaway goggles). The pilot read the altimeter through the goggles as about 4,500 feet. He knew that the lake level was around 4,200 feet, so he thought he had enough altitude. But only seconds later the aircraft hit the lake, tumbled, and sank beneath the surface. ■

U.S. ARMY SAFETY CENTER

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A. E. Hervey, Jr.
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23 July 1986

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Report of Army Aircraft Mishaps

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps

H series - Aircraft was on NOE flight. While hovering over trees, prior to transition to forward flight, aircraft began uncommanded turn to the right. Engine and transmission sound decreased, and low rpm audio and light came on. Aircraft rotated 360 degrees before settling into trees. Aircraft was destroyed. 8637

H series - During hover attempt, control was lost and aircraft crashed into trees, striking the ground in an extreme nose-low, right-side-low attitude. Three people were killed and two others were injured. 8638

UH-1 Class E mishaps

H series - Engine needle on tachometer dropped to zero during flight. Caused by failure of tachometer generator drive shaft.

H series - After hovering for takeoff, crew smelled burning electrical wires and smoke began coming from inverter relay in front of copilot's station. Caused by failure of inverter relay.

H series - Crew felt slight feedback on cyclic during short final. Hydraulic sleeve in fitting to hydraulic filter assembly had failed.

V series - During hoist training at 100 feet agl, master caution and main generator segment lights came on. Standby generator came on line. About 15 minutes later, master caution light again came on. Main and standby generator voltage regulators were set at 28 volts. After voltage regulators were reset, there were no more problems.

UH-60 Class E mishap

A series - Electrical control unit failed during flight, allowing NP to go to high side.

Attack helicopters

AH-1 Class D mishap

S series - During simulated engine failure, IP noticed rotor rpm increasing and took control. Pilot's inattention and IP's late corrective action allowed rpm to go to 106 percent, causing damage of nearly $9,000.

AH-1 Class E mishap

S series - During runup, fire guard signaled pilot to abort engine start. Fuel was flowing down both sides of aircraft at plenum chamber area. Caused by deteriorated fuel line.

AH-64 Class A mishaps

A series - Aircraft hit wires and crashed while conducting training mission under NVS. Main rotor and tail rotor blades. PNVS, windshield and stabilator were destroyed. 8639

A series - Severe thunderstorm with 70-knot winds and hail approached field where aircraft was operating. Aircraft was running at full rpm when

(continued on next page)

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
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	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	1 - 23 July	**4**	**3**
	August	2	1			
	September	3	2			
	Total for Year	45	31	Total to Date	**27**	**24**

Mishap briefs

blades began flexing and striking cockpit and tail boom. 8640

AH-64 Class E mishap

A series - Caution light on 90-degree gearbox came on during OGE hover. Cause by failure of input seal.

Cargo helicopters

CH-47 Class E mishaps

C series - When aircraft was brought to hover, oscillations were felt in cyclic, in roll axis. Caused by failure of dual lower boost servo cylinder.

C series - During downwind leg of traffic pattern to confined area, rpm dropped 6 to 8 rpm and crew felt medium- to high-frequency vibration. Vibration persisted after rpm was recovered. Caused by faulty vibration damper.

Observation helicopters

OH-58 Class E mishaps

A series - During checklist procedures for maintenance test flight, throttle was reduced to flight idle stop to check N1 rpm. After checking copilot's throttle for rpm, throttle couldn't be advanced or retarded. Caused by internal binding of power control assembly. This was the fourth occurrence in a 12-month period.

A series - Aircraft was picked up to a 2- to 3-foot hover when both pilot and copilot heard low rpm audio. Pilot saw N2 pass through 90 percent, then looked outside to land aircraft. As aircraft settled to ground and load was taken off rotor, N2 returned to 103 percent.

Fixed wing

OV-1 Class E mishaps

D series - During cruise flight under IMC, pilot noticed medium-frequency vibration throughout airframe. No. 1 engine oil pressure was decreasing to zero. Engine was secured in flight and aircraft landed. Engine oil pump failed, causing failure of No. 3 and 4 bearing assemblies.

D series - Aircraft was in flight at 9,000 feet msl. Pilot attempted 30-degree turn but couldn't move rudder pedals. After numerous attempts to move each rudder by applying maximum pressure, pilot recycled gust lock three times before regaining rudder control. Pilot made a no-hydraulics approach, with flaps, and landed. Cause undetermined.

U-21 Class E mishap

H series - Smoke began coming from floor area to right of console during flight. Cigarette lighter shorted out.

Maintenance

UH-1 Class E mishaps

H series - After aircraft landed from hovering autorotation, hydraulic warning light came on and pilot noticed stiffness in controls. Hydraulic line chafed through on servo control tube at irreversible valve.

H series - Crew felt cyclic feedback and heard loud banging during instrument approach. Self-locking nuts on the three small diameter lateral cyclic servo mounting studs lost torque and backed off. Resulting slack caused tension in the large stud to fail instantaneously, due to excessive cyclic loading. Suspect oil on mounting studs allowed nuts to back off.

V series - Crew was on IFR training flight. IP initiated an unusual attitude and during recovery there was a loud bang and egt rose. Inspection showed bleed band actuator assembly wasn't secured.

UH-60 Class D mishap

A series - When brakes were applied during roll-on landing, wheels locked and tires began smoking. Brakes weren't properly adjusted.

UH-60 Class E mishaps

A series - Severe vertical vibration occurred during power check. Dirt on anti-flaps for blades caused them to stick in place.

A series - After 1-hour flight, aircraft was being ground operated with both engines at 100 percent rpm. Cannon plug to emergency cable cut was found not plugged in. When crew chief touched cannon plug to hoist, cable was immediately cut. Cannon plug had been forced onto cable shear cartridge with pins of cartridge out of alignment with receptacles of plug. When cartridge pins punctured rubber seal between receptacles, short to outer shell of cannon plug resulted. The completed electrical circuit allowed static discharge to fire both electrical primers of the cable shear cartridge. Apparently during manufacture of the wiring harness, one pin of the cannon plug was shorted to wiring harness shielding. While this did not cause the static discharge, it was a contributing factor in completing the electrical circuit and allowing static discharge to fire the electrical primers of the cable shear cartridge. (continued on back page)

Stacom

Standardization Communication

FAA flight certification in Army aircraft

Paragraph 2-7c, AR 95-1, permits Army aircraft to be used to obtain Federal Aviation Administration (FAA) certification when the evaluation is conducted with other authorized Army flight training. A future change to AR 95-1 will delete this authority.

The FAA's Flight Standardization Office has issued a directive, dated 7 February 1986, which requires applicants who intend to use an Army aircraft for FAA certification to present a letter to the FAA examiner from their commanding officer or operations officer stating that they are authorized to use the Army aircraft for the sole purpose of receiving an FAA flight certification. The letter must also state that all maneuvers required for the test are authorized to be conducted in the aircraft.

A letter that would meet these requirements would violate paragraph 2-7c, AR 95-1, and DA policy on emergency procedures. There is no legitimate way for a commander to authorize use of an Army aircraft to perform maneuvers that are beyond the scope of the unit's ATM training program.

Under the United States code governing operations of public service/military aircraft, there is no requirement for an FAA rating. Therefore, there is no justifiable reason for commanders to permit the use of Army resources (aircraft, fuel, parts, maintenance, or instructors) to obtain or renew FAA certificates.

(For additional information see mini STACOM on FAA certification, 12 June 1985 issue of *Flightfax*.)

Establishment of Eastern Flight Standardization Branch of DES

A Memorandum of Understanding between the Chief, National Guard Bureau, and the Commanding General, U.S. Army Aviation Center, has established an agreement for the utilization of Army National Guard tour personnel to conduct a standardization program for low-density/nonstandard Army aircraft.

The new Eastern Flight Standardization Branch of Department of Evaluation and Standardization is currently located at Fort Indiantown Gap, PA. It is composed of branch commander, MAJ Thomas G. Petrick, and standardization instructor pilots (SIPs) in utility, observation, and cargo helicopters. SIPs must be qualified in low-density aircraft such as the CH-54, UH-1M, OH-6, U-8, U-3, and T-42 which are found primarily in Army National Guard units. Future SIP positions will include fixed wing aircraft.

Questions concerning the branch and these unique aircraft may be addressed to:

Eastern Flight Standardization Branch (DES)
C/O EAATS
Department of Military Affairs
Annville, PA 17002-5004

Telephone numbers are AUTOVON 235-2042, FTS 591-2810, or commercial 717-865-5444, extension 2042.

Establishment of a Western Flight Standardization Branch of DES will depend on future funding. The branch would be collocated with the Western ARNG Aviation Training Site at Marana, Arizona.

Identification of Friend or Foe (IFF) training

Training is the primary mission of a peacetime Army. This training must be complete and realistic to prepare soldiers for tomorrow's battlefield. Such preparation must include Identification of Friend or Foe (IFF) training. IFF training is the key to successful operations under the Army's forward area air defense umbrella.

Beginning in October 1986, the Directorate of Evaluation and Standardization will begin evaluating unit IFF training. These evaluations will be conducted during the FY 87 evaluation and assistance visits. Areas to be evaluated are: use, training, and maintenance of IFF equipment.

Every effort should be made to increase IFF training and use during FTXs, ARTEPs, and other appropriate exercises. Maintenance of all IFF equipment must be emphasized in order to ensure systems are operational prior to an exercise opportunity.

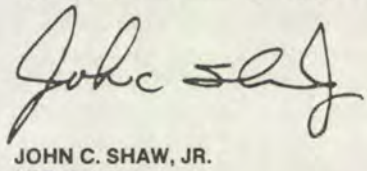
New Director for DES

LTC(P) John C. Shaw, Jr. was designated Director of Evaluation and Standardization on 19 June 1986. LTC Shaw succeeds COL Turner E. Grimsley, who has been reassigned to HQDA, ODCSOPS (DAMO-FDV).

LTC Shaw is eminently qualified for his new position, having held numerous command and staff positions of great responsibility in Army aviation. A Master Army Aviator and current instructor pilot, he received his aeronautical rating in December 1966. LTC Shaw's previous assignment was as Deputy Director of Evaluation and Standardization, U.S. Army Aviation Center, Ft. Rucker, AL. ■

STACOM 116 23 July 1986

Prepared by the Directorate of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5000, AUTOVON 558-3589 during duty hours, 558-6487 after duty hours. Information published here generally precedes the formal staffing and distribution of Department of the Army official policy. This information is provided to all commanders to enhance aviation operations and training support.



JOHN C. SHAW, JR.
LTC, Aviation
Director, DES

Mishap briefs

C-12 Class E mishap

D series - Aircraft was accelerating from 160 KIAS during level flight when pilot noticed upper-left engine cowling was rising up into slipstream. Mechanic apparently failed to ensure cam-type fastener was fully secured after maintenance.

OV-1 Class E mishap

D series - Pilot cockpit access door latch bolts wouldn't engage properly. Door was out of adjustment.

SD3-30 Class E mishap

Left engine quit while aircraft was on left base during approach. Foreign material in fuel caused gravity fuel-feed valve to stick in closed position, causing fuel starvation to No. 1 engine. Same aircraft had similar problem previously.

U-21 Class E mishap

A series - Immediately after takeoff, crew chief saw fuel siphoning out of left-wing tank cap. Tension on cap was loose.

Safety messages

• Safety-of-flight maintenance mandatory message concerning replacement of electrical contacts at the engine four-way fuel valves of AH-64A series aircraft (AH-64A-86-13, 111930Z Jul 86). Summary: During ground fuel-crossfeed check, engine flameout occurred when a wire at the four-way fuel valve broke due to contact overcrimping. Prime contractor considers this a random workmanship problem which was probably caused by use of a crimp tool with the selector knob incorrectly set. Purpose of this message is to accomplish 100 percent replacement of the crimp contacts at connectors P938 and P939 to preclude reoccurence of such failures. Only aircraft SN 82-23355 through SN 84-24222 are involved. NOTE: Crimp impressions that are too deep (overcrimped) will cause the wire to break easily at the crimp joint. Cracked wire barrels are also an indication of extreme overcrimping. Unless cracked wire barrels are present or several wire strands have already broken, visual inspection alone is an unreliable method of identifying overcrimped contacts. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

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Commander, Army Safety Center

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Report of Army Aircraft Mishaps

Thirteen receive Broken Wing Awards

Want to sleep on the thirteenth floor of a hotel? Most of us don't. That's why many hotels don't have a thirteenth floor. Whether we're superstitious or not, we don't usually feel very comfortable with the number 13 just because it's said to be unlucky, and who needs any bad luck?

But 13 isn't always an unlucky number. On the thirteenth of May 1986, 13 nominations for the Broken Wing Award were approved; 12 U.S. Army and 1 Danish Air Force aviator received the award. We don't mean to attribute these awards to luck, however. Luck had little to do with it. These aircrewmembers were well trained, experienced, and skilled. When the emergency arose, they knew what they needed to do, and they did it.

The Broken Wing Award is given to aircraft crewmembers who demonstrate a high degree of professional skill while actually recovering an aircraft from an in-flight failure or malfunction necessitating an emergency landing. Requirements for the award are spelled out in AR 672-74, dated 15 May 1982.

The following aviation crewmembers recently received the Broken Wing Award.

• **CW2 David C. Nelson, Headquarters and Headquarters Company, 35th Signal Brigade, Fort Bragg.** CW2 Nelson was pilot of an OH-58A, with three passengers on board. The aircraft was on a low-level mission over flat, wooded terrain covered by 25- to 30-foot pine trees. He was 15 miles from the nearest airfield when he heard a change in engine noise. The aircraft yawed left as rotor and N2 decreased. Realizing he had an engine failure, CW2 Nelson attempted to fly to a nearby road. Seeing that he couldn't make it, he autorotated, attempting to make sure the aircraft's passenger compartment missed the trees in his path. The aircraft was destroyed, but there was only one minor injury.

• **CW2 Frank K. Everest, A Company, 229th Attack Helicopter Battalion, 101st Airborne Division (Air Assault), Fort Campbell.** The AH-1S was making an approach to land for refueling at an Army airfield. The copilot, who was on the controls, announced that the anti-torque pedals were ineffective. CW2 Everest took the controls and began a go-around. After verifying the pedals were ineffective, CW2 Everest told tower personnel he was making a precautionary landing and made a running landing to the runway. When maintenance personnel removed the inspection panel between the horizontal stabilizers on the tail boom, they found the bolt which attaches the push rod to the bell crank lying on the panel. No trace was found of the nut that should have secured the bolt. When the bolt fell out of the push rod, there was no way for the pilots to retain tail rotor control. CW2 Everest's knowledge of emergency procedures and quick decision in an unusual emergency situation prevented damage to the aircraft and injury to the crew.

• **CW2 David W. Hathaway, 9th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CW2 Hathaway and two student pilots were on board a UH-1H in flight at about 500 feet agl. Suddenly there was a loud bang, followed by severe vibrations. As the IP took control, the engine failed and the aircraft went into autorotation. There was only

one suitable landing area and had CW2 Hathaway not immediately reacted by turning and maneuvering the aircraft toward it, it would have been out of reach. There would have been no second chance. Emergency governor operations failed to correct the problem and by now the vibrations were so bad the crew couldn't focus on their instruments. The IP got off a mayday call and began adjusting airspeed and descent for landing. The landing area was surrounded by marsh and creeks. The foot-tall grass covering it made it look deceptively smooth until the helicopter was about 15 feet above the surface. The terrain was actually very uneven and there was a ditch about 10 feet to the front of the aircraft's landing direction. That eliminated any hope of extending the glide distance. CW2 Hathaway made a last-second adjustment with the remaining collective input and made a sod touchdown. The abrupt landing caused the main rotor blades to flex down, damaging the aircraft's tail section. But because of CW2 Hathaway's quick reaction and ability to land the aircraft, in spite of the rough terrain

(continued on next page)

Thirteen receive Broken Wing Awards

and surrounding area, the mishap was limited to Class C damage and no one was injured.

• **CW2 Keith A. Turk, 7th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CW2 Turk was conducting simulated engine failure training with a student in an AH-1S. As the student completed power recovery and increased collective pitch to begin a climb, CW2 Turk heard a snap and saw that the collective lever cover at the gunner's station had broken apart. A piece of the cover had lodged between the collective lever and the control linkage. He raised the collective to try to free the broken cover from the linkage. It didn't work, and now the collective was at an even higher pitch setting than before, and couldn't be reduced. CW2 Turk decided that the only real option was to make a running landing at reduced rotor rpm. Reaching the airfield, he made a practice approach to determine how much airspeed and throttle reduction he would need to make his descent for the approach and be able to put the aircraft down and stop without running off the runway. Then he positioned the aircraft on final for the emergency landing. Using airspeed and throttle correlation to establish his descent, CW2 Turk completed the approach and landed, touching down at 80 to 90 KIAS. He was concerned that further reduction of throttle and rotor would make cyclic and pedal control doubtful and he was able to put enough force on the collective to bring the aircraft to a stop after skidding about 2,200 feet.

• **CW3 David L. Beetem, 7th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** The AH-64A was involved in aircraft qualification gunnery training over wooded, rolling terrain. CW3 Beetem was instructing on dry-fire gunnery at an out-of-ground-effect hover over 50- to 75-foot trees when the aircraft had a shaft-driven compressor failure. The first indication of trouble was when CW3 Beetem and his student smelled oil fumes. Within seconds, the cockpit was filled with bluish-white smoke. CW3 Beetem was on the controls and he immediately began an ITO to clear the surrounding trees. Using a combination of his helmet-mounted PNVS and what little he could see outside the cockpit through the smoke, CW3 Beetem flew to the arming pads and safely landed the multimillion-dollar Apache.

• **CW2 Kevin M. Frost, 193d Aviation Company (Pershing Support), 56th Field Artillery Command, APO New York 09454.** The mission was NVG training. CW2 Frost, IP, and two other aviators were on board the UH-1H. After about 2 hours of flight, the aviator on the controls elected to make a normal NVG approach to landing. The wind was 10 to 15 knots and the IP decided to use the approach to emphasize the importance of landing with a head wind when possible. The approach was normal until the aircraft began a yaw to the right at about 50 feet agl. The pilot told CW2 Frost that he had run out of left pedal. The pilot then nosed the aircraft over and tried to gain airspeed and fly out, but the UH-1 continued to rotate to the right. The aircraft was between 90 and 180 degrees to the right of its original heading when the IP took the controls. CW2 Frost continued to try to gain directional flight, but the aircraft was rotating about its vertical axis at a fast rate. He brought the aircraft down into ground effect at about 5 feet agl but the Huey continued to rotate, spinning around 20 to 25 times. As it rotated, it was also moving horizontally, parallel to the runway, and getting closer to a gymnasium and ball field. CW2 Frost pulled in more power to avoid the gym and a backstop on the field. At about 50 feet agl, CW2 Frost finally gained control and directional flight of the aircraft. As he attempted to make a normal approach, he confirmed there was a tail rotor problem. He elected to go around and make a running landing, controlling aircraft heading with manual throttle operation. The aircraft was undamaged. Maintenance personnel found a nut on the aircraft's tail rotor quill control tube had cracked. When the cotter pin slipped past the broken nut, tail rotor control was lost.

• **CW2 Ronald A. Hargrove, D Troop, I/18 Cavalry, California Army National Guard, Los Alamitos, CA.** CW2 Hargrove was assigned to fly a VFR service mission as an OH-58A pilot. Preflight, runup, and hover operations were normal and CW2 Hargrove began a normal takeoff. The aircraft was 60 feet agl, at about 55 to 60 KIAS, when the engine failed and all power was lost. CW2 Hargrove entered autorotation and performed the emergency procedure for an engine failure at low altitude and low airspeed. He only had enough altitude and time to make a straight-ahead landing, touching down 90 degrees to a taxiway which is only 40 feet wide. He was able to make his deceleration, flare, touchdown, and ground run without sliding off the paved taxiway. The aircraft was undamaged and neither the pilot nor the passenger was injured.

• **Mr. Charles W. Smith, 8th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** Mr. Smith, a civilian instrument instructor pilot, and a student pilot were on an IFR training flight in a UH-1H. During a climb to 2,000 feet, IMC was encountered at 900 feet agl. The right cargo door became unsecured and started to open while the aircraft was climbing. Mr. Smith took the controls while the student tried without success to secure the door from the pilot's seat. As the aircraft was being vectored to final and descending, smoke began coming into the cockpit from the pilot's defroster vents and the master caution and engine chip detector segment lights came on. About 10 seconds later, the engine oil pressure light also came on, followed by the oil pressure gauge and N2 rpm both dropping to zero. After confirming engine failure, Mr. Smith began autorotation. He lowered collective pitch, keeping the aircraft in trim. Slight collective pitch was necessary to keep rotor rpm from increasing into the high rpm danger area. He told the student to make an emergency call and to let him know

when VMC was apparent. When the aircraft entered VMC at 600 feet agl, Mr. Smith transitioned from instruments, noted a suitable landing area, and began a 120-degree turn. A full flare deceleration slowed airspeed and he leveled the aircraft and applied collective pitch. The Huey landed in a freshly plowed, water-soaked field. The aircraft was equipped with an internal auxiliary fuel tank and ballast weight. The skids sank about 7 inches into the soft ground and the Huey came to rest undamaged.

• **CW2 John A. Wirtz, Jr., 8th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** The UH-1H was en route to provide command and control coverage of NOE training for students. The copilot asked CW2 Wirtz, PIC, to reduce the friction on the cyclic control, stating that there was stiffness and binding in the right lateral area of the cyclic. CW2 Wirtz took control and confirmed unusual stiffness and binding in the forward and right quadrants of the cyclic. No caution or warning lights had come on and CW2 Wirtz began emergency procedures, but there was no effect on the problem. As he recycled the hydraulic control switch for the third time, the stiffness in the cyclic control increased and it moved violently to the left rear quadrant also. The aircraft's nose pitched up and it tried to enter into a left roll. CW2 Wirtz turned the switch off and succeeded in stopping the roll. He was able to almost level the aircraft by applying right forward cyclic. When the aircraft failed to respond further to cyclic input an emergency was declared. Only by using the collective could altitude, attitude, and airspeed be reasonably controlled. Through coordinated application of collective during the return flight and use of antitorque pedals on final, once landing and runway alignment were assured, CW2 Wirtz was able to make a safe emergency landing. Maintenance personnel found that a servo wire drive in the cyclic hydraulic servo assembly had failed. Depot analysis further concluded that primary cause of failure was overtorquing of the hexagon nut which resulted in overstress of the drive rod.

• **CW4 Walter J. Ellis, Aviation Support Facility, California Army National Guard, Stockton, CA.** The CH-47A was on a night IFR training flight in VMC conditions. CW4 Ellis, the PIC, was on the controls. He was also wearing a flight hood. About 15 minutes into the flight, the master caution and No. 1 generator caution lights came on, followed about 5 seconds later by the No. 2 generator caution light. A dual-generator failure meant CW4 Ellis had lost the No. 1 and 2 stability augmentation systems, without which the A model CH-47 is extremely unstable. The aircraft was also without the ac normal engine trim system, speed trim system, pilot and copilot torquemeters, hydraulic and engine oil pressure indicators, transmission oil pressure and temperature indicators, all fuel boost pumps, No. 1 and 2 transformer rectifiers, and the console and flight instrument lights. In spite of these handicaps, CW4 Ellis maintained control of the aircraft. As he removed his flight hood, he told the copilot to make a mayday call and turn off unnecessary electrical equipment. Then he began a descent with the copilot maintaining rotor rpm with the emergency engine trim system. He was further handicapped by the loss of the pilot and copilot searchlights. But, although much of the terrain the aircraft was flying over was covered by water and there were numerous high tension power lines, CW4 Ellis, with the help of other crewmembers, was able to find a suitable site and land without damage to the aircraft or injury to the crew.

• **CW4 Bernard J. Poulin, Army Aviation Support Facility, Maine Army National Guard, Bangor, ME.** CW4 Poulin was IP of a UH-1V on a VFR training flight. The purpose of the mission was standardization evaluation of the other pilot. En route to the area where the tactical portion of the evaluation would take place, the engine failed. The other pilot was on the controls and the aircraft was about 800 feet agl over a heavily wooded area. CW4 Poulin took control and told the other pilot to go to emergency governor, but he couldn't find the governor switch. Turning toward a more open area, CW4 Poulin turned the transponder to emergency and put out a mayday call. He moved the governor switch to the emergency position, while continuing in the autorotation descent. The aircraft landed in a snow-covered, marshy area. Although there was some damage when the main rotor blades contacted trees and the right-hand chin bubble was broken, damage to the airframe was minimal and there were no crew injuries.

• **CPT Mogens Kruse, Royal Danish Air Force, 9th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CPT Kruse was IP of a UH-1H involved in basic combat skills training over an area of heavy forest and some farmland. The aircraft was in terrain flight, 250 feet agl, at about 70 knots. The student pilot was on the controls when the crew noticed a mild rocking along the roll axis of the aircraft. As CPT Kruse took control, the rocking motion stopped. The crew were discussing whether the problem had been pilot-induced when they heard a loud grinding noise from the rear of the aircraft. Expecting a complete loss of power to follow, CPT Kruse immediately lowered the collective control and turned toward the only open land within reach. During autorotation descent, the engine quit. He told the student to assume crash position and proceeded to land the aircraft without any damage to the helicopter. When the crew inspected the aircraft, they found the main rotor blades wouldn't rotate clockwise because the engine had seized. CPT Kruse's alertness and quick reaction to the emergency prevented further deterioration of rotor rpm which could have meant a landing in the trees.

• **CW2 Thomas E. Wiese, A Company, Task Force 160, Fort Campbell.** (No details regarding the incident for which CW2 Wiese received the Broken Wing Award will be published.)■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - Bird struck and broke right chin bubble. Structural components were bent and cracked.

UH-1 Class E mishaps

H series - Chip detector light came on twice during flight. Replaced 90-degree gearbox.

V series - Master caution and tail rotor chip segment lights came on in flight. Caused by water in rubber boot cover.

UH-60 Class D mishap

A series - Jumpmaster released wind drift device into tail rotor. Metal rods in parachute streamer hit tail cone and became imbedded in transmission cowling. Tail rotor had small nick on leading edge of one blade.

UH-60 Class E mishaps

A series - Stabilators failed on three aircraft: after slingload was released, on short final and again on takeoff, twice during takeoff. Another aircraft was in flight when stabilator slewed to 10 degrees down while in auto mode. Crew manually slewed stabilator to zero degrees and continued to destination.

A series - Anti-flap spring was out of tolerance, causing severe pounding in rotor system during shutdown. Another aircraft's crew felt severe pounding in airframe as aircraft accelerated through ETL. Anti-flap stuck and then cracked. Aircraft had history of sticking anti-flap.

Attack helicopters

AH-1 Class E mishaps

F series - Master caution and transmission oil bypass segment lights came on during landing. Maintenance couldn't duplicate.

F series - Transmission oil bypass light came on during flight. Transmission temperature and pressure remained in normal operating range as aircraft landed. Caused by failure of pressure switch.

S series - Fire warning light came on during shutdown. Detection wire in cowling shorted out.

S series - Fire warning light came on while aircraft was on ground at flight idle. Caused by loose cannon plug on fire detector.

AH-64 Class E mishaps

A series - Aircraft was at OGE hover at 90 feet agl. Master caution and primary hydraulic pressure and low oil

FY 85 UH-1 Class A mishap reclassified

The copilot of a UH-1 on a tactical training mission in January 1985 created a dynamic rollover condition while conducting slope operations. When the helicopter's right skid hit a soft dirt mound, the UH-1 rolled onto its right side. The roll to the right was aggravated by a continuous power application. The main rotor blades contacted the ground and then hit the tailboom. The mishap was initially classified as Class A.

The aircraft has been repaired by Corpus Christi Army Depot and returned to service. Cost of repair has resulted in reclassification of the mishap from a Class A to a Class B. Reclassification of this mishap reduced total Class A mishaps for FY 85 to 45. ■

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	1-30 July	**5**	**3**
	August	2	1			
	September	3	2			
	Total for Year	45	31	Total to Date	**28**	**24**

segment lights came on, digital automatic stabilization equipment disengaged, and primary hydraulic gauge showed zero pressure. Hydraulic pressure hose assembly failed, causing loss of fluid in primary hydraulic system.

A series - Uncommanded yaw inputs were experienced during hover and aircraft turned as much as 60 degrees. Couldn't be duplicated during test flight.

A series - During OGE hover at 200 feet agl, aircraft experienced uncommanded right roll. Hover altitude hold and roll channel DASE were disengaged. After landing, flat pitch torque was 22 to 25 percent. DASE computer was replaced.

A series - Intermediate gearbox temperature light came on during OGE hover. Couldn't be duplicated during test flight.

A series - During hot refueling, CCR port began leaking after nozzle was disconnected. Caused by failure of poppet valve.

Cargo helicopters

CH-47 Class E mishaps

A series - Pilot's left jettisonable door flew off at 200 feet agl. During preflight check, door was centered in latch plate detents.

C series - Aircraft was at hover while all transmission pressures were checked. Transmission pressure gauge wouldn't move from 23 psi. Pressure gauge was faulty.

C series - Flight engineer saw hydraulic fluid spraying from utility system oil cooler fan during runup. Caused by failure of utility hydraulic cooler pressure line.

D series - During hover, No. 1 beep wouldn't respond to No. 1 or 2 beep trim switches. Caused by failure of N2 actuator.

CH-54 Class E mishaps

A series - No. 1 engine failed internally during taxi for takeoff.

A series - Screws on externally-mounted mirror for TOW kit backed off, allowing mirror to fall off during flight.

B series - Aircraft had delivered external load and was climbing over water when tail rotor servo caution light came on. Failure of locknut tube fittings allowed leakage of hydraulic fluid, causing loss of utility hydraulic system.

Observation helicopters

OH-58 Class E mishaps

A series - Pilot's finger slipped from starter switch and TOT went to 940° C., for 1 second. No damage to aircraft from hot start.

A series - During final approach, smoke was seen coming from behind instrument panel and armament panel light came on. Maintenance was unable to duplicate.

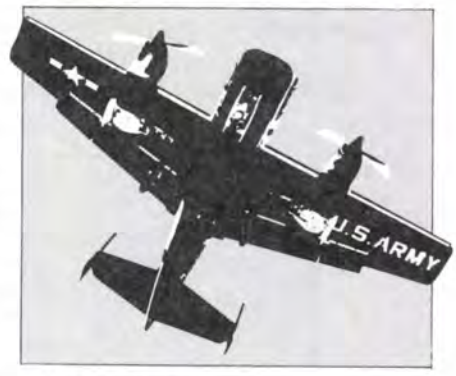
C series - Immediately after touchdown, master caution and engine oil bypass lights came on. As aircraft was shut down, IP saw excessive oil leaking in the engine compartment. Caused by faulty aft seal on accessory gearbox.

C series - Oil was seen spewing from diffuser vent opening when aircraft landed. Crew chief had overfilled engine oil reservoir, causing oil to be vented.

C series - Pilot felt binding in tail rotor controls during takeoff. Caused by dirt on secondary tail rotor control.

C series - Aircraft engine was started and N2 was allowed to stabilize. Engine oil pressure was within normal range and transmission light went out. N1 was above 58 percent. As pilot reached for generator switch, engine quit, engine light came on, and blades coasted down rapidly. Fuel valve handle and fuel boost switch were on and circuit breakers were in. Maintenance couldn't duplicate problem.

C series - Engine started normally, ran for about 10 seconds at 61 percent N1, and flamed out. Maintenance couldn't duplicate.



Fixed wing

OV-1 Class D mishap

D series - Pilot heard sudden noise and felt feedback in rudder pedals while taxiing after landing. Right wheel half bolt sheared and became wedged between wheel and brake assembly. Right main landing gear wheel and disc brakes damaged beyond repair.

OV-1 Class E mishaps

D series - Takeoff was aborted due to low torque indication on No. 1 engine.

D series - Autofeather system was inoperative during engine runup check. Caused by failure of autofeather relay.

SD-3-30 Class E mishap

Right engine flamed out when propellers and fuel were brought back to taxi and ground during landing rollout.

T-42 Class E mishap

A series - Starter failed during runup. Couldn't be duplicated.

Maintenance

CH-47 Class E mishaps

C series - During flight, crew chief told IP flares were being dispensed from M-130 flare system. IP turned AN-ALQ 156 off and was reaching to turn off the M-130 system when crew chief told him flares were continuing to be dispensed. Malfunction ceased when power was removed from M-130. Investigation showed copilot's cyclic button for dispensing flares did not have to be

(continued on back page)

Mishap briefs

depressed to activate dispensing system. Cyclic grip had been removed and reinstalled within last 2 months.

C series - During flight, master caution and No. 1 engine oil low segment warning light came on. Crew chief confirmed oil leaking from engine. Oil line fitting on engine wasn't properly tightened. Nut loosened, allowing oil to leak.

C series - During runup, pilot's attitude indicator began erratic movements. When either pilot or copilot VGI was placed in emergency, both attitude indicators began erratic movements. With both VGI switches placed in normal position, movements stopped. System appeared to be operating normally and runup continued. During practice ITO, with aircraft in level attitude, both pilot and copilot attitude indicators rotated to 40 degrees nose low. Pilot's attitude indicator had been replaced earlier. Investigation showed a UH-1 attitude indicator had been installed. The systems are not compatible. It has not been determined if UH-1 attitude indicator was received and issued for installation by mistake or if crew assumed it was a compatible substitute.

CH-54 Class D mishap

A series - Maintenance personnel were performing MOC on AFCS hydraulic system in attic of CH-54. APP was started and operating within normal limits when egt and N1 surged beyond limits. APP backfired several times. Master switch was turned off and personnel got off aircraft. Return line from utility hydraulic system ruptured, spraying hydraulic fluid into intake of operating APP, causing explosion, fire, and internal failure of APP.

OH-58 Class E mishap

A series - Low transmission oil pressure light flickered during approach then burned steadily as approach terminated. Oil line to forward housing had been hand-tightened, allowing oil to escape.

Safety Messages

• Safety-of-flight technical message concerning requirements for ungrounding of OH-6A series aircraft (OH-6-86-07, 162359Z Jul 86). Summary: Due to loss of abrasion strips on tail rotor blades, a grounding message was directed for the H-6 aircraft (SOF message OH-6-86-02, 130115Z Jun 86). Purpose of this message is to provide instructions for ungrounding the OH-6A aircraft. (This message is not applicable to commercial variants. These aircraft will be addressed in a separate message.) Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

U.S. ARMY SAFETY CENTER

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6 August 1986

Flightfax®
Report of Army Aircraft Mishaps

Of witches and switches and other scary tales

Actually, this article really has nothing to do with witches except for the fact that they fly too. We're serious about the switches, though, because some of the things that happen with them are downright scary.

A recent Class C mishap (meaning damage and injury costs of less than $100,000 but more than $10,000) happened to an aircraft that didn't get a single dent and an aircrew who didn't receive as much as a scratch. So how could it be called a Class C mishap? Because damage to the load the aircraft was carrying amounted to at least $45,000.

It was an NVG flight and the UH-60 was carrying an external load consisting of an M102 howitzer with two rounds. The pilot, who was on the controls, told the copilot to turn on the searchlight. Suddenly, the slingload was released. The copilot had inadvertently activated the emergency hook release, allowing the slingload to fall.

Figure 1 shows switch arrangement on the UH-60 collective stick grip on helicopters equipped with NVG compatible lighting. While the cargo release is a recessed button and the searchlight is turned on by a raised toggle switch, it's easy to see that someone could push the emergency hook release button when they intended to hit the searchlight switch. These switches aren't shaped exactly the same on the typical collective stick grip compared with the collective stick grip on helicopters equipped with NVG compatible lighting, but they are in the same relative position on both helicopters. (Figure 2 shows a typical collective stick grip.)

The location of the emergency hook release on the collective stick grip is essential to ensure continued safe flight should the cargo hook release switch on the cyclic stick grip fail to function properly (figure 3). If the cargo release switch on the cyclic stick grip fails to work, the crew must be able to maintain control of the aircraft and still be able to locate and activate the emergency hook release. That's why the emergency hook release is where it is, but its location can be a problem in a situation such as the one just described.

The U.S. Army Materiel Command has requested the Project Manager for the Black Hawk to evaluate the adequacy of the existing "guard" for the UH-60 emergency hook release button. The guard is intended to protect the button from inadvertent activation, but it mustn't interfere with speedy activation when the emergency hook release

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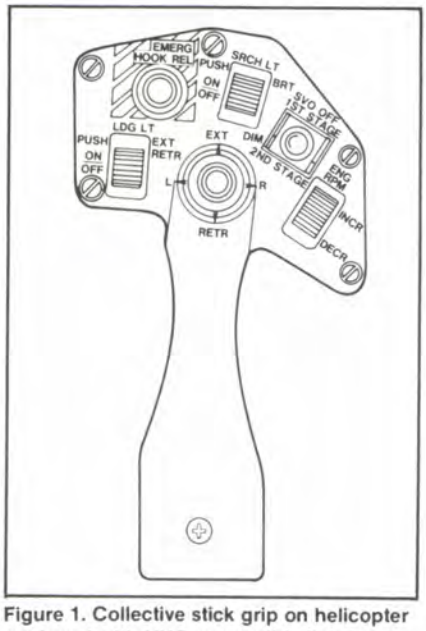

Figure 1. Collective stick grip on helicopter equipped with NVG compatible lighting

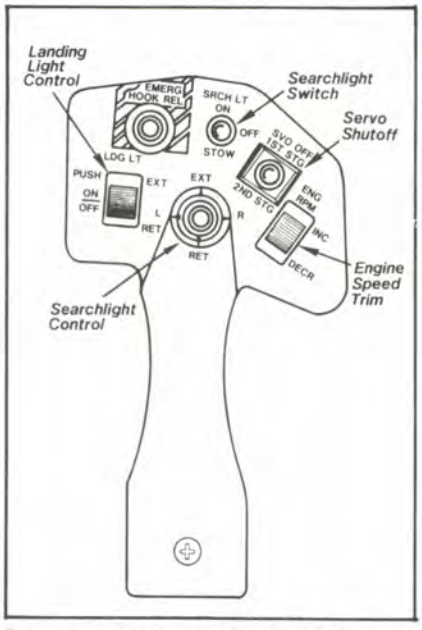

Figure 2. Typical collective stick grip

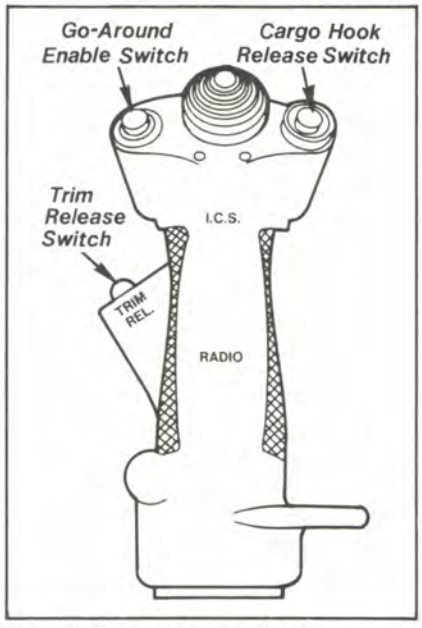

Figure 3. Typical cyclic stick grip

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

H series - Brownout effect occurred during takeoff. Main rotor blades struck ground and aircraft rolled onto its side. 8641

UH-1 Class C mishap

H series - On short final, pilot noted engine oil temperature gauge indicated 150° C, resulting in almost $60,000 damage to engine.

UH-1 Class D mishaps

H series - During hover taxi to parking, PIC hovered too close to civil fixed wing aircraft. Rotorwash caused airplane to ground loop and hit barrier, making tear in fabric of airplane's underside.

H series - Pilot was distracted during preflight and he unbuttoned only part of inlet screen cover fasteners, then he started aircraft without copilot or fireguard. At 6600 rpm, pilot saw engine inlet air caution light come on. Demand for air from engines caused forward baffle to be drawn back, striking K-flex drive shaft bolts.

UH-1 Class E mishaps

H series - Hydraulic pressure caution light came on in flight and hydraulic system failed. Caused by ruptured hydraulic line.

H series - Aircrew heard loud bang from transmission area during transition to cruise flight. Aircraft yawed right. Master caution light came on, N2 rose to 6900 rpm, and rotor rpm reached 339 rpm. IP reduced throttle and told student pilot to put governor switch in emergency position, but N2 and rotor rpm didn't decrease. IP closed throttle and autorotated to landing. After touchdown, crew could see smoke coming from transmission area. Wafer filter gasket failed; no other discrepancies found.

UH-60 Class D mishaps

A series - Aircraft, flying lead in flight of 3, was slingloading M102 howitzer. On short final, aircraft had to make 45-degree left turn to emplace load on upslope. Ground guide was giving hand and arm signals to PIC. As aircraft hovered forward, gun contacted ground and overturned. CE, who had poor depth perception, hadn't warned load was close to ground. Radar altimeter showed adequate clearance. Ground guide was directing aircraft to move forward and down when M102 struck ground.

A series - During postflight inspection, APU access cover was found missing. Crew failed to ensure panel was properly secured before takeoff and it blew off during flight.

UH-60 Class E mishaps

A series - Dust and sand between bolt and bushing caused anti-flap stop for main rotor blade to seize, causing unusual vibration during hover.

A series - While transitioning to cruise flight shortly after takeoff, crew felt mushiness in fore and aft cyclic control inputs. Caused by defective pitch SAS actuator.

A series - Aircraft had excessive and erratic one-to-one vibration while hovering during NVG training flight. Anti-flap stop bushing had separated.

A series - During taxi, stabilator failed, was reset, and failed again.

Attack helicopters

AH-1 Class D mishap

S series - Pilot didn't monitor battery voltage during start procedures. Aircraft tgt went to 900° C. for about 20 seconds. Fuel switch and throttle were shut off at about 850° C.

AH-1 Class E mishaps

E series - During flight, pilot heard loud bang and saw flash from rear. Aircraft started to descend slightly and tgt exceeded 950° C. for unknown time. Engine was replaced.

E series - Aircraft was in high orbit. Pilot noticed transmission oil pressure gauge drop to zero. Caused by failure of oil pressure switch.

AH-64 Class E mishaps

A series - After No. 1 engine was run up and checks completed, torque spiked and tgt climbed to top of gauge. Crew saw smoke and sparks coming from No. 1 engine nacelle. Maintenance investigation showed dents on leading edge of first stage compressor blades. Borescope revealed fifth and sixth stage compressor blades badly damaged. Engine was replaced and is being held for EIR exhibit and disposition.

A series - Crew was performing gunnery tasks during OGE hover when intermediate gearbox temperature light came on. Temperature probe (sensor) was replaced.

Cargo helicopters

CH-47 Class D mishaps

A series - Front panel window blew out during flight and broke left bubble window.

C series - Aircraft was hover taxiing into parking on maintenance ramp. Another CH-47 to immediate right and downwind appeared to be secured except there were no blade ropes attached. Crew saw tunnel covers blow off top of parked aircraft. Crew chief of parked aircraft had unlatched tunnel covers in preparation for preflight.

CH-47 Class E mishaps

B series - Pilot applied power during termination of steep approach to confined area. No. 2 engine decelerated to 35 percent. Altitude allowed aircraft to fly out of confined area. Caused by failure of main fuel control.

B series - During final approach, crew was checking transmission oil pressure. When transmission pressure selector switch was placed in mix position, pressure went to zero. Master caution and transmission oil pressure lights came on. Caused by failure of transmission pressure selector switch.

C series - Rotor rpm fluctuated on takeoff. Caused by failure of tachometer generator shaft.

Observation helicopters

OH-58 Class E mishaps

A series - During approach, crew heard unusual noise in rotor system. Caused by bond separation on 18 inches of trailing edge of one main rotor blade.

A series - Pilot had begun start and obtained 60 percent on N1. Rotor tachometer N2 rose to 150 to 200 rpm then suddenly dropped to zero. Caused by failure of N2 tachometer generator.

A series - Attitude indicator precessed more than 30 degrees in 5 to 7 minutes. Attitude indicator replaced.

Fixed wing

U-8 Class E mishap

F series - No. 1 engine couldn't be started because starter wouldn't engage flywheel. Starter drive gear sheared.

U-21 Class E mishaps

A series - No. 1 propeller tachometer fluctuated 100 rpm after takeoff. Caused by internal failure of tachometer generator.

A series - Left engine generator light came on and load meter showed zero. Caused by failure of voltage regulator.

OV-1 Class E mishaps

D series - Fuel strainer light came on after takeoff. Caused by defective fuel strainer pressure sensor.

D series - Aircraft was about 200 feet agl after takeoff when it yawed right, indicating power loss on No. 2 engine. Autofeather system didn't activate because power wasn't totally lost. Torque and N1 dropped and egt approached 800 degrees. IP reduced power to flight idle and reduced propeller rpm to minimum which reduced egt to normal limits. Caused by crack in turbine nozzle. Engine removed and sent for overhaul.

Maintenance

UH-1 Class E mishap

H series - Aircraft was conducting overwater hoist mission. After several lifts, load was at top of boom. Hoist operator attempted to swing in boom with control pendant but boom wouldn't rotate in. Pilot tried unsuccessfully to rotate boom with pilot's control. A ⅛-inch piece of insulation had been removed from ribbon wire. Suspect vibration wore through remaining insulation and wire grounded out against base of shaft. Ribbon wire may have been damaged during installation.

UH-60 Class E mishap

A series - IP simulated stabilator malfunction during flight. Aviator responded with proper emergency procedure up to point of resetting auto control. Stabilator wouldn't reset. Cannon plug had apparently been removed to replace FM radio module and was reinstalled improperly. Action wasn't written up in logbook.

CH-47 Class E mishap

C series - Aircraft was at 700 feet agl, 120 KIAS, with slingload. Lower rescue door ripped loose from connecting rods, striking bottom of aircraft in four places aft of cargo hook. Connecting rod attaching point had been repaired using bolts too short for effective attachment. Bolts sheared, causing door to come off. Door was recovered.

OH-58 Class E mishap

A series - Aircraft was hovering for takeoff when crew felt high-frequency vibration in airframe. Pair of pliers was found in compartment of engine oil tank. Vibration persisted after FOD was removed. Vibration was eliminated after tail rotor was vibrexed and weight added to tail rotor balance wheel.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	July	**5**	**3**
	August	2	1	1-6 Aug	**2**	**1**
	September	3	2			
	Total for Year	45	31	Total to Date	**30**	**25**

Of witches and switches . . .

is needed. If the present system is determined to be inadequate or it needs to be improved, recommended changes will be addressed by the Black Hawk Configuration Management Board.

In the meantime, aviators need to be aware of the possibilities for inadvertent release of slingloads. It's enough to give you nightmares just to think about what could have happened if there had been troops underneath the aircraft when this slingload fell to the ground.

The best solution we can offer is awareness and training. Aircrews must consciously check the dozens of switches and buttons they use during every flight and positively identify those that present a problem due to their proximity to each other. Only a fool would tell you that's easy, especially during times of task overload. Nevertheless, that's the task that has to be done and it will have to be done through training and practice.

In another case of mistaken identity of switches, an M151 ¼-ton truck and equipment were dropped from about 100 feet agl. The CH-47 had been in flight about 5 minutes and the crew chief was attempting to transmit information about the status of the external cargo over the aircraft intercom. He inadvertently pressed the cargo release switch which is located less than an inch above and to the left of the intercom switch on the winch hoist control grip he was using. The result was a Class D mishap when the cargo fell into a swampy area.

Something to keep in mind is that there are some quirks about the way the mind and body interact that are usually in your favor, but in some cases can actually work against you. We're talking about habit patterns.

We do best what we do repeatedly, and habit patterns are formed from doing the same things in the same way over a period of time. Almost every waking moment, we have to receive, sort, decide, and act on a barrage of information being fed into the brain from our senses. Without habit patterns to depend on in a demanding environment like an aircraft's cockpit, it's not likely that anybody could fly at all. That's especially true when there is a crisis that demands extraordinary attention and effort. Habit patterns take over some of the load while the brain deals with the more demanding tasks. That's good. What isn't good is that habit can sometimes make you look awfully foolish (like the woman at a formal dinner who found herself cutting up her dinner partner's meat before she realized she wasn't home having dinner with the children). But much worse than looking foolish, habit can kill you if you aren't careful.

Ask the fixed wing aviator whose habit pattern tells him to lower the gear at a certain point when he's landing. Say just this once, however, that for some reason the gear was never retracted. So he goes through the normal landing procedures and instead of putting the gear down, he retracts it. He may not be aware of his error until he hears that unholy sound of metal screeching on concrete and feels the shock of a wheels-up landing.

Just about everybody has their own version of putting the clock out and winding up the cat. We aren't going to try to play psychologist and go into a lot of detail here about why it happens. We just want to remind you that it does happen and ask that you take extra precautions. There are situations where your best protection is to take a look, a real look, at the button or switch you're about to use—before you use it.

U.S. ARMY SAFETY CENTER

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13 August 1986

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Report of Army Aircraft Mishaps

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps

H series - Engine oil pressure light came on. Caused by broken pressure relief valve.

H series - During climb, rpm limit light came on and would not go out despite attempts to reset circuit breakers. Caused by malfunction of rpm warning control box.

H series - Engine oil temperature exceeded 100 degrees during flight. Caused by failure of flow control thermostat.

H series - Master caution and main generator lights came on. Caused by faulty voltage regulator.

UH-60 Class D mishap

A series - Postflight inspection revealed broken lower anticollision light. Light hit the ground during landing when aircraft rolled over an incline.

UH-60 Class E mishaps

A series - Crew chief heard noise outside aircraft and saw that left step-cover hinge had broken loose. Forward fastener on cover was apparently defective. This is the fourth cover to come loose in this unit.

A series - Crew felt unusual vibration during takeoff. Caused by jammed anti-flap stop.

A series - Stabilator failed and audio and horn sounded during hover. Caused by burned-out potentiometer in actuator.

Attack helicopters

AH-1 Class B mishap

S series - After engine shutdown, as main rotor was coasting down, lightning struck concrete parking pad and left skid tube, traveled along tail boom, and exited tail rotor blade to ground. 8643

AH-1 Class C mishap

F series - Weather deteriorated rapidly as aircraft was flown into a valley. Copilot lost visual contact with the ground and told the pilot, who could still see the ground. Pilot attempted vertical descent for landing. With airspeed near zero, pilot experienced vertigo, and aircraft began flying rearward. Pilot corrected with forward cyclic and collective. Copilot took control of aircraft in a 45-degree right and 30-degree nose-low attitude and was told that torque exceeded 110 percent. Attitude was recovered and climb established. Landing was completed without further incident.

AH-1 Class D mishap

F series - Crew chief found aircraft checklist inside tail rotor drive shaft cover. No. 3 drive shaft had to be replaced. Crewmember closed drive shaft cover from right side of aircraft, preventing him from seeing checklist under the drive shaft.

AH-1 Class E mishaps

F series - Gas producer acceleration appeared sluggish during battery start, and tgt continued to increase after ignition switch was turned off. Aborted start procedures were accomplished,

(continued on next page)

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	July	**4**	**3**
	August	2	1	1-13 Aug	**2**	**1**
	September	3	2			
	Total for Year	45	31	Total to Date	**29**	**25**

Mishap briefs

and no limits were exceeded. Aircraft battery had been used for fresh water engine flush and was not recharged before attempted start.

S series - Master caution and alternator rectifier lights came on. Caused by failure of generator alternator.

AH-64 Class E mishaps

A series - Intermediate gearbox light came on during shutdown. Temperature sensors were replaced.

A series - During runup of No. 1 engine, as power lever was moved from idle to fly position, aircraft rolled and yawed to right. Tail wheel was dragged 12 feet and aircraft began to roll right. IP and pilot used full left pedal to stop yaw movement and 2 inches of left cyclic to level aircraft. Aircraft had the same problem, to a lesser degree, on the next flight. Cause unknown.

A series - No. 1 engine would not start. Caused by failure of starter.

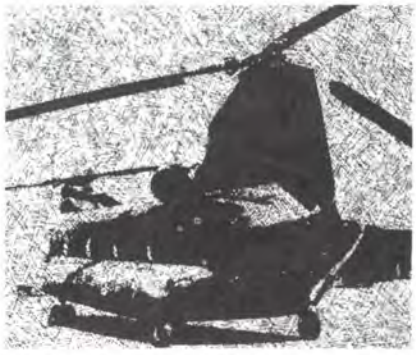
Cargo helicopters

CH-47 Class E mishaps

C series - Four blivets were hooked up for external load training. As load was lifted, flight engineer noticed one of the blivets was leaking fuel. Load was set down. Blivet was leaking from end cap.

C series - Master caution and transmission oil pressure lights came on. Caused by failure of transmission oil pressure transducer.

D series - As aircraft landed in water, ramp hit underwater object. Crew had been told that all hazards had been marked with buoys. LZ controller requested the helicopter land closer to the beach. After telling the LZ controller the aircraft had hit an underwater object, the controller replied, "We knew there were underwater stumps at that



location, but we didn't think you would be landing there."

CH-54 Class E mishap

A series - Second-stage hydraulic gauge indicated 1600 psi. Caused by faulty gauge.

Observation helicopters

OH-58 Class B mishap

B series - Engine failed, and aircraft crashed in deep ravine. Main rotor blades, skid, and chin bubble were damaged. Suspect failure of compressor section. 8642

OH-58 Class C mishap

C series - Tail boom and fuselage were damaged during touchdown autorotation. Pilot did not apply enough collective to cushion touchdown.

OH-58 Class E mishaps

A series - Copilot saw oil on greenhouse during flight. After landing, pilot saw oil covering entire aircraft. Failure of transmission oil pump seal caused oil leak.

C series - Loud bang was heard from engine area and torque fluctuated from 80 percent to 60 percent. Caused by failure of fifth-stage bleed air valve.

C series - N2 and rotor dropped to 80 to 85 percent and low rotor light and audio activated during power recovery from simulated engine failure. IP took control and landed. Oil was found in exhaust collector. Caused by leaking turbine oil bellows seal.

C series - During runup, crew chief noticed right servo bellcrank mount was loose and lifting off the roof. Bolts mounting bellcrank to roof had worked loose but had not worked off.

Fixed wing

U-21 Class E mishap

H series - Copilot saw oil coming from right engine nacelle during flight. Caused by failure to secure oil filler cap during preflight.

C-12 Class E mishap

C series - Gear warning horn sounded during gear retraction. Caused by failure of microswitch in power lever.

Maintenance

UH-1 Class E mishap

H series - Transmission oil hot light came on. Caused by dirty oil cooler fan.

UH-60 Class E mishap

A series - Stabilator failed during hover. No. 1 and No. 2 collective and lateral accelerometers were out of adjustment.

AH-1 Class E mishap

A series - During approach, IP took controls to demonstrate go-around. As power was being applied, IP noticed that collective was extremely stiff. Aircraft was landed. Collective frictions were in the off position.

CH-54 Class E mishap

A series - Crew chief saw oil on right landing gear and on No. 2 engine during shutdown. Engine was 2 quarts low on oil. Packing was pinched, allowing oil to seep past it.

(continued on back page)

Stacom

Standardization Communication

FC 1-216, Task 1060

It is not the purpose of this article to endorse or prohibit the performance of any maneuver but to provide insights to prevent a possible unsafe flight environment from developing.

To maintain pilot proficiency, CH-47 cargo helicopter units have, by SOPs, allowed individual aviators, at their discretion, to practice flight with the stability augmentation system (SAS) released.

Updated equipment for the CH-47D aircraft is now being received by aviation units. The advanced flight control system (AFCS) in this aircraft has been vastly modified and interconnected electromechanically with other components (for example, with the differential airspeed hold (DASH)) of the flight control system.

Units should consider reviewing their individual SOPs with regards to AFCS-OFF flight. Unit instructors should ensure that individual aviators are aware of the AFCS operation and limited aft center-of-gravity limits, especially at high gross weights.

If proper planning is not done and precise aircraft control with respect to rate-of-closure is not maintained, less-experienced aviators could be faced with inadequate control travel to accomplish a safe maneuver. ■

Attention CH-47D operators

Those of you who fly the CH-47D should be prepared for revisions to the -10 operators manual. Several changes are being made to enhance the operation of the CH-47D to allow the aircraft to be airborne faster in a support mode. Our goal is more on-site support time, without a compromise in safety.

Be aware that change 11 to the CH-47D operators manual and change 6 to the checklist contain some minor errors. The intent is to start and accelerate only the first engine to flight (rotor rpm should stabilize at 91 to 94 percent). After starting the second engine, be sure to monitor the second engine's transmission oil temperature to ensure it is at the minimum required before accelerating it to flight mode. ■

CH-47 NVG operations

Those of you flying NVGs, be sure to check that the IR bypass filter is installed prior to NVG flight. AVSCOM has given approval to remove this filter to allow both searchlights to be used for night unaided flight.

Reminder on DA Forms 2028

As always, be sure to check with your unit SIP before sending in your DA Forms 2028: Recommended Changes to Publications and Blank Forms, to avoid conflicts in the manuals. ■

Telephone number changes

Current AUTOVON telephone numbers for Flight Standardization Division, DES, are as follows: Flight Standardization Division Headquarters, 558-3589; Aeroscout/Attack Branch, 558-6066; Utility Branch, 558-2442; and Cargo/Fixed Wing Branch, 558-2442. To make commercial calls, use area code 205 and prefix 255. ■

STACOM 117 13 August 1986

Prepared by the Directorate of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5000, AUTOVON 558-3589 during duty hours, 558-6487 after duty hours. Information published here generally precedes the formal staffing and distribution of Department of the Army official policy. This information is provided to all commanders to enhance aviation operations and training support.

JOHN C. SHAW, JR.
LTC, Aviation
Director, DES

Mishap briefs

OH-58 Class C mishap

D series - Contractor personnel were attempting initial engine start following extensive modification of helicopter from A to D series. The first run was to calibrate the mast torque system. Therefore, main rotor blades were not installed and helicopter was tied down to the ramp. All indications were normal during start until NG reached 30 percent. At that point, tgt rapidly rose to maximum. Engine was shut down. Review of engine history page of computerized engine monitoring system revealed tgt of 1138° C., had been recorded. Protective tape had been left covering engine compressor inlet.

OH-58 Class E mishaps

A series - Transmission oil hot light came on during hover. Transmission cooling duct was full of water which restricted airflow to transmission oil cooler.

C series - When pilot activated NVG enable switch, master caution light came on. Caused by corrosion on wire terminals.

OV-1 Class E mishap

D series - No. 2 engine compressor stalls occurred during flight. Variable inlet guide vanes and bleed bands were readjusted.

C-12 Class E mishap

C series - Fire detection and fire extinguishing systems were inoperative during preflight. Caused by broken wire on A133 relay board.

U-21 Class E mishap

C series - When takeoff power was applied, No. 2 engine ITT started to exceed limits well before takeoff power was reached. Takeoff was aborted. Deteriorated engine bleed air line was leaking.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

SMA safety film available

In a recently released safety training film, Sergeant Major of the Army Glen E. Morrell discusses NCO responsibilities toward safety.

The film, **SMA Morrell Speaks on Safety** (SAVPIN 705887-DA, TVT 20-626), has been released for Armywide distribution. It's available at your local visual information library. ■

Check modified landing lights on UH-1

If the landing light on your Huey was modified for NVG training, check it out before you need it. Make sure the light's IR cannister doesn't contact the fuselage when it's fully extended. If that happens, the motor in the light keeps running until it burns up.

Some landing lights modified by MWO 55-1520-210-30-57 are missing the rivet that keeps the "pink light" cannister from elevating into the bottom of the fuselage when it's fully extended.

When installed properly, the rivet will trip the motor's microswitch *before* the cannister makes contact with the fuselage. ■

—from *PS Magazine*, Aug 86

U.S. ARMY SAFETY CENTER

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20 August 1986

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Report of Army Aircraft Mishaps

Density altitude and you

Why is density altitude important to you? This summer, Army aviation has had two Class A accidents as a direct result of high density altitude, insufficient power available, and inadequate mission planning (performance planning card—PPC). Those accidents cost two aircraft; far worse, they cost three lives. That's why density altitude is important.

Density altitude is affected by three factors.

Altitude. The higher the altitude, the less dense the air.

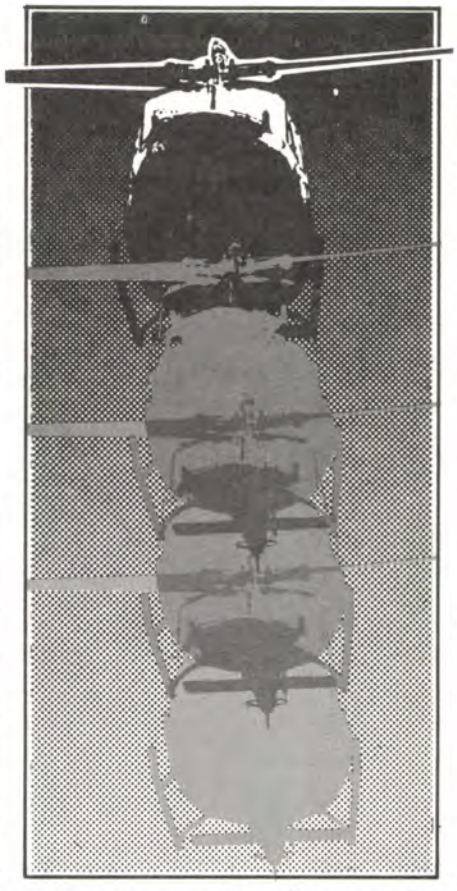
Temperature. As temperature increases, air density decreases.

Humidity. When the temperature of air increases, so does its ability to hold moisture. Since water vapor is a gas, air with high humidity is less dense. Remember, the standard density altitude formula, the dead reckoning computer, and most density altitude charts are based on dry air.

If the air is hot and the relative humidity is high, but those factors are not considered in computing density altitude, that can lead to an error of 1,000 feet or more (an error of 1,000 feet equates to 1 pound of torque or 200 pounds of load). That is extremely important during mission planning because it affects how much weight the aircraft can safely carry. You don't have to be concerned about the accuracy of density altitudes obtained from sources such as Air Force weather stations; they already include the effects of humidity.

Density altitude affects gross weight and aircraft performance

High gross weight is often thought of as a weight somewhere near the published maximum; for example, 9,500 pounds for a UH-1H. That can be misleading in planning aircraft performance since it refers to a structural rather than a performance limitation. The ability of a UH-1H at or below 9,500 pounds to hover depends on the density altitude. A better term for performance planning purposes might be "high mission allowable gross weight" which takes density altitude into account.



Since density enters into the calculation of airfoil lift, it follows that a decrease in density will result in a decrease in lift produced.

There is also a direct effect on engine performance. Less dense air reduces the pressure ratios through an engine, resulting in a loss of power. In a turbine engine, this loss may be as much as 3 to 4 percent.

As density altitude goes up, tail rotor effectiveness goes down. Power trains can be overtorqued and autorotations can become especially critical when pilots attempt otherwise normal maneuvers under high density altitude conditions.

Plan the mission carefully

- Check weight and balance.
- Use performance charts to determine mission allowable gross weight.
- Complete performance planning cards (PPC).
- Repeat above steps for each point of intended landing (or hovering).
- If the result is marginal, reduce the load still further.

Allow a safety margin

During the summer months, when temperatures and humidity are high, high density altitude can make flying extremely hazardous. Avoid scheduling missions during the midmorning to midafternoon hours whenever possible. When missions must be flown during these hours, sound by-the-book planning can give you a power margin. Allow yourself a safety margin by not overloading the aircraft.

(Additional information on density altitude and gross weight validation factor may be found in STACOM, 18 Feb 81 and 21 Sep 83 issues of *Flightfax.*)■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps

H series - Aircraft was conducting helicopter cast operations. Seven successful water insertions had been completed. The pilot picked up the eighth load of soldiers, flew around into position, aligned with the cast lane, and established the prescribed airspeed and altitude. Upon reaching the cast area, the pilot saw the safety boat officer give a prearranged abort signal. The pilot announced on the intercom to the drop master that it was a wave off and "no go." The pilot repeated the information twice and the copilot made the same announcement once. The pilot then accelerated the aircraft into translational lift and prepared to go around for another attempt. Feeling the aircraft begin to react to abrupt lateral center of gravity changes similar to those of exiting troops, the pilot turned around to find the drop master dropping his troops. Seven soldiers jumped before the pilot or crew chief could react. Six soldiers required hospital care; the seventh soldier drowned. 8644

H series - During flight at 500 to 1,000 feet agl, aircraft's transmission chip detector light came on, followed by a grinding noise. Crew began precautionary landing. The transmission began to seize and the rotor blades were barely turning when aircraft hit the ground in a level attitude. 8645

UH-1 Class D mishap

V series - During search and rescue operations, crew spotted victim's vehicle in a valley and began a high reconnaissance of the area. Pilot saw electrical wire pole on east ridge of valley, but saw no pole on opposite ridge or valley floor. Copilot made 180-degree left turn and set up approach. At about 400 feet agl, pilot looked inside aircraft to perform prelanding check. Aircraft was in decelerated attitude when crew felt a jerk and heard an unusual noise. As copilot pulled in power to stop descent, crew saw wire passing under chin bubble. Wire had struck nose compartment, cracking right chin bubble, before sliding under nose and being cut by lower wire cutter. Wires were stretched across valley with support poles about one-half mile apart. Sun glare helped conceal wires against valley floor.

UH-1 Class E mishaps

H series - Engine oil pressure dropped to zero and master caution and engine oil pressure lights came on as aircraft hovered. Caused by failure of oil line.

H series - Hydraulic pressure caution light came on during flight. Line had ruptured, causing hydraulic system to fail.

H series - Large bird hit aircraft during downwind landing, leaving remains on nose battery compartment, searchlight, and WSPS, but causing no damage.

H series - Engine chip detector light came on in flight. Aircraft has had five instances of chip lights in last 2 1/2 months, but oil samples show no engine deterioration. Engine was removed.

H series - Aircraft had mild compressor stall while conducting TEAC. After variable inlet guide vanes were adjusted, aircraft was released.

M series - Aircraft was being test

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	July	**4**	**3**
	August	2	1	1-20 Aug	**3**	**1**
	September	3	2			
	Total for Year	45	31	Total to Date	**30**	**25**

flown at 1,000 feet agl after swashplate replacement when master caution and No. 1 hydraulic segment lights came on. Pedal pressure verified hydraulic failure. About 200 feet before touchdown, hydraulic assist returned and caution lights went out. Aircraft yawed due to pressure applied with hydraulic off, then No. 1 system again failed. Hydraulic pump was noisy and fluid was seen leaking from bottom of aircraft. Elbow tube cracked in thread area, allowing hydraulic fluid to leak.

UH-60 Class E mishaps

A series - Stabilator failed while aircraft was in level flight at 143 KIAS. After slowing to 67 KIAS, auto control reset button was pushed. Stabilator programmed down to 30 degrees with no accompanying audio warning horn. Copilot depressed auto control again and stabilator went up to zero, then as airspeed increased stabilator programmed down. When acceleration was stopped, programming stopped. Airspeed was reduced to 65 KIAS, then an attempt to accelerate caused the sequence to repeat. On a third attempt to increase airspeed above 75 knots, stabilator performed correctly. Caused by failure of upper actuator. Both actuators were replaced.

A series - Stabilator failed during takeoff. Auto reset was successful, but then stabilator failed a second time at 30 and 40 KIAS. Another aircraft's stabilator failed 3 minutes before takeoff and wouldn't reset electrically or manually.

A series - Stabilator failure audio warning came on in flight at 145 KIAS, accompanied by strong smell of burning electrical insulation. Caused by electrical short circuit in stabilator control panel.

A series - Aircraft yawed both left and right during approach. No. 1 engine was overspeeding as aircraft touched down. Caused by malfunction of ECU.

A series - Crew heard loud noise and felt vertical vibration during climbout. Caused by defective anti-flap stop.

A series - During takeoff, aircraft had pronounced vertical vibration. Anti-flap stop had failed to retract as rotor rpm increased. Bushing in support assembly migrated laterally, causing flap assembly to bind. Anti-flap and striker plate were replaced.

A series - Anti-flap on main rotor blade stuck and cracked. Caused by extended operations in desert environment.

A series - During training flight, AFCS and boost were turned off. While aircraft was on downwind, boost came back on and crew briefly smelled smoke. Caused by electrical short circuit in SAS shutoff valve on pilot assist module.

A series - Aircraft was at remote refueling point. Crew chief hooked up CCR nozzle, and grounding wire to aircraft fueling system broke. Pilot elected to leave refueling point. CCR nozzle and ground wire were still attached to aircraft. Aircraft dragged fuel hose about 200 feet, destroying hose, CCR nozzle, and 100 GPM fuel filter. Pilot and crew chief failed to follow proper refueling procedures.

Attack helicopters

AH-1 Class B mishap

S series - Engine failed at 1,500 feet agl during training mission. Autorotation was probably not successful due to high density altitude. Skids were ripped off and turret was damaged. 8646

AH-1 Class D mishaps

F series - Damage to leading edge rubber boot on both main rotor blades was found during postflight inspection. There had been no vibration or indication of blade problem during flight and crew couldn't determine if damage was from flying debris or strike.

F series - Pilot misjudged rotor blade clearance while maneuvering around tree line during NOE hover. One blade hit tree, causing damage to filler and rubber boot on leading edge of blade.

AH-1 Class E mishap

S series - Alternator failed during flight. Replaced by maintenance.

AH-64 Class E mishaps

A series - Aircraft made uncommanded yaw to left during runup. Controls were neutral and collective full down. Same problem had occurred twice in this aircraft 3 days previously. Maintenance couldn't duplicate problem during test flight at that time, but DASE computer was replaced. Following third occurrence, heading attitude reference set was replaced.

A series - Knocking was heard and felt in cyclic and floor of pilot's station during ground taxi. During coastdown, loud knocks were heard. Couldn't be duplicated during MOC test flight.

A series - Aircraft was performing gunnery tasks at 84-foot OGE hover. Temperature light on tail rotor gearbox came on. When maintenance couldn't duplicate, tail rotor gearbox was replaced.

A series - While aircraft was at hover, IP from another aircraft informed crew the tailwheel strut looked as if it had partially collapsed. Crew had performed roll-on landings, but had noticed no hard landings. Tailwheel shock strut was replaced.

A series - During recovery from simulated single engine failure at OGE hover, utility hydraulic psi and oil low caution lights came on. Utility hydraulic pressure dropped to zero. Caused by failure of hydraulic line.

Cargo helicopters

CH-47 Class D mishaps

D series - Crew was attempting to land on mountain LZ which sloped to the rear. Crew chiefs were positioned at cabin door and cargo ramp. As aircraft descended, aft wheels touched ground and forward gear was only inches off when crew chief at cabin door told pilot to pick back up because aircraft was getting too close to some rocks under aircraft's nose. As aircraft lifted off, it rotated slightly around the pitch axis. The motion drove the VOR antenna into the ground, pushing its mount back up into aircraft slightly, causing more than $2,800 damage to antenna and sheet metal. Crew failed to anticipate pitching motion of aircraft, which could have been caused by wind gust or reprogramming of longitudinal cyclic speed trims.

D series - Hole in ramp's outer skin was found during postflight inspection. Apparently caused by ramp being lowered on a rock during PZ and LZ landings. Insufficient crew coordination may have been a factor.

D series - Aircraft was hovering over mountain site while lowering five 5-gallon water cans. Cans were dropped when winch cable broke. Cable guide assembly was damaged.

CH-47 Class E mishaps

C series - No. 1 engine started to overspeed during flight. Rotor rpm went to 255 and torque to 81 percent for about 5 seconds. Caused by failure of N2 actuator.

C series - During rapid refueling at ground idle and APU on line, pilots noticed high-pitched winding-down sound. As pilot checked instruments, both generators, rectifiers, and No. 2 hydraulic pressure segment lights were beginning to illuminate. Internal failure of AGB motor pump caused binding in direction of rotation.

C series - During flight, master caution, No. 1 hydraulics-off and No. 1 SAS-off lights came on. No. 1 hydraulic pressure gauge dropped to zero. Caused by failure of No. 1 hydraulic pump.

D series - Aircraft was in flight at 85 KIAS when IP noticed that forward longitudinal cyclic trim actuator wasn't programming. Caused by defective automatic flight control system computer. Ambient temperatures had exceeded 90° F., for 2 hours before and during flight. Maintenance experience indicates a number of such malfunctions have occurred during hot climatic conditions.

Observation helicopters

OH-58 Class D mishap

C series - No abnormal control or flight indications were noted during NOE training flight but during postflight inspection, crew found TOW missile wire had wrapped around swashplate, causing gouges. Swashplate was replaced.

OH-58 Class E mishap

A series - During flight, pilot noticed torque gauge was fluctuating and engine oil pressure was steadily decreasing. Caused by failure of engine oil pump.

Fixed wing

SD3-30 Class E mishap

Crew was unable to activate starter on right engine. Failure of generator control panel prevented electrical power from reaching starter.

U-8 Class E mishap

F series - During climbout, two birds were seen passing close to nose section, streaking below No. 2 engine. Crew felt no impact, but they found bird remains in No. 2 engine air filter during postflight inspection.

Maintenance

UH-1 Class E mishap

H series - Aircraft was in flight about

Mishap briefs

1,000 feet agl when copilot noticed transmission oil pressure fluctuating from zero to 100 psi. Caused by improper grounding between coupling and gauge.

UH-60 Class E mishaps

A series - Stabilator failed in flight. Stabilator bias and accelerometer setting were out of adjustment.

A series - Stabilator failed in flight. After auto reset, stabilator again failed about 5 minutes later. Lateral accelerometers were out of adjustment.

A series - Stabilator failed on takeoff. Bias actuator was out of adjustment.

A series - PIC felt severe high-frequency vibration during takeoff. Forward vibration absorber wasn't properly adjusted, causing elongation of bracket mounting points.

A series - Transmission fluid was seen leaking from aircraft. Valve hadn't been properly tightened when installed by unit.

AH-1 Class E mishap

F series - Pilot felt stiffness in cyclic fore and aft axis during OGE hover. Stiffness increased when ECU was turned off. Clamp under copilot's cyclic was rubbing and catching on wire bundle coming from cannon plug to gun control unit.

CH-47 Class E mishaps

C series - Aircraft was at hover, preparing to hook up slingload when No. 1 engine went to maximum power because of a high-side beep failure. Pilot increased thrust while copilot regained control with engine condition lever. During initial installation, electrician allowed excessive solder to form on connection. Engine beep control switch shorted out across the terminal and commanded full power. This is the fourth report of this same thing happening.

C series - Master caution and transmission oil pressure segment lights came on during taxi. No. 1 engine transmission pressure was fluctuating and had dropped to 20 psi. During installation, mechanic allowed seal to be crimped, causing leak.

C series - After landing on glacier to drop off troops, aircraft's No. 1 engine shut down. IP attempted restart, but N1 never rose above 40 percent. Crew chief saw fuel leaking from engine. Caused by chafing of engine fuel line.

OH-58 Class E mishap

A series - During flight, pilot noticed high amp meter indication. When battery switch was turned off, amp meter dropped to zero. Voltage regulator was improperly adjusted.

C-12 Class E mishap

C series - During cruise flight, aircraft yawed right as No. 2 engine torque dropped 15 percent. P3 air filter was partially clogged, causing loss of power.

OV-1 Class E mishaps

D series - During level-off at 14,000 feet msl, crew heard series of loud pops and felt aircraft shake. No. 1 engine egt climbed to 680 degrees for about 3 seconds. Situation returned to normal when power was reduced, but when pilot attempted to return power to cruise, egt began to climb out of normal range. Variable inlet guide vane actuator lever was loose and out of rig.

D series - Aircraft shuddered and crew heard loud grinding noise while taxiing. Caused by combination of sticking brake linings, low nose tire air pressure, and air in hydraulic lines.

U-21 Class E mishap

C series - While starting engines with GPU, No. 1 engine started with no problem. When No. 2 engine was started, No. 1 engine N1 dropped to 45 percent and ITT rose to 750° C., and continued to climb. Aircraft battery was discharged beyond minimum amperage needed for engine start.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time inspection of manual release cable to forward hook on CH-47C and CH-47D helicopters (CH-47-86-07, 041400Z Aug 86). Summary: QDR identified that an emergency manual release cable for the forward hook had been found crushed and inoperable. Manual release of either forward or aft hook could not have been accomplished. The failed cable had been improperly mounted, placing it directly under an "I" section of the floor. When the floor was heavily loaded, it displaced down onto the cable, crushing it. Purpose of this message is to require an inspection of the forward hook manual release cable to ensure clearance with the floor "I" sections. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection and replacement of PN AGE121-1 and PN AGE121-1A, A-C deice generators on OV-1 and RV-1 series aircraft (OV-1-86-03, 051700Z Aug 86). Summary: A number of EIRs have been received citing seizure or disintegration of the deice generators. Previous failures of this type were traced to faulty bearings and/or wear of the grease seals, allowing grease to be lost from the bearing, and leading to eventual bearing failure. As a result of these failures, a spacer was added to the armature shaft during overhaul at Corpus Christi Army Depot and new procurement at Leland Electrosystems, Inc. This message directs a one-time inspection to identify serial numbers and replace those generators which do not fall within the criteria of paragraph 9. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

What's your training worth?

What is the value of training? Do you often find yourself asking that question? Generally speaking, we all accept the fact that to be effective in combat we need weapons training. And you can't argue too much about the need for training on equipment like protective masks. But what about other kinds of training, the kind some of us think of as less than necessary?

For instance, how about training in how to use a fire extinguisher? Admittedly, it's a little hard to get excited about that kind of training and that brings up more questions. Is this kind of training being done, and if it is, is it really worthwhile? We'll let you be the judge.

Let's look at an accident where the pilot attributed his observer's survival to a simple class the pilot had attended on how to use a fire extinguisher. In a word, *training*.

On 14 May 1985, the OH-58 helicopter this pilot was flying had an engine failure. He made an autorotation to the only available landing area, which was covered with trees. The aircraft was a total loss as a result of the landing and the observer was knocked unconscious and pinned inside the wreckage. While the pilot was attempting to get the observer out, a fire broke out, and because the pilot had been trained on the proper way to use the aircraft's fire extinguisher, he was able to extinguish the fire. He then freed the observer. But let's take a look to see what kind of training was responsible for the outcome of what could have easily been a tragedy.

The pilot of this OH-58 had attended a 2-week Aviation Mishap Prevention Orientation Course at the Eastern Army National Guard Aviation Training Site in Annville, Pennsylvania, about a month before this accident happened. A class on fire prevention was included in the course. This fire prevention class was taught by SFC Andrew J. Ulichny, Jr. who was eminently qualified to teach fire prevention, and also happens to be Annville's fire chief.

SFC Ulichny supplemented the class with a 45-minute hands-on demonstration on how to use the Halon 1301 aircraft fire extinguisher, the Halon 1211 extinguisher, and also carbon dioxide, dry chemical, water, and foam extinguishment agents. The aviator learned more in the 2 hours about fire extinguishers and how to use them than most of us learn in a lifetime. The 2 hours he invested in that training became an investment of time that paid the most important dividend—it saved a life.

Many of us still consider this instruction insignificant until we reread the first few words from the pilot's letter of appreciation to SFC Ulichny. It said, "Dear Chief: I'm going to start this letter off with an apology. I'm really sorry I forgot your name but, believe me, I'm glad I didn't forget your class!"

Our hats are off to professionals like SFC Ulichny. How much is training worth? Ask the pilot and observer on that OH-58—it's worth your life. ■

—CW3 R.J. Rendzio, Investigation Division, AUTOVON 558-3262

U.S. ARMY SAFETY CENTER

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Volume 14 □ Number 46

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Report of Army Aircraft Mishaps

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 23 Oct 85 issue (8601) □ While on a maintenance test flight and performing an engine performance check, the pilot experienced loss of engine power. Pilot entered autorotation but due to aircraft's altitude and low rotor rpm, the UH-1 was damaged during touchdown. Aircraft was climbing to hover altitude of 40 feet when engine failed because improper procedures were used during installation of a fuel line and fuel quick disconnect. The fuel line twisted over itself, severely kinking the line. The fuel quick disconnect had been turned the wrong way. Then, when maximum rpm was demanded, increased fuel flow collapsed the fuel line and the quick disconnect parted because the retention ring was no longer functional. The aircraft had not received an adequate maintenance inspection. The unit had not followed minimum crew requirements contained in AR 95-1 and the result was there were two people on the aircraft in addition to the crew. One passenger and the crew chief were seriously injured. The other passenger and the pilot received minor injuries.

UH-60 Class A mishap in 8 Jan 86 issue (8610) □ Aircraft had been involved in NVG training when the pilot was asked to assist in locating a downed aircraft. The UH-60 located the aircraft and led a medevac aircraft to the site. The UH-60 pilot then refused a request to transport MPs to the site because his aircraft was not equipped for the mission, however, the pilot agreed to lead a CH-47 to the site. Landing next to the downed aircraft, he made sure he was no longer needed then began a return flight to the airfield. While en route, the pilot received a request to relay a message to the CH-47. Unable to make radio contact, the pilot decided to return to the site and contact the CH-47 from the air. From about 2,000 feet agl, he still was unable to make radio contact. The pilot descended in a circular pattern to 300 feet agl and began flying up a valley at 10 to 20 knots. He saw a wire strand on his right windshield and pulled collective pitch to try to avoid the wires, but it was too late. The main rotor blades were shredded when they hit several strands of wire. The aircraft fell vertically 224 feet, hit a dead tree, and came to rest near a small stream. The aircraft was destroyed, one crewmember was killed, and three others were injured. The pilot made an improper decision to descend below the known 400-feet agl wire hazards height. The crew had violated the unit's crew endurance SOP, NVG SOP, and Army directives on aircrew mission briefing, briefback, and debrief by continuing to fly missions once the downed aircraft had been located and medevac was on site. Failure to use available restraint systems contributed to the fatality and serious injury of another crewmember.

Attack helicopters

AH-1 Class B mishap in 29 Jan 86 issue (8614)□Downgraded to Class C. The mission was a maintenance operational check to ascertain that the N2 system mechanical rigging was properly adjusted. With the engine operating at 104 percent, the pilot noticed the N2 tachometer rise to 106 percent and the rotor tachometer rise to 109 percent and he shut down the aircraft. Inspection revealed that both main rotor blades and one tail rotor blade were damaged. The pilot failed to notice that the aircraft was on red X status pending inspection and not ready for an MOC. During the mishap, the pilot failed to follow procedures when he maintained N2 rpm at 104 percent. The operators manual states maximum operating rpm is 100 percent. The crew chief also failed to follow procedures by performing adjustments to the N2 system while the engine was operating at full rpm. He elected to make the adjustments although the runup was for an MOC only. Throughout the incident, he did not use a headset or flight helmet and there was inadequate communication between the crew chief and the pilot and the crew chief and ground personnel. The crew chief failed to inform the pilot that he was performing adjustments to the N2 system. Later, he failed to properly convey to the other ground support person that he wanted him to monitor the linear actuator, not adjust it. This person misinterpreted the crew chief's instructions and instead of monitoring the linear actuator, he disconnected it and made an improper adjustment to the rod end bearing.

Cargo helicopters

CH-47 Class B mishap in 8 Jan 86 issue (8611) □ Downgraded to Class C. While on NVG training flight at 200 feet agl, pilots saw low wires which appeared to correspond to location of plotted wires on map; however, plot was wrong. Crewmember in rear of aircraft, who was not wearing NVG, saw another set of wires which were the ones they were looking for. He alerted the pilot and the IP made an evasive maneuver, but one forward rotor blade hit a ½-inch cable. Damage was

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

H series - UH-60 was hovering at airfield. A UH-1 on short final for landing landed on top of UH-60. Pilots of both aircraft were using night vision goggles. Tower was in operation. 8647

UH-1 Class D mishap

V series - As aircraft completed low pass over LZ, main rotor blade struck tree on right side of aircraft. Blade was damaged.

UH-1 Class E mishaps

H series - Crew chief noticed loose tail rotor drive shaft cover during hover. Pilot had partially secured tail rotor cover during preflight. Crew chief did not secure cover as directed. Pilot did not check that cover was secure.

H series - Crew heard intermittent squealing noise in transmission area after takeoff. Five minutes later, hydraulic pressure light came on and slight feedback was felt in controls. Caused by failure of hydraulic pump. Fluid was pumped overboard through case drain.

UH-60 Class D mishaps

A series - Pilot landed to what he thought was level terrain. Tail wheel went into ditch, and stabilator hit side of ditch. Stabilator skin was torn. Dust and sun hindered pilot's visibility.

A series - Tail wheel struck berm during takeoff. Shock strut assembly was broken. Blowing dust reduced visibility.

A series - During shutdown, crew chief noticed rear window of left rear cargo door was missing. Inspection of cargo door indicated left emergency release handle had been activated. Suspect passenger sitting in left rear portion of cabin pulled on jettison handle thinking it was door handle.

UH-60 Class E mishaps

A series - Stabilator failed during takeoff. Acceleration was stopped and automatic mode was reengaged. Flight was continued and stabilator failed again. Emergency procedure was followed and stabilator would not reengage. Aircraft was landed without further incident.

A series - Crew felt unusual rotor vibration during hover. Bushing on antiflap slipped, causing antiflap to seize in place.

Attack helicopters

AH-1 Class E mishaps

E series - Transmission oil hot light and master caution light came on. Transmission oil temperature gauge read 110° C. Aircraft was landed, and oil cooler fan assembly was cleaned.

S series - Electrical sparks were seen coming from area near copilot/gunner's right tail rotor control pedal. Frayed wire in electrical wire bundle had contacted tail rotor pedal.

S series - During shutdown, copilot saw hydraulic fluid draining out of aircraft. Hydraulic line to No. 2 hydraulic pump was ruptured.

AH-64 Class D mishap

A series - Pilot was firing 30mm gun during 30-foot agl out-of-ground-effect hover. Pilot was told by wingman that his left forward avionics bay door had popped open. Aircraft was landed immediately. Inspection revealed damage to avionics bay door which was caused by articulation of 30mm gun. Latches on avionics bay door failed to hold door closed securely during firing of gun.

AH-64 Class E mishaps

A series - APU fire warning handle illuminated during takeoff. APU was not running nor had it been started during refueling operation. Caused by malfunction of flame detector.

A series - High frequency vibration was felt in tail rotor pedals during hover. Caused by failure of hanger bearing.

Cargo helicopters

CH-47 Class E mishaps

D series - When No. 1 engine control lever was placed in ground position, engine stabilized at 55 percent and power turbine inlet temperature was noted at 350° C. and slowly decreasing. Caused by faulty N1 actuator.

C series - No. 2 engine oil pressure decreased to zero during hover. Caused by faulty transducer.

C series - Power turbine inlet temperature was seen climbing through 1020° C. and N1 decreasing below 30 percent during simulated engine failure. Caused by failure of engine fuel control.

C series - Copilot's No. 1 and No. 2 normal engine trim would not increase rpm during runup. Caused by failure of engine trim switch.

Observation helicopters

OH-58 Class D mishaps

C series - During NOE training flight, IP misjudged clearance of rotor system to treeline and main rotor blades hit top of tree. Main rotor blade tip was damaged.

C series - Postflight inspection revealed damage to fuselage and left passenger door. Caused by unsecured

passenger seatbelt.

A series - TOT increased to 960° C. during start. Start fuel section of fuel nozzle was blocked. Suspect use of Jet A fuel contributed to blockage.

OH-58 Class E mishaps

C series - Engine oil bypass light came on after aircraft landed. Large quantity of oil was on engine deck and aft fuselage. Oil cap had been left unsecured.

C series - Aircraft encountered spike knock during landing from low-level, low-airspeed autorotation. Pilot held aircraft off too long. IP failed to react in time to prevent spike knock.

Fixed wing

U-8 Class D mishap

F series - Nose wheel tire blew out during landing.

C-12 Class E mishaps

C series - When flaps were set to full down during final approach, indicator stopped at 85 percent. When flaps were placed in up position after landing, flaps went to up position but indicator stayed at 85 percent. Caused by broken shaft on flap position indicator transmitter.

C series - Right engine torque fluctuated plus or minus 2 psi, and oil pressure indicated 50 psi plus or minus 5 during flight. Caused by ruptured fuel heater line, which caused loss of engine oil.

OV-1 Class E mishap

D series - Nose gear indicator showed nose wheel was not up. Another aircraft crew confirmed gear was neither up nor down. Emergency gear-down system was used to lower gear for landing. Caused by faulty nose gear actuating cylinder.

U-21 Class E mishap

A series - Aircraft had been in flight for about 10 minutes when it entered light turbulence. Right nacelle fuel cap began siphoning fuel. Landing was made to nearest airport. Suspect one retaining lug was misaligned when fuel cap was inserted. Cap securing tab was forced down, causing cap to appear properly installed.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	July	**5**	**3**
	August	2	1	1-27 Aug	**3**	**1**
	September	3	2			
	Total for Year	45	31	Total to Date	**31**	**25**

Maintenance

UH-1 Class E mishaps

H series - Hydraulic pressure light came on, followed by master caution light. Incorrect clamps installed on right cyclic servo pressure lines caused chafing and failure of line.

H series - Igniters would not start engine and no egt was indicated on gauge. Caused by incorrect installation of wire splice on ignition interlock switch.

UH-60 Class E mishap

A series - Stabilator failed during flight. Amplifier was out of adjustment.

AH-64 Class E mishap

A series - Collective became very stiff during takeoff. Collective friction was adjusted incorrectly.

OH-58 Class E mishap

A series - Rpm low audio activated and TOT fluctuated during flight. Tension spring was adjusted incorrectly on throttle/fuel control.

C-12 Class E mishaps

C series - Pilot noticed rapid rise of tgt to 850° C. during flight. Wire terminals rubbing together caused false reading.

D series - When gear handle was placed in up position during takeoff, gear handle lights did not go out. Gear was visually checked and recycled. Left gear and nose gear retracted but right gear remained three-fourths down. Gear was extended using hand pump. Gear up-lock switch was out of adjustment.

U-21 Class E mishap

F series - Left bleed air light came on during climbout. Bleed air line had dry rotted.

Safety messages

- Maintenance information message concerning AH-1/TH-1 series aircraft composite main rotor blade (K747) update (MIM-AH-1-86-ME-05, 122300Z Aug 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Followups

limited to one main rotor blade and right lower windscreen. Aircraft landed with power. A reconnaissance of the route had not been made and the map the pilots were using had not been compared with the unit wire hazard map. The AN/PVS-5 NVG they were using have limited capability and in low-light conditions flight altitudes of about 400 feet agl or less are required in order to navigate accurately. Sufficient ambient light existed, however, so that a high altitude could have been used.

Observation helicopters

OH-58 Class A mishap in 27 Nov 85 issue (8605) □ While in flight to refuel, the pilots of an OH-58C aircraft failed to see a second OH-58C approaching from their left rear. The OH-58s collided in midair, control of both aircraft was lost, and both aircraft crashed. One crewmember was killed and the three others were injured. The pilots of the overtaking OH-58 had transferred aircraft control just prior to the mishap and the PIC was concentrating on map orientations. The copilot was focusing his attention on tasks inside the cockpit. He would have had to be looking through the right windscreen to see the aircraft they were merging into. The pilots of an AH-1, flying behind the first OH-58, saw the approaching OH-58 but didn't think the aircraft were going to collide. Maintaining radio silence had been emphasized and the relatively inexperienced aviators decided not to break radio silence to warn the lead OH-58 of the other OH-58 approaching from their left rear.

Fixed wing

U-21 Class B mishap in 27 Nov 85 issue (8606) □ Shortly after touchdown on runway, aircraft tilted left and left propeller struck the ground. It then tilted right and the right propeller struck the runway. The aircraft leveled as both main landing gears collapsed, then slid down the runway about 250 feet before stopping. No one was injured. Both main landing actuators and their mounting brackets failed due to overstress. This type of failure can result if the weight of the aircraft is placed on the landing gear without the gear being completely extended and locked. The nose gear, also, was not fully extended and locked. The pilot had only 1 1/2 hours of flight time in the aircraft before making this flight and had made only two landings in the U-21. The IP made a wrong decision when he allowed the pilot to attempt a coupled approach to minimal weather conditions and a landing without any previous demonstration and practice. In addition, the IP failed to ensure the aircraft landing gear was fully extended and locked before the landing was attempted. ■

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Report of Army Aircraft Mishaps

It had happened before

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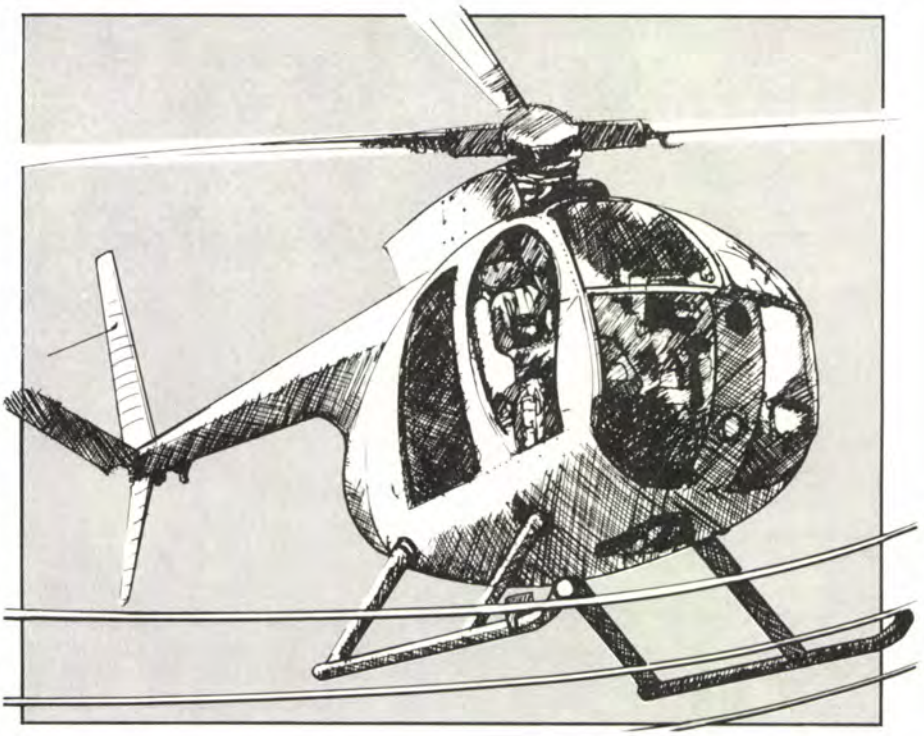
An Army OH-58 was seen flying at low altitude over a river. Suddenly, the aircraft struck a set of highline wires over the river and crashed. The crew was flying at an unauthorized altitude along a route that hadn't been safety checked. One person was killed in the accident.

Another Army aircraft, this time an OH-6, was on an authorized low-level training flight over a river when it, too, hit highline wires. Although the pilot was able to maintain some control until the wire broke, the aircraft went down in the river. A safety reconnaissance of the flight route had been made, but the reconnaissance flight crew failed to detect the wires so they weren't plotted on the hazard map. Fortunately, no one was killed or seriously injured in this accident.

The ironic thing about these accidents is that, although they took place 12 years apart, they happened in exactly the same place. This set of highline wires still was not marked on hazard maps.



Mission requirements and unit environment

The pilots of the OH-6 are part of a unit which is required to operate at low altitudes, both day and night, in a hazardous environment. Aviators who routinely are exposed to nap-of-the-earth or contour flying sometimes become somewhat acclimated to the flight hazards encountered at these altitudes. An aviator who feels comfortable flying at low levels may develop a false sense of security which can lead to a lack of urgency and intensity of concentration that was true of this aircrew.

A unit trainer was tasked with performing the safety reconnaissance of the flight route. The word reconnaissance means "...An exploratory or preliminary survey, inspection, or examination to gain information...." Unfortunately, in this case, the information gained wasn't accurate. The crew failed to detect the set of highline wires crossing the river, and this lack of information contributed to the accident.

The flight route was initially saftied, then was changed because one leg of the flight wasn't suitable. This portion of the route was saftied 2 days before the accident. The route was flown backward at an altitude of 100 feet, at an airspeed of 80 knots.

Aircraft in this unit were not equipped with wire cutter devices although a modification work order had been available for more than a year. The delay was attributed to engineering and installation problems. That's not to say that had a wire cutter been installed the accident wouldn't have happened; however, aircraft flying the type of low-level missions assigned to this unit certainly should have had wire cutters installed.

History of flight

For training purposes, the flight was scheduled so that part of it would fall within hours of darkness. After detailed mission briefings and brief back, the flight took off around 1600. The OH-6

(continued on next page)

It had happened before

which would be involved in the accident was in lead position. In addition to the two-man crew, another pilot who had been recently assigned to the unit was on board.

After climbing to an altitude of 250 to 300 feet agl, the lead aircraft turned onto the route of flight and began making the checkpoints exactly as planned. After reaching the checkpoint where the contour phase of the flight would begin, the aircraft descended to 50 feet agl and began flying at 50 KIAS. The PIC took the controls from the copilot and told the second aircraft to go to tactical trail. The copilot took the map and began navigating.

The position of the sun on the windscreen made it necessary for the PIC to lean back in the seat to keep the sun out of his eyes. He also had his dark visor down.

The PIC felt the aircraft hit something. His peripheral vision told him a wire was hooked on the aircraft. It extended in a westerly direction and was drawing tight. He began immediate deceleration, probably as a reaction to the change in attitude or pitch caused by the wire. He was able to maintain control of the aircraft up to the point where the wire broke. Then, he began feeling moderate to severe vibrations through the controls and thought the aircraft might be coming apart. His main concern was to get it on the ground as soon as he could.

Just before touchdown, at about 5 knots, the PIC applied aft cyclic to minimize ground run. The throttle was reduced to flight idle. The aircraft yawed left and the tail rotor and aft portion of the skids hit the river bed. After the first impact, the aircraft rolled forward, breaking the right front skid off at the connecting point. Then the rotor blades struck the tailboom and the ground, severing the tailboom from the fuselage. The aircraft rotated about 160 degrees and came to rest on its left side.

The river at that point was about 2 feet deep and the PIC and passenger were under the water. Then they surfaced and the passenger helped the copilot free his left foot, which was caught between the pedals. The copilot and passenger climbed out through the right-side doors,which were now at the top of the aircraft. The PIC got out through the windscreen opening. They used hand signals to tell the other aircraft that they were all right. A civilian medical evacuation helicopter picked up the crew and took them to a hospital, where they were examined and released.

In this accident, conversation in the cockpit probably detracted from, rather than enhanced, performance of the aircrew. In missions requiring low-level contour flying, where so many hazards might be encountered, constant, intense attention and crew coordination are required. Inadequate coordination and division of attention were contributing factors in the mishap.

While weather and environmental conditions during this flight were good, the position of the sun in relation to the direction of flight is believed to be a contributing factor in the pilot's failure to detect the wires. The fact that the pilot had to lean back in his seat because of the position of the sun bears out that the sun was causing him difficulty in seeing. (The previous accident involving these wires had occurred at about the same time of the year and was also in the afternoon.)

Responsibility for this accident has to be shared by the aviators, the reconnaissance team, and supervisory personnel. There are several "shoulds" that either directly contributed to what happened or were present but not contributing factors.

- The crew should have had a sense of urgency and intensity about the mission that would have ensured better coordination between crewmembers and better division of attention during all phases of contour and low-level flight.

- The hazard map should have been accurate with the wires clearly marked. It should have included narrative as well as pictures and overlays. Adequate flight time, personnel, and resources should be set aside to get this task done. The safety reconnaissance should be considered a top priority mission in itself.

- The entire process of the training plan and flight safety reconnaissance should have been properly supervised throughout. A final check should have been performed by personnel not involved in the initial plan.

- The position of the sun in relation to the direction of flight at the time of the mishap should have been considered. Personnel should be briefed about impairment of visibility when flying at low level into the sun and training missions should be planned to avoid low-level flights when the sun is in a position to reduce visibility.

- Personnel not essential to the conduct of the mission shouldn't be on board aircraft which are involved in checkrides, practice of emergency procedures, or flights in which there is high risk.

- Wire cutter devices should have been installed on the unit's aircraft. Until they are, altitude restrictions should be imposed to preclude more wire strikes.

- Higher-level headquarters should ensure that the wire cutter devices are procured and installed. Until that is done, mission training should be conducted at altitudes where wire hazards are not prevalent.

- Immediate action should be taken to mark the highline wires at the mishap site to prevent future accidents. Once wires have been marked, a flight check should be made of the mishap site from every angle, direction, and altitude to ensure that markers are visible and will do the job for which they are intended. These wires should have been marked after the accident twelve years ago.

It's a lot easier to say what *should* be done than it is to do it. But accidents *shouldn't* happen either. To make sure they don't, we'll just have to take care of the shoulds. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

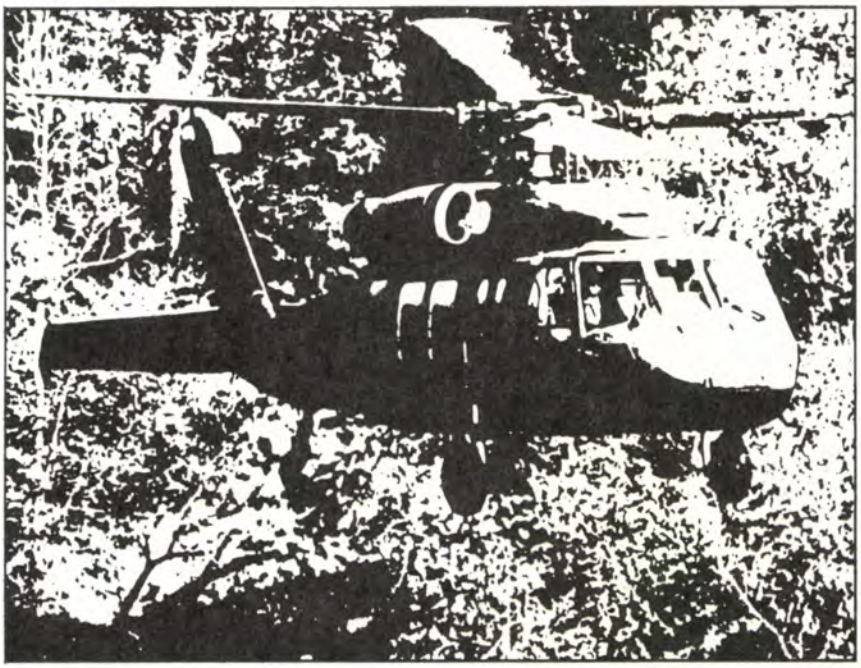
Utility helicopters

UH-1 Class E mishaps

H series - During slingload training, cargo hook released load of two fuel blivets. Aircraft was about 500 feet agl, cargo release switch was off, and load was stable. Caused by improperly attached cargo hook. Manual release cable was too tight.

H series - Pilot's attitude indicator failed in flight. Caused by failure of gyroscope.

H series - Master caution light came on three times during landing. Caused by failure of master caution panel fault function indicator.



UH-60 Class D mishap

A series - As aircraft landed, soldier pulled window jettison handle when he tried to open door. Window struck stabilator.

UH-60 Class E mishaps

A series - Stabilator failed during flight, was reset, appeared to function normally, then failed again.

A series - Stabilator horn and light came on during ground operations. After resetting and about an hour's flight, horn and light came on again. Bias was adjusted.

A series - Stabilator auto control mode failed on takeoff and again during flight. Suspect actuators were out of tolerance.

A series - Stabilator failed on takeoff and again two hours later. Potentiometers needed adjusting.

A series - Stabilator failed, was reset, and failed again 30 minutes later. Changed stabilator amplifiers.

A series - Stabilator failed, was reset and immediately failed again. Replaced actuator.

A series - Stabilator failed twice during flight.

A series - Copilot felt vertical vibration during hover. Pilot also felt rotor-bumping feedback. Caused by bonding separation of main rotor blade antiflap bushing.

A series - During NOE flight, No. 2 engine torque dropped to 35 percent with 93 percent rotor droop. Caused by failure of electrical control unit.

Attack helicopters

AH-1 Class D mishap

S series - Damage to tail rotor, synchronized elevator and tail fin from tree strike was found during postflight inspection. Caused by inattention to obstacle clearance during NOE flight.

AH-1 Class E mishaps

F series - Crew heard loud squeal

during climbout, followed by master caution and No. 2 hydraulic segment lights. Caused by loss of hydraulic fluid from cracked fitting.

F series - During flight, crew noticed high-frequency vibration in pedals followed by master caution and engine oil bypass light. Vibration resulted when oil cooler fan bearing seized, causing oil drain line fitting to break.

S series - Aircraft was at 20-foot hover while firing rockets. When grass fire broke out, smoke and heat were ingested into engine, resulting in compressor stall. Tgt increased to 950° C for 3 to 5 seconds and N2 decreased to 80 percent. Rpm was regained and tgt returned to normal when aircraft reached clean air.

AH-64 Class E mishaps

A series - Aircraft was in flight performing gunnery tasks. Temperature caution light for intermediate gearbox came on. Intermediate gearbox was replaced. Following day, same aircraft was performing dry-fire gunnery tasks at 80-foot hover when tail rotor gearbox temperature caution light came on. Temperature sensor was replaced.

A series - During taxi for takeoff, utility hydraulic caution light came on. Caused by failure of hydraulic oil line tube assembly.

Cargo helicopters

CH-47 Class D mishaps

D series - Burns on rotor blade upper and lower surfaces were caused by lightning strike. Damage amounted to $6,800.

D series - Ruptured skin and broken cargo ramp actuator mounting point were caused by hard water landing. Total damage was $7,000. Water spray obstructed visibility.

CH-47 Class E mishaps

C series - After level off, crew alerted pilots of hydraulic leak in ramp area. Caused by failure of utility oil cooler fan assembly.

D series - No. 1 engine debris screen latch indicator failed during flight.

Observation helicopters

OH-58 Class C mishap

C series - Aircraft was in flight at 90 to 100 KIAS, 60 to 70 feet agl, while crew conducted individual aeroscout observer training. Aircraft crossed a ridgeline and was descending when it struck a large tree. Nose was crushed in, both windscreens and chin bubbles broken out, antitorque pedal linkage from pilot to copilot side severed, and right elevator and vertical fin damaged. IP lost tail rotor authority with antitorque pedals. IP used cyclic and collective and observer manipulated his pedals to land aircraft. Damage estimated at $50,000.

OH-58 Class D mishap

A series - Engine N2 drooped twice. During second incident N2 went to 93 percent, requiring autorotation to an open field. As aircraft touched down, it pitched forward, nose-low. Application of aft cyclic caused tail stinger to contact the ground.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	July	**5**	**3**
	August	2	1	August	**3**	**1**
	September	3	2	1-3 Sep	**0**	**0**
	Total for Year	45	31	Total to Date	**31**	**25**

OH-58 Class E mishaps

A series - Engine oil pressure decreased rapidly during flight. Pilot autorotated and landed. Oil line failure allowed oil to be pumped into cockpit.

A series - Passenger saw smoke coming from engine compartment during NVG approach to confined area. Caused by oil spraying on engine when diffuser scroll vent cap popped off.

A series - During landing, crew noticed high-frequency vibrations in copilot's collective and in airframe. Caused by faulty coupling on engine to transmission drive shaft.

Fixed wing

C-12 Class E mishap

C series - Passenger noticed fuel coming from No. 2 engine nacelle during climbout. Caused by failure of O-ring for fuel quantity probe.

OV-1 Class E mishaps

D series - Landing gear wouldn't retract after takeoff. Landing gear emergency dump valve activated prematurely.

D series - No. 1 prop failed to come out of reverse when power levers were returned to ground idle during landing roll. Caused by failure of prop control relay.

SD3-30 Class E mishap

During preflight in the dark, copilot noted pitot covers were installed but didn't remove them because that was the flight attendant's job. Later, aircrew took off with the starboard pitot tube cover still in place.

U-21 Class E mishaps

A series - Crew noticed fuel siphoning from right nacelle fuel filler cap during climbout. Fuel cap was improperly seated.

A series - Birds were seen on runway as aircraft was landing. About 10 feet agl it hit three birds.

Maintenance

UH-1 Class D mishaps

H series - Aircraft was on final approach after being test flown for vertical vibration. Ground personnel saw something hanging from aircraft's right side. Vibration had caused 30mm MILES transmitter to fall, pulling wire clamps out and making tear in sheetmetal below right door. Civilian contractor had mounted transmitter. Inspection of stubs hardpoints showed retaining assembly was rusty and stuck. Stubs were being held in place by boresighting adjustment screws.

V series - Aircraft was inspected, MOC'd, preflighted, and flown for about 45 minutes after work was completed on tail rotor drive shaft hanger bearings. Next day, during preflight, torque wrench box was found under drive shaft cowling. One section of drive shaft was scratched and was replaced. Box was same color as drive shaft.

UH-1 Class E mishap

H series - Standoff clamp, which maintenance had installed to prevent chafing, caused chafing during normal movement of return line to lateral servo. Chafed line leaked, causing complete loss of hydraulic fluid during flight. Installation of clamp was not IAW TM 55-1520-210-23.

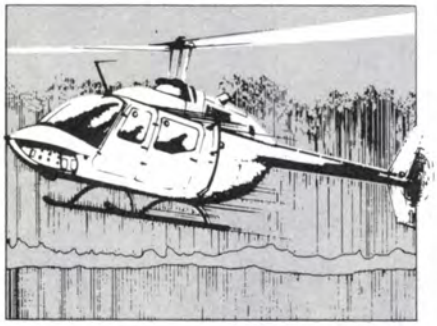
CH-47 Class E mishaps

C series - During flight, transmission oil temperature indicator read 140° C. and transmission hot caution light came on. Wire to aft transmission temperature bulb was broken at splice.

D series - During runup, emergency power indicator light came on intermittently. Cannon plug to emergency power light was dirty and loose.

D series - During runup, No. 1 flight boost return caution light came on. It went out when button was reset, then came on again. Filter on flight boost return module was so deteriorated it was plugging itself, causing the bypass button to pop and caution light to come on. (continued on back page)

Mishap briefs



OH-58 Class E mishap

C series - Crew smelled fuel fumes after takeoff. Maintenance tightened loose jam nut on fuel shutoff valve and released aircraft. Generator caution light came on in flight. While voltage regulator was being adjusted, maintenance personnel saw fuel leaking on electrical compartment. Caused by defective preformed packing around jam nut.

U-21 Class E mishap

F series - During flight, left bleed air warning light came on. Clamp on poly flow tubing in left wing center section was loose, allowing tubing to vibrate free.

Safety messages

• Safety-of-flight maintenance mandatory message concerning revision to message on removal of AN 310-8 nuts, NSN 5310-00-167-1289, on UH-60A/EH-60A series aircraft (UH-60-86-15, 191300Z Aug 86). Summary: Safety-of-flight maintenance mandatory message (UH-60A-86-13, 291415Z Jun 86) directed that aircraft which have not complied would be put on Red X status. Some units have not been able to obtain replacement parts within the task/inspection suspense date. Since the parts affected are used for nonflight applications, it is not necessary to ground the aircraft. This message changes the requirement for a Red X to a circled Red X, restricting use of the affected parts. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message concerning flight restrictions on OH-6A and OH-58A series aircraft with T63-A-700 engine (OH-6A-86-10 and OH-58A-86-05, 222300Z Aug 86). Summary: Purpose of this message is to direct operational restrictions on all OH-6A and OH-58A aircraft as a result of a recent T63-A-700 engine failure. There have been five previous failures of this type engine since 1979. Message also requires addressees to provide data on engines which will assist in investigation and implementation of corrective actions. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

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Report of Army Aircraft Mishaps

Followups

Additional information on mishap briefs previously published

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Utility helicopters

UH-1 Class A mishap in 13 Nov 85 issue (8604) □ Pilot initiated maximum performance takeoff to clear 45-foot wires on one side of the helipad. Aircraft had cleared the wires when the crew heard a loud bang from the aft section and saw the master caution light come on. Witnesses on the ground saw intermittent flames coming from the engine exhaust and noticed a reduction in the whine noises from the engine. More banging noises from the aft section were coupled with loss of power and rotor inertia. The pilot tried to maintain altitude and airspeed to reach the only open field available ahead of the aircraft. The aircraft was about 200 feet agl when the engine failed completely. The pilot began autorotation, rotor rpm and airspeed dissipated, and the aircraft lost altitude. The aircraft received major damage when it hit the ground. Two of the five people on board received major injuries and one was uninjured. The first stage power turbine failed due to overstress mechanism at high temperatures. The most probable cause of the overstress was fatigue cracks or distortion of the first stage power turbine nozzle resulting in catastrophic failure of the remaining power turbine components. Inspection criteria were inadequate: engines and components were being inspected only when there was some indication that problems existed. This engine had shown no symptoms of problems or warning of impending failure.

UH-1 Class A mishap in 11 Dec 85 issue (8608) □ Two UH-1 aircraft were flying over snow-covered terrain in light to moderate snowshowers. Copilot of the trail aircraft allowed distance separating the aircraft to exceed the desired distance. Attempting to regain the proper separation, he found his rate of closure was too fast. He then executed a too rapid deceleration and a rate of descent of about 1,500 feet per minute developed. The nose of the aircraft pitched up slightly and visual horizon was lost. When the copilot leveled the aircraft the horizon again became visible but with such a rapid rate of descent, there wasn't enough time to take corrective action. The aircraft hit the ground before it could be recovered. All four people on board were able to leave the aircraft under their own power.

UH-1 Class A mishap in 11 Dec 85 issue (8609) □ Aircraft was 4,000 feet msl at 100 KIAS when the crew detected a burning odor. About half a minute later, the aircraft yawed left. The passengers in the rear heard a cracking noise above and behind them and the aircraft yawed right and pitched up slightly. The PIC took the controls and immediately began a power-on approach to land. When the PIC decelerated at about 100 feet agl, the aircraft spun to the right. The pilot applied right cyclic into the turn, but maintained the descent and power settings. He attempted to decelerate again at 40 feet agl, but the aircraft continued to spin to the right. While in the spin, the pilot attempted to cushion the landing but was unsuccessful in slowing his rate of descent before impact. The aircraft hit the ground in a nearly level attitude but with forward and sideward motion. It then pivoted about the nose and rolled over, coming to rest on its left side. The aircraft was destroyed. Two crewmembers and both passengers were injured. The emergency was caused by someone exerting pressure on the top of the tail rotor drive shaft heat shield during maintenance. The tail rotor drive shaft then rubbed on the deformed heat shield until the drive shaft failed, resulting in loss of thrust. The PIC failed to respond to the emergency correctly. When the aircraft yawed, he should have checked his flight controls. He would have noted a lack of pedal response and he then could have chosen the proper emergency procedure. Instead, he decided to land immediately. He was unprepared when the aircraft began spinning. After it had spun around 2½ times, he attempted to regain airspeed without first arresting the descent. When the spins continued, he found himself too near the ground to effectively slow the rate of descent and the aircraft crashed.

Attack helicopters

AH-1 Class A mishap in 5 Feb 86 issue (8617) □ Single pilot of lead aircraft in a flight of two elected to deviate from the planned route of flight along a valley. The more direct route he chose led into rising terrain where hilltops were obscured by clouds and fog. Inadvertently entering instrument meteorological conditions (IMC), the pilot began vertical helicopter instrument recovery procedures (VHIRP). He made two radio calls and squawked the transponder emergency code. These actions required him to divert his attention from flying and complex cockpit tasks. While attempting to execute VHIRP, he became disoriented and lost

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

EH-1 Class E mishap

H series - Alternator failed during runup, causing shearing of shear pin and binding in quill.

UH-1 Class D mishaps

H series - IP was demonstrating simulated engine failure to runway. IP began increasing collective at about 30 feet then realized he had not increased throttle to full open. Manuever was continued without power to runway. Rear crosstube was damaged during touchdown.

H series - During postflight inspection, IP found dent in tail rotor blade. Suspect FOD. Because of size of dent and sudden stoppage criteria, maintenance replaced tail rotor blade, tail rotor hub, 42-degree gearbox and 90-degree gearbox.

UH-1 Class E mishaps

H series - IP saw student was having problems with heading control during missed approach. IP took control and found antitorque pedals had stuck. Investigation showed tail rotor control nut assembly had broken at inboard side of retaining nut. Cotter pin was still installed, allowing pitch change control cables to jam.

H series - During short final approach, crew noticed change in engine noise, and excessive lateral vibration and cyclic play. A 12- by 2-inch tear was found, 3 inches inboard from tip of main rotor blade. Caused by bonding failure of main rotor skin.

H series - During OGE hover check, torque gauge fluctuated and crew felt slight surge and vibration. Engine oil temperature increased from 90 to 96 degrees. OAT was 28° C. Caused by minor FOD ingestion into first-stage compressor.

UH-60 Class E mishaps

A series - Three aircraft had stabilator problems. During cruise flight, stabilator came out of automatic mode; auto mode was regained after emergency procedure was initiated. Caused by defective No. 1 stabilator actuator. Stabilator on another aircraft failed at 130 KIAS during deceleration maneuver. Several attempts to reset to auto mode were unsuccessful. Caused by failure of right harness assembly. Stabilator on third aircraft failed during two separate takeoffs.

A series - Aircraft was part of six-ship mission transporting howitzers. No. 2 engine chip caution light came on in flight. Engine replaced.

A series - Crew smelled fuel during flight. Crew chief found fuel was streaming along No. 2 engine cowling. Newly-installed manifold assembly was defective.

Attack helicopters

AH-1 Class D mishaps

S series - Aircraft was being flown NOE with numerous landings to confined areas. Crew noticed no indication of tail rotor strike, however, foliage streaks were later found on tail rotor blade. Blade tip also had a small gap.

S series - While hovering for TOW engagement, aircraft settled and struck a small tree limb. Pilot was concentrating on keeping aircraft within launch constraints and failed to maintain adequate obstacle clearance.

AH-1 Class E mishap

F series - During postflight inspection, pilot noticed about 3 inches of tail rotor blade doubler had separated and broken away. Crew noticed no input in controls during flight.

AH-64 Class E mishaps

A series - Primary hydraulic pressure began fluctuating. Master caution, primary hydraulic caution, and ASE caution lights came on. Cracked pump case resulted in failure of primary hydraulic pump.

A series - After refueling, start of No. 2 engine was aborted twice when it appeared tgt would exceed 867° C. Connector on anti-ice valve was cleaned and aircraft released.

Observation helicopters

OH-58 Class E mishaps

A series - During engine shutdown after NVG flight, crew noticed dc ammeter indicated 35 amps. When battery was turned off, ammeter indication fell to zero. Caused by internal failure of storage battery.

D series - Crew noticed abrupt vibration during flight at 95-percent torque. Vibration and flight control response were normal during power descent. When pilot resumed higher power flight mode, severe vibration was again felt at 95-percent torque. After landing, pilot noted large difference in fuel levels in flight and on the ground. Suspect that during high power settings, with inflight nose-low attitude, fuel pump can be evacuated, causing flameout. Crew of OH-58 had called out four different fuel consumption checks to a following aircraft. All checks confirmed constant fuel flow indications and that sufficient fuel remained to reach destination. Engineering investigation is being conducted.

Fixed wing

C-12 Class D mishap

C series - As aircraft rotated for takeoff, bird struck left wing, breaking stall warning transducer.

C-12 Class E mishaps

C series - On intermediate stop after refueling, crew noticed fuel leaking

from right wing area near fuel drain. Caused by failure of right inboard leading edge of fuel cell.

C series - During flight, fumes began coming into aircraft from vents, causing eye irritation. Pilots turned off ventilation system and dumped cabin pressure to clear cabin of fumes. Caused by failure of vent blower.

OV-1 Class E mishaps

D series - During runup, with engine operating steadily at flight idle power setting, No. 2 engine chip light came on. Where filings came from has not yet been determined.

D series - Master caution and No. 1 engine chip detector light showed dim illumination. Both lights went out when power was reduced and came on again when cruise power was applied. Caused by internal failure of chip detector.

T-42 Class D mishaps

A series - Rated student pilot was at controls as aircraft was rounded out before touchdown. Crew heard loud noise as props hit runway. IP took controls and added power for go-around. Another SP had seen SP on controls touch gear handle, but he didn't place gear handle in the down position. IP failed to notice that SP hadn't extended gear. Postflight inspection showed warning system was operating properly, however, none of the crewmembers remembered hearing the gear-up warning horn. Two left prop blades were curled and two right prop blades were scuffed. Damage exceeded $2,500.

A series - During rollout after landing, right brake puck began dragging on disk, causing right tire to blow out and aircraft to begin turning right. When opposite rudder and brake were applied, aircraft skidded slightly and left tire blew out.

U-21 Class E mishap

A series - During before-landing check, unsafe indication remained on right main landing gear. Gear appeared to be extended during flyby but unsafe indication remained after emergency landing gear extension checklist was performed. Caused by failure of landing gear downlock switch.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	July	**5**	**3**
	August	2	1	August	**3**	**1**
	September	3	2	1-10 Sep	**0**	**0**
	Total for Year	45	31	Total to Date	**31**	**25**

UV-18 Class E mishap

A series - Aircraft was on an ILS, on descent, 1 mile from airport. When power was reduced, aircraft yawed left, T5 went to 700 degrees and dropped. When power was applied, T5 rose rapidly but with no power to engine. Cause of engine failure not known.

Maintenance

UH-1 Class E mishap

H series - During flight, pilot noticed N2 tachometer needle was down to zero. Caused by broken wire on N2 tachometer generator.

UH-60 Class E mishap

A series - Upon applying initial power for takeoff, pilot felt slight jerk in controls and No. 1 hydraulic system began leak isolation functions. Chafing of return line from No. 1 hydraulic pump to No. 1 transfer module had caused line to fail.

AH-1 Class D mishap

F series - Aircraft was in traffic for landing when pilot noticed transmission oil pressure gauge fluctuating between 50 and 25 psi. Cracked main transmission oil filter housing unit allowed transmission fluid to vent overboard. Suspect primary filter was improperly torqued during installation.

OH-58 Class E mishap

A series - During postflight inspection, pilot found mast boot safety wire wrapped around mast inside boot. Lower end of boot was worn.

A series - Igniters didn't operate during engine start. Caused by broken wire at starter button in collective head.

C-12 Class E mishap

C series - As aircraft was positioned for takeoff, No. 1 engine wouldn't develop full power. P-3 air line was cracked.

OV-1 Class E mishap

D series - While performing IFR climb after takeoff, airspeed began decreasing and altimeter froze. Pitot static port was clogged by insect larvae.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Followups

control of the aircraft. The pilot and crew chief were killed when the aircraft hit the ground. The aircraft was destroyed in the crash and fire that followed impact.

AH-1 Class B mishap in 12 Feb issue (8618) ☐ During maintenance test flight to check autorotation rpm, test pilot advanced throttle to make power recovery from autorotation. Severe shudder or vibration was felt when needles were joined and became worse when collective was applied. Test pilot reduced throttle and autorotated to runway. Aircraft landed with tail-low attitude. Combination of low rotor rpm, aircraft rocking fore and aft, and right forward crosswind caused the rotor to flex down and sever the tailboom. Transmission, drive train, main rotor, pitch change tubes, and tail rotor received major damage. Flight had appeared normal until power recovery was initiated at 700 feet agl with collective full down. At this point, aircraft began to vibrate and shudder abnormally. Condition worsened as collective was increased. Test pilot elected to autorotate to runway. As collective and throttle were reduced the vibration disappeared. As test pilot cushioned the landing, the aircraft appeared to fall through the last 3 to 4 feet. The heels of the skids touched first and the aircraft rocked forward. The copilot heard a grinding noise and noticed rotor blades were turning slower than normal. Although the tailboom was severed with damage to the drive train system and transmission mounts, neither crewmember realized the extent of the damage until they got out of the aircraft.

Observation helicopters

OH-58 Class A mishap in 4 Dec 85 issue (8607) ☐ Aircraft was on a service mission to check police of training areas. The OH-58 was about 50 feet above trees when the engine lost power. The pilot entered autorotation and turned toward the only available clear landing area. When the pilot saw that he couldn't reach the cleared area, he zeroed airspeed, applied collective pitch, and brought the aircraft down vertically through the trees. The aircraft came to rest upright. There was major damage to the aircraft, but only one minor injury. The tube assembly (PC line) between the governor and fuel control unit had failed due to corrosion.

OH-58 Class A mishap in 12 Mar 86 issue (8620) ☐ Aircraft was on a training mission, supporting units calibrating their multiple laser engagement system (MILES) equipment. Pilot was flying at NOE altitudes to avoid a MILES engagement when the main rotor blade struck a 41-foot tree, 15 feet below the top. The main rotor hub and blades separated from the aircraft and the airframe struck the ground in a near inverted attitude. The pilot and crew chief were fatally injured. While attempting evasive maneuvers, the PIC made an improper decision to fly NOE while the aircraft was not capable of NOE under existing flight conditions. He lost control of the aircraft when he made an abrupt left diving turn with an angle of bank of approximately 60 degrees and a dive angle of about 20 degrees. ■

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17 September 1986

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Report of Army Aircraft Mishaps

The pilot went with experience instead of procedures and lost

During takeoff, the pilot of an OV-1 chose not to follow procedures in the Aircrew Training Manual (ATM). He didn't follow the procedures because he disagreed with the Army ATM about retracting the landing gear immediately after takeoff. The extended gear increased drag and before the aircraft reached an airspeed where it could operate with a single engine, one of the engines began going into compressor stall.

The Mohawk was about 150 feet agl when the pilot realized that an engine was stalling. He couldn't tell which engine it was and he reduced power on both engines, then reapplied power. Hearing the engine begin stalling again, he again reduced power on both engines; but this time he reapplied power only on No. 1 engine. No. 1 engine stalled. He reduced power on No. 1 and applied power on No. 2 engine. As No. 2 engine accelerated, the pilot jettisoned the wing fuel storage tanks and began a 5-degree bank to the right; then No. 2 engine also stalled. The pilot told the technical observer to eject from the aircraft, then ejected himself. The aircraft struck the ground at a shallow angle, skidded 427 feet, and came to rest upright. A post-crash fire consumed the cockpit. Neither crewmember was seriously injured, although the pilot was only a few feet from the ground when his parachute opened.

Unit maintenance personnel had replaced an excessively worn inner bearing in the aircraft's right aileron and they asked the contractor test pilot to test fly the aircraft. He made a weather check with a flight service station because he had another flight scheduled and wanted to see what they were reporting. He did not obtain a weather briefing from operations at the Army airfield. There was a weather warning in effect which called for 20-knot winds, gusting up to 40 knots. While weather was not a contributing factor in the accident, weather conditions exceeded safe operating limits prescribed by the operators manual.

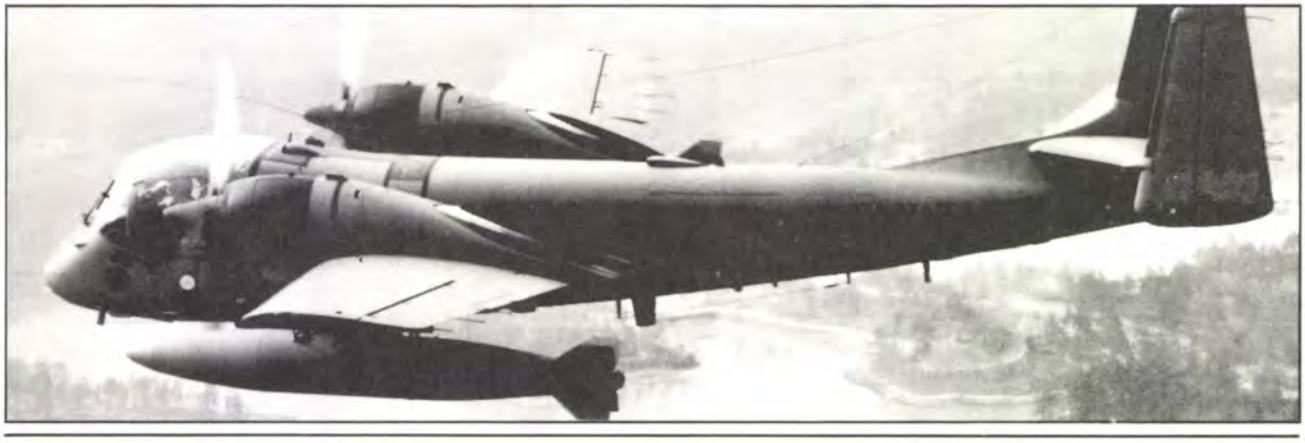
The pilot began takeoff with 2,500 feet of roll, gained groundspeed of about 90 knots, and rotated the aircraft to takeoff attitude. The OV-1 had climbed to between 150 and 200 feet agl when the engine began going into compressor stall. According to ATM procedures, the landing gear will be retracted immediately after takeoff when the remaining runway available does not allow for an aborted takeoff, but the pilot didn't retract the gear.

This pilot had more than 8,000 flight hours in single and multiengine fixed wing aircraft. He had accumulated 2,500 hours in the OV-1 and an additional 360 hours in the OV-1D as a maintenance test pilot. He disagreed with the procedures prescribed by the ATM because he was convinced from his own experience that the gear should remain down until the aircraft accelerated through single-engine airspeed. He did what his experience told him to do; he left the gear down.

The pilot was also relying on his own experience when he reduced power after encountering engine stall at a critical point in flight. But the operators manual doesn't address the proper emergency procedures for engine stall during takeoff and climb in an OV-1 aircraft.

Several materiel factors contributed to the emergency situation which led to

(continued on back page)



Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - During engine response check, aircraft was hovering 50 feet agl with 50 psi torque. As descent was begun, compressor stall occurred. Suspect FOD caused sudden stoppage, resulting in damage to engine compressor blades and 45- and 90-degree gearboxes.

UH-1 Class E mishaps

H series - Master caution and hydraulic lights came on during flight and hydraulic controls gradually failed. Caused by pin-hole leaks in hydraulic lines to left cyclic irreversible valve and hydraulic filter inlet.

H series - During simulated engine failure, IP noticed engine and rotor tachometer needles failed to split. Suspect IP failed to roll throttle to flight idle.

H series - IP smelled fuel during takeoff. During shutdown, crew chief found fuel dripping from fuel filter outlet onto engine deck. Fuel filter outlet quick disconnect was leaking at breakaway point. Left tank fuel line was also leaking.

H series - During takeoff, right pedal became stiff and springy while left pedal was normal. Caused by malfunctioning of tail rotor magnetic brake.

UH-60 Class D mishap

A series - Refueling personnel attempted to remove closed-circuit nozzle from refueling port by jerking it in upward motion. Two broken screws on bottom of refueling port were found during postflight inspection.

UH-60 Class E mishaps

A series - Crew heard low whine from rear of aircraft. After 60 seconds, No. 1 engine pressure light went to zero. Caused by failure of IPS blower.

A series - After takeoff, crew heard abnormal sound. Caused by failure of antiflap stop.

A series - Aircraft was passing through 60 knots after takeoff when crew felt pounding vibration in rotor system. Antiflap stop blade was stuck.

Attack helicopters

AH-1 Class E mishaps

E series - Alternator/rectifier lights came on in flight. Caused by alternator failure.

E series - During NOE flight, aft fuel boost and low fuel caution lights came on. Fuel gauge showed 500 pounds of fuel. Caused by failure of fuel boost pump.

S series - Pilot saw smoke and smelled fumes in cockpit during takeoff. Master caution and aft fuel boost lights came on. Alternator had failed.

AH-64 Class D mishap

A series - As aircraft passed through 70 KIAS during takeoff, crew heard abnormal noise and felt vibration from main rotor area. Caused by unbonding of metal strip on main rotor blade.

AH-64 Class E mishaps

A series - During power check, primary hydraulic psi caution light came on followed by primary hydraulic low caution light. All DASE channels disengaged. After aircraft landed, large amount of hydraulic fluid was found in transmission area. Caused by ruptured hydraulic line.

A series - After closed-circuit refueling, fuel began leaking from around fuel port. Fuel continued to leak after shutdown. O-ring around CCR poppet valve was replaced.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	July	**5**	**3**
	August	2	1	August	**3**	**1**
	September	3	2	1-17 Sep	**1**	**0**
	Total for Year	45	31	Total to Date	**32**	**25**

Cargo helicopters

CH-47 Class E mishaps

B series - Rotor rpm gauge dropped to zero during GCA landing. Caused by failure of N2 rotor tachometer generator.

C series - No. 1 engine chip detector light came on in flight. After landing, crew chief found metal sliver on chip detector. Oil lab results recommended replacement of engine.

C series - Master caution and transmission pressure lights came on in flight. Caused by failure of No. 2 engine oil pressure transmitter.

C series - During hot refueling with engines at ground idle, crew chief noticed fuel leak from No. 2 engine. Caused by failure of hose assembly.

C series - Utility oil cooler fan came on in flight and stayed on until aircraft landed and shut down. Engine starter manifold caused overheating of engine starter hydraulic line, making oil cooler fan run continuously.

C series - No. 1 pitch SAS link leaked excessively during flight. Caused by failure of SAS extensible link.

Observation helicopters

OH-6 Class E mishap

A series - Fire extinguisher fell out of helicopter after landing to runway. Bracket was bent and had to be adjusted before fire extinguisher could be secured.

OH-58 Class A mishap

A series - Aircraft was about 10 feet above trees when pilot heard a loud bang. Aircraft made two 360-degree rotations and nosed down into trees. 8648

OH-58 Class D mishap

A series - Aircraft touched down during hovering autorotation. SIP couldn't lower collective because latch on armored panel was in the way. Aircraft began drift/bounce to left. SIP pushed left pedal to align aircraft and lifted collective to remove latch so collective could be lowered. Aircraft rocked back and damaged vertical fin. Suspect left armor panel retaining pin had rotated under collective.

OH-58 Class E mishap

A series - Aircraft was about 100 feet agl at 60 KIAS when pilot felt metal vibrating on metal. He landed, but no problem could be found. He took off again, again felt the vibration, and landed. This time, small door on transmission cowling was found open. Fire guard was wearing heavy gloves, which limited his sensitivity; he said he might not have completely secured door before first takeoff.

Fixed wing

C-7 Class D mishap

A series - Power was reduced as aircraft descended from 5,000 feet msl. As it passed through 3,500 feet there was a loud backfire and vibration was felt in right engine. Backfiring stopped and vibration lessened when power was reduced further with zero thrust from right engine. Single-engine procedure was used for landing, but right engine didn't have to be shut down. Failure of exhaust valve guide allowed valve to float and cylinder to malfunction.

OV-1 Class D mishap

D series - During no-flap takeoff, groundspeed reached 110 KIAS. Winds were at 210 degrees and gusting at 10 to 20 knots. After liftoff to about 10 feet agl, aircraft began settling and aft SLAR boom hit the runway. Pilot continued takeoff then returned to landing. Damage was found during postflight.

U-21 Class E mishaps

G series - No. 2 engine wouldn't develop takeoff torque. At 60 knots, IP told pilot to abort. Cause unknown.

H series - Pilot's left brake failed as aircraft taxied from runup area. Caused by failure of master cylinder.

Maintenance

UH-1 Class C mishap

H series - During HIT check at 5-foot hover, PIC saw EGT indication was 650° C., with 27 psi torque. Engine compressor had ingested screwdriver left by maintenance personnel during engine flush. Engine will be replaced.

UH-1 Class E mishaps

H series - Fuel was seen venting overboard during hot refueling. Overflow from safety release valve was caused by pressure during closed-circuit refueling. Safety release valve should have been replaced with plug.

H series - While doing OGE hover checks, IP noticed engine oil temperature fluctuating between 75° and 90° C. After oil temperature gauge was replaced twice without solving problem, broken wires were found inside wire splice on transmitter. Splice had been crimped too tightly, allowing broken wires to make intermittent contact.

H series - When pilot checked engine compartment during ground operations, he noticed fuel leaking from fuel control. O-ring on fuel control solenoid was pinched during installation, causing slow fuel leak.

M series - Master caution and No. 1 hydraulic pressure lights came on in flight. Collective servo shield clamp rotated and punctured No. 1 hydraulic system return line aft of servo.

AH-1 Class E mishap

S series - Master caution and No. 2 hydraulic lights came on in flight. Hydraulic lines in turret hadn't been retightened after personnel loosened them during maintenance.

U-21 Class E mishap

H series - Left engine failed during autoignition system check. Caused by contaminated fuel in left nacelle. During engine flush, EPA return line wasn't disconnected, allowing cleaning mixture to be returned to nacelle tank.

SD-3-30 Class E mishap

Landing gear failed to retract when gear handle was placed in up position. Spring which resets lever on emergency landing gear hydraulic accumulator overcentered. This disabled spring so that it couldn't reset the lever when cockpit T-handle was released. Spring was repositioned by hand.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Experience isn't always the best teacher

this accident. A combination of the following factors affected both engines, causing them to intermittently malfunction and produce insufficient power.

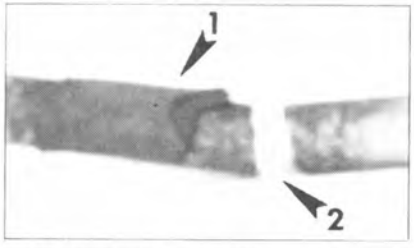
- Sand erosion of the compressor blades
- Sand and dirt buildup within the compressor
- Engine compressor impeller rub in No. 1 engine
- Possibly damaged, and/or improperly installed, bleed air check valves
- Increased demands placed on a single engine due to malfunctioning of the opposite engine

These conditions existed because of the sandy, dusty environment in which the aircraft had been operated, a manufacturer's design fault in the magnesium compressor impeller, and deficiencies in the bleed air check valves (which would not be detectable during a normal preflight inspection). The lack of a system in the unit to record and track engine performance on a daily basis; for example, a health indicator test (HIT), is one reason these conditions weren't detected prior to the accident.

Neither crewmember in this OV-1 aircraft was flying with his flight helmet visor down and the western-style boots the pilot was wearing didn't provide the protection he should have had when he ejected and landed on the ground. Protective equipment can't do any good unless it is worn and worn properly. ■

Corroded line causes accident

An OH-58 Class A accident was caused by failure of the tube assembly (PC line), NSN 4710-00-131-6466, P/N 6870035, between the governor and the fuel control unit. The tube failed because of stress caused by corrosion. The failed area had been wrapped to keep it from chafing with adjacent lines directly below the engine. The wrap was composed of a chloride-based material (such as neoprene) which is highly corrosive to the low-grade stainless steel lines.



Chloride-based wrap (1) caused line (2) to become corroded and break.

If lines are installed correctly, they do not need to be wrapped to prevent chafing. Corpus Christi Army Depot does not recommend wrapping any antichafing material around stainless steel lines. Water and cleaning solvents might be retained in the wrapping material, thereby corroding the lines.

The Safety Center recommends you not use antichafing material. If any of your lines are presently wrapped with this material, it should be removed and the lines inspected.

Safety Center point of contact is SFC Ford, AUTOVON 558-4198/3901, commercial 205-255-4198/3901. ■

U.S. ARMY SAFETY CENTER

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Christmas card art

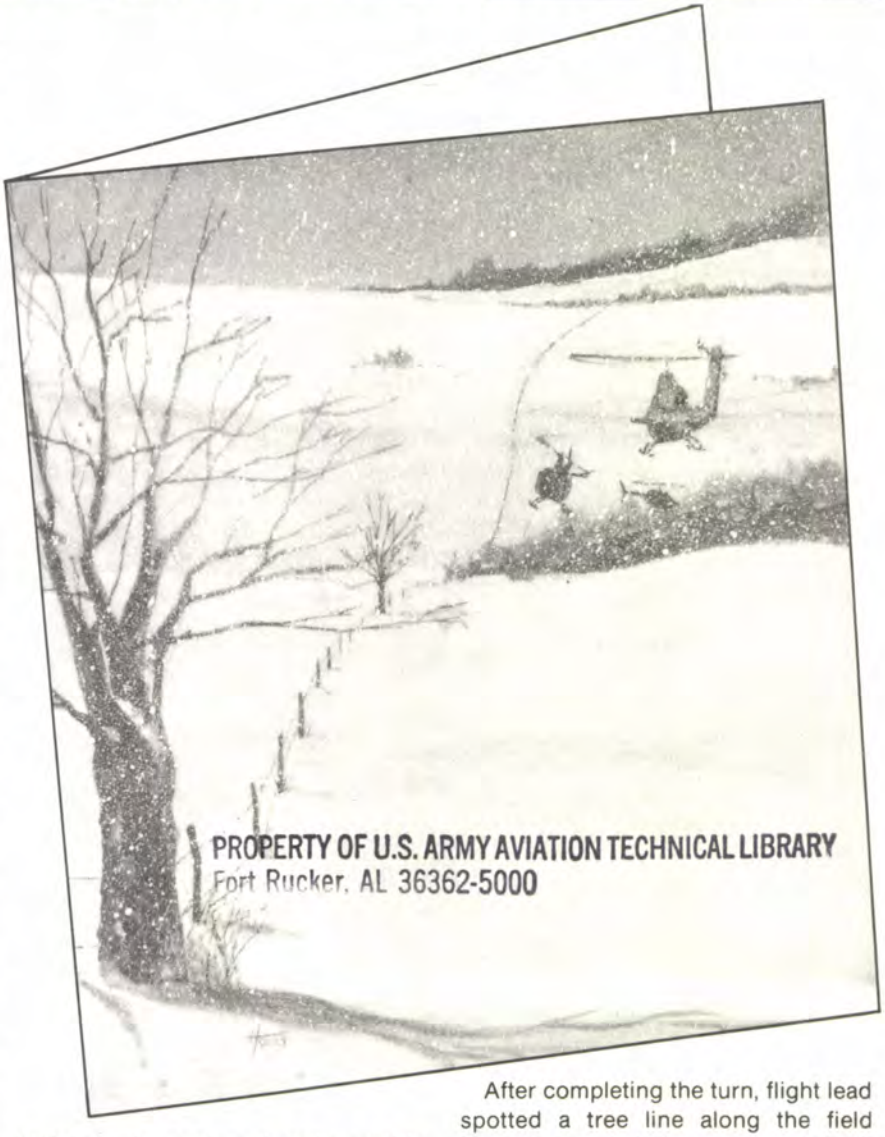
Last week's **Flightfax** reported some cases of pilots who crashed while operating their aircraft in a snow environment. A few years ago, we printed an account of a near-accident sent to us by an aviation safety officer stationed in Germany. Sometimes we learn more from near-accidents than we do from accidents, so we are reprinting this account. The lessons learned apply just as much today as they did then.

One of our flights recently encountered conditions near our training area that were totally unexpected and even more ominous than those detailed in most whiteout briefings. Following four days of gunnery qualification at the range, a flight of two OH-58 and three AH-1S aircraft departed the airfield en route to home station about 2.3 hours away. The weather briefing forecast VFR conditions for the entire route of flight, with the worst conditions expected in the vicinity of snowshowers: ceilings down to 1,000 feet and visibility limited to 1 mile. Otherwise, the flight could anticipate 3,000 and 3 along the route.

About 10 minutes after takeoff at an altitude of approximately 400 feet agl, the flight encountered the edge of an approaching snowshower. This leg of the flight happened to generally parallel an east-west highway, but since visibility appeared better to the north of the shower, flight lead in the first of the two OH-58s steered the flight away from the highway and across large, generally open, snow-covered fields, dotted occasionally by sparse tree lines.

Neither visibility nor the ceiling was critical at this time, but within seconds the flight was to experience nearly total IMC while technically operating well within VFR minimums. This situation occurred as a result of the snowshower falling over totally white terrain, obscuring the horizon, and reducing other terrain features to barely discernable gray outlines in an overall white void.

Realizing an almost total loss of outside reference, flight lead immediately initiated a right turn, announcing his intentions to the flight. Using instruments and a barely visible powerline that crossed the open field, the flight was able to execute a successful 180-degree turn and escape the worst of the whiteout, at least momentarily.



After completing the turn, flight lead spotted a tree line along the field boundary and shot an approach to it, followed by the second OH-58 and chalk three, the first of the three Cobras. The remaining two Cobras had spotted the highway and elected to land parallel to it. The two OH-58s had

Christmas card art

no problems during the landing, although the crews were anticipating a possible whiteout due to blowing snow. None was experienced, probably due to a thin crust that had formed over the 12 inches of accumulated snow.

The first Cobra, chalk three, had followed the OH-58s and was now preparing to land behind them, less than 50 feet from chalk two and also parallel to the wood line. As the pilot later described the landing: Neither he nor the copilot was aware that the aircraft was drifting slowly right as he terminated his approach. The aircraft hit the ground slowly, moving right and forward. To compound the problem, the pilot had unknowingly landed beside a small ditch, about 12 inches deep, hidden under the drifted snow. The aircraft's sideward movement allowed the right skid to fall into the ditch and the aircraft began an immediate right roll. Both pilot and copilot immediately added left cyclic and yanked the collective as the aircraft rose to a hover, narrowly averting a rollover. The pilots later reported the control movements were rapid enough to cavitate the hydraulic pumps, which they clearly heard as they brought the Cobra to a hover.

During these few seconds, the snowfall had intensified and visibility was now severely limited, even within the close proximity of the two OH-58s and the tree line. The pilot of chalk three made two more attempts before he could successfully set the aircraft down with only slightly forward motion.

In the meantime, the other two Cobras—chalk four and five—were having difficulty landing beside the highway. As the now heavier snowfall reduced conditions to near zero-zero, the crews found the highway to be a less than perfect horizontal reference. In the deteriorating conditions of the blowing snowshower, there was no discernable difference in sky and ground. The highway appeared, as one crewmember described it later, "like a black ribbon swimming in a bowl of milk." Both aircraft were able to land without incident. Flight lead determined that all elements of the flight were safely landed and notified flight following. The aircraft were shut down and waited approximately 25 minutes for the shower to pass.

About this same time, a UH-1 from the unit was southbound to visit other elements of the unit 20 minutes' flying time away. The pilot, a unit IFE, encountered similar conditions of snowshowers over open snow-covered terrain. He stayed on his instruments until clear of the conditions. Although VFR all the while, he was effectively "blinded" by the freakish conditions.

In later "hangar flying" sessions with the crewmembers involved, a few pertinent observations were made:

- The conditions occurred without warning. The growing intensity of the snowshowers could not be detected until the flight was within it. The change from a light shower to heavy was immediate and without warning.
- Most literature dealing with whiteout describes it in its more familiar form of blowing snow induced by rotorwash while at a hover. Equally dangerous and related to it is the phenomenon of snow falling over open, snow-covered fields, and the loss of horizontal reference. Perhaps "white vertigo" would be a more apt description.
- When approaching a showshower of unknown intensity, never depart a prominent (and visible) terrain feature in an attempt to go "via direct" or cross country. If you cannot maintain visual reference to a road, railroad track, or powerline, it is unlikely that you will be able to see anything.
- Wind-driven snow can obscure a number of hazards underneath. The necessity of shooting an approach "to the ground" must be balanced by the realization that very uneven terrain can lurk beneath very level snow.
- Be aware of the difficulty in detecting slow and subtle movement of the aircraft when hovering over snow, even in the vicinity of a visual reference.
- Anticipate the worst and plan for the possibility—indeed, the probability—of encountering adverse conditions while flying in winter climates. Strangely, the conditions we encountered were variously described as being "beautiful" or "Christmas card art." The presence of mind and professionalism of these crews prevented this idyllic scene from being marred by one or more aircraft accidents. ■

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	1-23 Oct	**2**	**0**
	November	4	3			
	December	5	5			
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**2**	**0**

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

H series - Engine failed while aircraft was at 40-foot hover. Aircraft crashed. 8601

UH-1 Class D mishaps

H series - Copilot at the controls terminated approach at 7 to 10 feet. Insufficient power was available and aircraft started slow turn to right. Pilot was changing radio frequencies from tower to ground control. When he noticed aircraft turning to right, he got on the controls and reduced throttle. Aircraft landed hard, spreading aft skids.

H series - Postflight inspection revealed that sheetmetal screw had hit and damaged tail rotor blade.

UH-1 Class E mishaps

H series - Master caution and transmission oil pressure lights came on during takeoff. Transmission internal oil filter gasket had ruptured, allowing 8 quarts of oil to be forced out of transmission assembly.

H series - Complete hydraulics failure occurred during hover for takeoff. Caused by defective left lateral servo.

H series - N2 rpm began to bleed off during hover. Caused by deteriorated deice valve gasket.

H series - Engine oil pressure fluctuated several times, then decreased. Caused by malfunction of quick disconnect on oil return line to engine oil tank.

UH-60 Class D mishap

A series - Aircraft was taxied to parking ramp to drop off two passengers. Though the passengers had been briefed by the pilot, one of them mistook the window jettison handle for the cabin door handle and pulled it. Nothing happened, so the passenger did not tell the pilot. Aircraft then took off. Window jettisoned and hit stabilator, causing small dent.

UH-60 Class E mishaps

A series - Crew felt movement in pedals and heard slight bumping sound. Cracked T-fitting caused hydraulic leak.

A series - Right accessory module chip detector light came on during takeoff. Accessory module was replaced.

Attack helicopters

AH-1 Class D mishaps

S series - Aircraft hit tree during night vision goggles low-level training flight. Illumination from moonlight had been good until immediately before mishap when aircraft entered cloud shadow and unforecast rainshower. Pilot said he was having problems maintaining ground reference from rear seat.

S series - During maintenance operational check, ¼-inch screw was drawn into tail rotor, causing skin puncture. Screw was then thrown forward and hit cheek of a soldier who was standing adjacent to engine.

S series - When MILES system didn't work, pilot landed and saw that fairing on right side of inboard wing was missing.

Cargo helicopters

CH-47 Class D mishaps

D series - Flight engineer and crew chief were securing troop seats for internal loading of jeep. Jeep driver did not wait for directions from crew chief before boarding aircraft. Crew chief had to move to keep jeep from hitting him. Troop seats were torn by jeep.

A series - Right aft gear knocked over helipad light while pilot was making right turn. Flight engineer did not properly clear aircraft during turn.

CH-47 Class E mishaps

D series - Crew chief heard high-pitched noise from aft transmission area. Caused by failure of aft transmission oil pump.

A series - Flight engineer saw fluid dripping from vicinity of hydraulic cooler fan. Caused by bearing failure of cooling fan assembly.

D series - No. 1 engine oil pressure indicated 120 psi. Caused by failure of oil pressure transmitter.

Observation helicopters

OH-58 Class D mishaps

C series - Aircraft hit tall yucca plant during training flight. Hole was torn in chin bubble.

C series - Aircraft had just completed NOE aerial observation mission. Postflight inspection revealed TOW missile wires wrapped around main rotor mast. Pitch change links and swashplate inner ring seal were damaged.

OH-58 Class E mishaps

A series - Before-takeoff check revealed N2 to be too low. Caused by failure of N2 governor.

C series - Pilot was performing evasive maneuver during training flight. As aircraft came to a hover behind sand dune, pilot felt bump in tail rotor pedals. Aircraft was landed, and inspection revealed no damage to tail rotor.

Fixed wing

C-12 Class E mishaps

C series - While repositioning on the ramp, pilot began right turn. About halfway through the turn, clunking sound was heard. Left pedal went full forward. Inspection revealed retainer on the front of the idler arm had torn through two of the four slots.

C series - No. 2 torquemeter fluctuated during flight. Oil temperature rose to 140° and oil pressure dropped to 40 psi. No. 2 power lever was reduced to idle and propeller feathered. Aircraft returned to base and landed. Caused by internal failure of engine.

T-42 Class E mishap

A series - Unsafe gear indication was noticed during prelanding check. Gear

Mishap briefs

was lowered manually. Caused by defective landing gear actuating motor.

U-21 Class E mishap

A series - Fuel was seen siphoning from right engine nacelle during flight. Copilot had failed to secure fuel cap correctly during preflight.

Maintenance

UH-60 Class E mishap

A series - Aircraft vibrated during approach for landing. Caused by improperly serviced damper assembly.

AH-1 Class E mishap

S series - Idle stop was found to be stuck open during engine runup. Solenoid was cleaned and lubricated.

CH-47 Class E mishap

D series - No. 2 hydraulic flight control light came on. Caused by insufficient torque on hydraulic fitting on forward swiveling actuator.

C-7 Class E mishap

A series - Red gear warning light remained on after gear was retracted. Down-lock switch was out of adjustment.

C-12 Class E mishap

C series - Brakes failed during taxi. Aircraft was stopped through use of reverse thrust. Caused by pinched O-ring on left main brake inlet fitting.

Safety messages

• Safety-of-flight maintenance mandatory message concerning comprehensive safety inspection of CH-47A helicopters (CH-47-85-12, 082300Z Oct 85). Summary: Message provides inspections and maintenance actions for the CH-47A helicopter to enhance safety. Separate messages will be dispatched on the other CH-47 models. Maintenance improvement information developed from feedback from this message will be issued in a subsequent maintenance information message. Contact: Ron Desplinter, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning comprehensive safety inspection of CH-47B helicopters (CH-47-85-13, 082310Z Oct 85). Summary: Same as above message, except for CH-47B helicopters. Contact: Same as above.

• Safety-of-flight maintenance mandatory message concerning comprehensive safety inspection of CH-47C helicopters (CH-47-85-14, 082320Z Oct 85). Summary: Same as above message, except for CH-47C helicopters. Contact: Same as above.

• Safety-of-flight maintenance mandatory message concerning comprehensive safety inspection of CH-47D helicopters (CH-47-85-15, 082330Z Oct 85). Summary: Same as above message, except for CH-47D helicopters. Contact: Same as above.

• Safety-of-flight technical message concerning one-time inspection of spiral bevel gear in forward and aft transmissions in CH-47A, B, and C helicopters (CH-47-85-16, 110300Z Oct 85). Summary: A forward transmission was found to have a spiral bevel gear with broken teeth. Metallurgical analysis of the gear indicates that it had been manufactured from a type of steel that is inferior to that specified for this gear. A search of records has been made and gears at contractor and Army facilities have been examined. No other defective gears have been identified. To ensure safe operation, this message imposes a one-time inspection of CH-47A, B, and C helicopters. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/4200.

U.S. ARMY SAFETY CENTER

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Coping with the cold

The first snows have already fallen in many parts of the world where Army aviation personnel are stationed, and cold weather is the topic of conversation in many areas. Although units are responsible for conducting thorough training programs in cold weather operations, each crewmember and maintenance person is responsible for protecting himself against cold weather hazards. Let's review some of them.

Maintenance and preflight activities can be greatly affected by the cold. It will take more time than usual preparing an aircraft for flight during periods of extreme temperatures. Flight and ground crews move slower and maintenance is slower than normal. Mechanics can lapse into hurry-up attitudes and omit steps they would not think of omitting otherwise. With their attention divided between their work and their growing discomfort, they may honestly think they have completed their work properly when actually they have not. Every step should be checked and rechecked for accuracy.

Cold temperatures and windchill add to the stress of preflight operations. Crewmembers should try not to rush the preflight inspection because of the cold. Preflight inspections demand even more attention in cold weather.

The correct use of personal gear, including clothes, is very important. Clothing should be worn loose and in layers for maximum insulation and retention of body heat. If you get warm, you can remove a layer of clothes. Just as you don't want to be cold, you also don't want to be hot. Overheating causes sweat which, in turn, dampens clothes. Dampness reduces the insulation value of clothes. You should remain cool but not cold.

Clothing should also be clean. Dirty clothes lose much of their insulation value. Air pockets in dirty clothes are filled up or crushed, and heat can escape from the body more easily.

Heads, hands, and feet present special problems in cold weather. An uncovered head and neck lose heat up to 10 times faster than any other area of the body. Some kind of head covering is essential, and a scarf is a tremendous asset.

The correct fit of shoes, socks, and gloves makes the difference between relative comfort for the person on the flightline and frostbitten fingers and toes. Shoes, socks, and gloves that are too tight restrict blood circulation and invite cold injuries. When feet get wet, they should be dried and dry socks put on as soon as possible. Each time socks are changed, the feet should be massaged. The inside of boots should also be wiped as dry as possible.

Survival

All preparations for winter survival should be based on the worst weather conditions that can be expected along the proposed flight route. Hopefully, you won't ever find yourself in a cold weather survival situation. But you must be prepared in case you do. The alternative to being a fatality in a survival situation is to be properly clothed, to know exactly what to do, and to have the necessary gear to handle the emergency.

A recent U.S. Air Force review of actual winter survival episodes indicated that death was most likely under the following conditions: (1) The crewman wore inadequate clothing for the climate, (2) the crewman was injured, and (3) the crewman had little knowledge of proper winter survival techniques.

First of all, be sure you have signalling devices with you—and be sure your passengers know where to locate the devices in case you aren't able to tell them after a crash. These signalling devices should be in your cold weather survival kit, which should be in your aircraft during all flights in cold weather.

Signalling skills could mean the difference between rescue and death. If one method fails, use another. Don't waste the battery of your PRC-90 radio during the night or in inclement weather. Removing the battery during periods of nonuse and putting it in a warm pocket will extend its life. A mirror works well in good weather. If you don't have a regular signal mirror, one can be improvised from any shiny-surfaced object. Fire is an excellent attention-getter. In the daytime, put something on the fire to produce heavy smoke, but don't stay near a heavy smoke-producing fire long. Signals can also be tramped out in the snow. If there is no snow, disturb the natural look of the ground in any way possible.

If you are not soon rescued, protection from the cold becomes a problem. Don't try to live in the aircraft. You need a shelter that is well insulated. Snow is a good insulator.

Get a fire going as soon as possible. Standing dead trees make the best firewood because they are reasonably dry and produce less smoke. Dry grass will burn longer if it is gathered in bunches and knotted together. To get

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

H series - While in cruise flight, approximately 100 feet above the highest obstacle, pilot made descending 270-degree right turn with a bank in excess of 60 degrees. As aircraft went through a downwind condition, it began to pitch nose down. Aircraft developed excessive sink rate which the pilot was unable to correct. Before impact with the trees, pilot applied full collective and aft cyclic. Aircraft crashed into trees, coming to rest on its right side in heavily wooded ravine. 8602

UH-1 Class D mishaps

H series - Dents were found on underside of main rotor blades following night vision goggles NOE training flight.

H series - Start was aborted as N1 reached 13 percent and egt was beginning to rise. As copilot was closing the throttle and turning the fuel switch off, crew chief yelled "Fire." Fire was caused by the primary fuel igniting. Start fuel switch had not been turned on.

H series - Two loud popping sounds were heard from engine area during hover. Caused by failure of engine fuel control.

UH-1 Class E mishaps

H series - Engine oil temperature rose to 100 degrees for 5 minutes during flight. Caused by malfunction of oil temperature gauge.

V series - Crew smelled smoke during takeoff. Caused by failure of main inverter.

H series - Engine oil pressure dropped from 85 psi to 70 psi. Caused by malfunction of oil pressure transmitter.

H series - Right fuel boost pump light came on during landing and circuit breaker popped. Caused by failure of boost pump.

UH-60 Class D mishap

A series - Aircraft developed severe vertical vibration during landing. Rotors drooped, causing aircraft to become uncontrollable. Slingload was released. Crew was then able to control aircraft and land. Main rotor red dampner fluid level indicator seal had failed, releasing all fluid.

UH-60 Class E mishaps

A series - Stabilator audio and caution light came on. Failure of stabilator amplifier caused loss of automatic stabilator control mode.

A series - No. 2 engine surged during landing. Shear pin in control linkage sheared prematurely.

Attack helicopters

AH-1 Class B mishap

S series - Aircraft was overtorqued during landing..Aircraft bounced three times and came to rest upright with left skid sticking in the ground. 8603

AH-1 Class E mishap

S series - Aircraft rolled left and right during hover. Copilot saw object coming from vicinity of tail rotor. No damage was found after landing.

AH-64 Class E mishap

A series - Hydraulic pressure was below 2000 psi before APU was started. As pilot was manually pumping hydraulic accumulator, check valve broke at 2700 psi. Restrictor valve was replaced.

Cargo helicopters

CH-47 Class E mishaps

C series - No. 2 engine oil pressure increased to 99 pounds during flight. Caused by failure of oil pressure transmitter.

C series - Crew chief saw hydraulic leak in aft pylon area after aircraft was landed. Caused by failure of No. 1 hydraulic line.

Observation helicopters

OH-58 Class E mishaps

A series - Master caution and engine chip detector lights came on. Aircraft was landed in field. Maintenance found metal flake on lower chip detector. Chip detector was cleaned and aircraft cleared for return flight to base. After 5 minutes of flight, master caution and engine chip detector lights came on. Aircraft was landed and maintenance changed both chip detectors and flushed engine oil system. Aircraft was hovered for about 2 minutes before engine chip detector light came on. Cause unknown pending further investigation.

C series - Aircraft would not start. Caused by failure of ignition exciter box.

Fixed wing

U-21 Class E mishaps

A series - Right engine torque, N1, N2, and temperature fluctuated. Engine failed shortly afterward. Caused by failure of fuel control.

A series - About 20 minutes into flight, oil was seen streaming from rear

of No. 2 engine nacelle. Failure of preformed packing at pressure relief valve allowed oil leak.

OV-1 Class E mishaps

D series - No. 1 engine was shut down during flight. During restart attempt, No. 2 generator failed and could not be reset. No. 1 engine could not be restarted. Single-engine landing was made. Caused by failure of starter generator.

D series - Landing gear failed to retract completely after takeoff. The only gear indicating down and locked was the nose gear. Both main gear appeared to be down but not locked. Emergency gear extension procedures were followed, and aircraft was landed. Failure of right main gear caused hydraulic fluid to leak into pneumatic system and dump valve to offset.

D series - No. 1 engine had been shut down during flight. No. 2 engine compressor stalled and chip detector light came on. No. 1 engine was restarted and No. 2 engine shut down. Caused by failure of accessory gearbox carrier assembly.

Maintenance

UH-1 Class E mishaps

H series - Crew could not communicate on intercom system during runup. Copilot's floor mike switch wires were crossed.

H series - Loud noise was heard during flight. Master caution and hydraulic lights came on, and hydraulics failed. Hydraulic line was installed incorrectly.

AH-1 Class E mishaps

S series - Copilot noticed his door ajar during hover and could not close it. Suspect door top latch was adjusted incorrectly.

S series - Vibration was felt in airframe and pedals during hover. Forward cross tube retainer was torqued incorrectly, allowing landing gear to vibrate.

CH-54 Class E mishap

A series - Slight yaw was felt during hover power check, followed by failure of No. 1 engine. Engine spline coupling on main gearbox had severed at gear plate face. Caused by insufficient lubrication.

OH-58 Class E mishap

C series - N1, N2, and torque fluctuated during before-takeoff check. P3 service air line to fuel control was loose.

Safety messages

• Safety-of-flight technical message concerning depot team inspection of suspect spiral bevel gear in forward and aft transmissions in CH-47A, B, and C helicopters (CH-47-85-17, 152330Z Oct 85). Summary: Forward and aft transmission spiral bevel gears suspected of having improper material will require a depot-level inspection using contractor teams and equipment. The inspection team will perform an eddy current inspection of the gear using their own equipment. Assistance will be required from AVUM/AVIM. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	1-30 Oct	**3**	**0**
	November	4	3			
	December	5	5			
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**3**	**0**

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

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Terence M. Henry
Colonel, Aviation
Commander, Army Safety Center

Coping with the cold

maximum benefit from the fire, make some sort of reflector to radiate the heat toward you. A reflector can be fashioned from trees, logs, metal from the aircraft, or most any material that is available.

Staying dry is very important in preventing cold injuries and hypothermia. If you get wet, change into dry clothes or dry your wet clothes. Keep your sleeping bag clean and dry by using some type of insulation, such as plenty of boughs, underneath it.

If drinkable water is available, use it instead of melting snow or ice. If you have a choice of snow or ice, melt the ice. If you must melt snow by heating, it should be compressed before it is put in a container. Your cold weather survival kit should contain combat rations for at least 3 days. If you need more food, you can fashion snares and traps to catch small animals.

Hypothermia

Hypothermia is the lowering of the body's inner core temperature. You can die in less than 2 hours from exposure even though the temperature may be well above freezing. Exposure to the wind and cold air with wet clothing accelerates heat loss. Signs of hypothermia include fatigue and drowsiness, uncontrollable fits of shivering, muscular weaknesses, stumbling and falling, incoherence, slurred speech, and, eventually, unconsciousness. The best treatment for hypothermia is rapid warming.

Frostbite

Every part of the body is susceptible to frostbite, but the ears, nose, hands, and feet are most commonly affected. The first sign of frostbite is usually a stinging or dull ache followed by numbness. The skin of the affected area turns red at first and later becomes pale gray or waxy white.

Immediate action can stop frostbite. If the cheeks and ears are frostbitten, cover them with warm hands until you feel pain. Place frostbitten fingers, uncovered, under the armpit, on the belly, between the legs, or any part of the body that is warm. Don't blow your warm breath on your cold hands. Your warm breath is very moist, and you don't need a layer of water vapor on your hands. Place bared, frostbitten feet against the belly of a companion or under his armpits. Never rub frostbitten areas. You may cause further tissue damage.

To prevent injuries and stay warm when it's cold, remember COLD:

C—for cleanliness and care. Clothing, feet, and socks are warmer when clean. Constant care of the feet is essential.

O—for overheating. Overheating will rob heat through sweat and result in dehydration and coldness.

L—for loose and layered. Loose layers of clothing ensure circulation and insulation. Adjust the number of layers to the temperature and activity.

D—for dry. Dry clothes are essential to heat retention. A wet garment is a cold garment.

FM 1-202 contains excellent information on operating and surviving in cold weather conditions. Only through knowledge of cold weather problems and use of protective devices will you be able to safely cope with the cold.

If you've never been stationed in Alaska, you may not have had a chance to attend a cold weather survival school. In 1980, the 88th Army Reserve Command began a cold weather survival training program. Each year in January they sponsor four classes of 30 personnel each. Attendees come from the U.S. Army Reserves, the National Guard, and the Active Army. Some DA civilians have also attended.

The course is conducted near Ely, Minnesota, about 200 miles north of the Minneapolis/St. Paul metropolitan area and 4 to 6 miles south of the Canadian border. The course is 4 days in length. The instructors for the course come from the 3612th Combat Crew Training Squadron, Fairchild Air Force Base, Washington. The program of instruction is the same as that used in the U.S. Air Force Arctic Survival School at Eielson Air Force Base, Alaska.

For information on class dates for 1986 and allocations for the course, contact Major Hayes, CW4 Chapman, or SSG Hyde at the 88th U.S. Army Reserve Command, Fort Snelling, St. Paul, MN 55111, or call AUTOVON 825-5642 or commercial (612)291-0131. ■

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Helicopter icing

Traditionally, helicopter operating manuals have addressed the issue of in-flight icing and its effect on helicopter performance with a **caution** or a **warning** to the pilot to avoid the icing environment. Such restrictions and limitations were acceptable at one time when helicopters were viewed as aircraft operating primarily in VMC. Since early helicopters lacked the equipment and sophisticated systems normally employed for flight in IMC, there was little justification for expending valuable time and resources on helicopter icing research and development.

Modern helicopters have a greatly expanded concept of operations and today routinely perform a broad range of tasks in IMC and marginal VMC. It's this expansion of the helicopter's operating envelope that compels a more thorough understanding of the hazards associated with in-flight icing.

Hazards of in-flight icing

The risks associated with flight in subzero precipitation or moisture have been known since the pioneering days of fixed wing flight. Typically, we have characterized icing problems by their effect on lift, drag, weight, and thrust. It is readily accepted that in-flight icing reduces thrust and lift and increases drag and weight, all to the detriment of an airplane's performance.

Rotary wing aircraft also suffer from these effects when exposed to icing conditions and, in addition, are susceptible to various complications that are **not common** to fixed wing aircraft. Although many questions remain regarding helicopter icing and its impact on aircraft performance and mission effectiveness, researchers are beginning to uncover significant insights into this facet of helicopter development.

The rotor blade icing process and its subsequent effect on helicopter performance can't be analyzed in the straight-forward manner used to explain ice accretion on the leading edges of a fixed wing aircraft. Spanwise elements of a rotor blade, unlike the leading edges of an airplane's wing, move through air at various airspeeds. Rotor blade icing is made even more complex by the constantly changing angle of attack experienced by the helicopter's main rotor blades in normal forward flight. These obvious and unique characteristics of the helicopter's lifting system, combined with differing surface temperatures along the blades' spanwise sections and smaller airfoil thicknesses, make helicopter rotor blade icing complex and extremely hazardous.

A major hazard is the deterioration of normal autorotational qualities. The adverse effect of main rotor icing on autorotational performance was documented during artificial and natural icing tests conducted by the U.S. Army in the mid-1970s. A major finding was that moderate ice accumulation (approximately one-half inch) on inboard portions of the UH-1H Huey rotor blade (and those on similar type aircraft) was sufficient to seriously deteriorate autorotational qualities by causing a loss of 22 rpm during autorotation at 70 knots indicated airspeed.

Deterioration of normal autorotational rpm results from ice accumulation in greater amounts near the inner portions of the rotor disc which directly affects the blades' efficiency with respect to upward airflows during autorotation.

The reported result is that with about one-half inch of ice on the main rotor blade's inner portion, **minimum (safe)**

Ice formation in the air intake of an engine can cause foreign object damage.

Helicopter icing

rotor rpm can't be maintained during autorotation.

Helicopter pilots shouldn't attempt to judge or estimate main rotor blade ice accumulation by observed buildup on the windshield or other parts of the aircraft because icing occurs at an accelerated rate on the rotor blade as compared to accumulation on the fuselage. A more reliable method for monitoring the buildup of rotor blade ice on UH-1 type aircraft is to compare power requirements after the formation of in-flight ice to power settings prior to ice detection. Researchers indicate that blade icing of one-half inch or greater on the UH-1 will be accompanied by a 5 to 6 pounds per square inch (psi) torque increase over the "before" or "no ice" power requirement. Icing tests conducted in the United Kingdom document cases where significant autorotational rpm deterioration occurred with only 6 percent power increase over the "no ice" power requirement.

Helicopter pilots should remember that even small buildups of ice on the main rotor blades can significantly deteriorate the available autorotational rpm to a level where safe landings cannot be assured. When in-flight icing occurs, most of the damage to autorotational performance is done by the initial ice accumulation, i.e., the first one-fourth inch of ice on the rotor blade. For helicopter pilots, this means that every encounter with icing should trigger an expanded crosscheck with careful attention to power settings. If continuous increases in power are required to maintain altitude and airspeed, there is reason to suspect that autorotational rpm has been compromised and the icing environment should be left quickly. If the accumulation of rotor blade icing deteriorates autorotational rpm, then it would seem that the shedding of rotor blade ice would be welcomed. In-flight shedding of rotor ice can and does occur. Unfortunately, it is as likely to create a problem as it is to relieve one.

Symmetrical (affecting all rotor blades simultaneously in the same way) shedding of ice in flight can be beneficial by restoring the rotor blades to a more efficient or clean configuration and by reducing the weight of the aircraft. Asymmetrical shedding (affecting less than all of the main rotor blades), however, can create extremely severe vibrations depending on the amount of ice discharged, the type of rotor system, and other factors. The severity of these vibrations is documented by test pilots engaged in conducting natural icing studies with helicopters. Their reports identify numerous occasions where in-flight icing tests have been aborted because of main rotor blade icing and subsequent asymmetrical shedding which caused vibrations so severe that it became all but impossible to read the instrument panel.

Ice on rotors can result in vibration.

The severity of vibrations resulting from asymmetrical shedding of rotor ice is generally thought to be a function of the unbalanced weight of the rotor system and therefore may be expected to be greater for two-bladed and three-bladed systems than those rotor systems employing four, five, or more blades.

Ice shedding from the main or tail rotor can also produce problems apart from an unbalanced rotor system. Though documentation is less than authoritative, researchers have experienced and expressed a concern for structural or foreign object damage to the helicopter's fuselage, rotors, or engines resulting from rotor blade shedding. This particular hazard appears to be more threatening to large multi-engine aircraft (more than 12,500 pounds) and especially for tandem rotor systems.

Asymmetrical shedding of rotor blade ice can be minimized by avoiding static temperatures lower than -5° C. Research tests with UH-1 type aircraft suggest that by rapidly varying main rotor speed or entering autorotation, symmetrical shedding may be induced when static temperatures are -5° C. or warmer. **Collective and cyclic inputs were generally ineffective in producing symmetrical shedding and may result in asymmetrical shedding. At temperatures below -5° C., it's generally not possible for a pilot to induce shedding.**

The disastrous effects of in-flight icing on helicopter engines have been reported in many military and industry publications. In-flight icing presents a hazard to normal engine performance in two major ways, **ice ingestion** and **air starvation.** Ice ingestion is minimized on many helicopters by the availability of engine anti-icing systems used to prevent the accumulation of ice deposits in the area immediately forward of the compressor section. When operating normally and environmental conditions don't overtax their capabilities, these systems considerably reduce damage from ice ingestion.

Even when aircraft are equipped with engine anti-icing systems, there

remains a need for caution to ensure normal operation of the engine. Engine anti-icing systems will prevent the buildup of "ingestible ice deposits" only when outside meteorological conditions or aircraft operating conditions (most notably forward airspeed) do not exceed systems' design capabilities. As an example, when operating normally, the engine air inlet anti-icing system on the HH-3 helicopter will maintain the engine inlet surfaces at or above 37.8° C. (100° F.). However, if outside air temperatures are very cold, extremely heavy icing conditions prevail, or the helicopter is maintaining a high forward airspeed, the engine air inlet anti-icing system will be incapable of maintaining a high enough temperature to prevent the buildup of ice in the engine inlet duct and the potential for subsequent ingestion of ice deposits exists. Many HH-3 pilots have experienced an occasion where cruise speeds in excess of 100 knots couldn't be maintained without illuminating the engine inlet anti-ice caution lights—an indication that inlet air surfaces are not being maintained above 37.8° C. and that the potential for ice ingestion has increased significantly. A common remedy for such conditions is to reduce airspeed to about 70 KIAS which provides the anti-ice system a chance to recover from the high airspeed and/or harsh outside conditions.

Even when the engine air inlet anti-icing system is capable of sufficiently heating the engine inlet surfaces, there is still the threat of random ice ingestion if deposits on rotors, fuselage sections, antennas or windshield surfaces shed and are directed into the engine air intake stream. Shedding ice deposits from the helicopter, often larger than household ice cubes, can be devastating to engine compressor blades if ingested into the engines.

Perhaps the most insidious aspect of engine anti-icing is the case where engine anti-icing systems have been activated and fail to perform as expected. When a failure or malfunction in the anti-icing system does occur and there is **no** accompanying cockpit annunciator light or instrument to alert the pilot of a failure in the anti-icing system, it may create a false sense of security and no warning that an engine failure may be imminent.

Air starvation of the engine due to accumulation of ice on the engine inlet screens has been reported by the Navy and other operators. Several helicopters had engine flameouts due to ice accretion on the engine inlet screens, and, in one case, air starvation of both engines occurred only a few minutes after ice was first noticed forming on the aircraft. Flight in icing conditions with inlet screens installed is extremely dangerous and must be avoided if at all possible.

Icing forecasts by National Weather Service or the USAF Air Weather Service may be of little use to helicopter pilots if those pilots are uninformed about how the various forecast icing rates were first determined. The methodology and terminology used to characterize and classify the icing environment was developed from in-flight icing tests conducted on DC-4 and DC-6 type aircraft. Thus, such labels as trace icing, light icing, moderate icing, and heavy icing, which are used to relate the rate of ice accretion on a fixed cylindrical probe on a DC-6, are of little use to the helicopter pilot in ascertaining or predicting the rate of ice accretion on a complex rotor system. As an example, light icing is defined as an accumulation of one-half inch of ice on a small probe per 40 miles. The rate of accretion is sufficient to create a hazard if flight is prolonged in these conditions, but insufficient to require diversionary action. While the prior definition may well be appropriate for a 100,000-pound airplane, there is no assurance that the rotating surfaces of a helicopter will accumulate only one-half inch of ice over that same 40 miles. Further, while one-half inch of ice on the wing of a large airplane might appropriately be called "light icing," there is every reason to believe that one-half inch of ice on the leading edge of most helicopter rotor systems could result in tragic consequences if autorotation became necessary. ■

—from The MAC Flyer

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	1-6 Nov	**0**	**0**
	December	5	5			
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**3**	**0**

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - Postflight inspection revealed hole in tail rotor blade after landing to gravel area. Suspect flying pebbles hit blade.

M series - Dzus fastener vibrated loose and was struck by tail rotor blade. Blade was damaged beyond repair.

H series - Main rotor blade hit tree during landing. Blade was damaged.

H series - Compressor stall occurred during flight. With application of power on short final, compressor stall became severe and aircraft yawed left. Pilot lost visual reference in dust during landing. Aircraft bounced once, breaking lower wire cutter.

UH-1 Class E mishaps

H series - Crew heard whistling sound from main rotor system during flight. Tap protecting leading edge of main rotor blade had come loose.

H series - Transmission oil temperature decreased to -50° C. Caused by failure of temperature transmitter.

H series - When aircraft was picked up to a hover, egt rose to 620 degrees with bleed air and deice switches turned off. Caused by defective anti-ice valve.

H series - Crew felt severe vibrations during flight. Six inches of red main rotor blade tip had debonded.

H series - Malfunction of fuel control caused compressor stall during flight.

UH-60 Class D mishaps

A series - As aircraft was landing at night, right side sunk into swampy ground. Landing light was broken and searchlight motor mechanism was jammed.

A series - Underside of aircraft was punctured during landing in unimproved LZ.

A series - Main rotor blade hit tree branch during takeoff from field site.

Attack helicopters

AH-1 Class C mishap

S series - Aircraft began settling during approach for landing. Collective was applied, and torque reached 65 psi. Aircraft landed hard, damaging tail boom, skid tubes, cross tubes, and fuel cell access panel.

AH-1 Class D mishaps

S series - Pilot misjudged rotor blade clearance while parking aircraft near tree. Main rotor blade erosion boot was damaged.

S series - Maintenance test pilot had been running aircraft for about 10 minutes when he heard a loud bang. Aircraft began to vibrate laterally and vertically. Pilot immediately closed throttle, but main rotor head had already contacted mast. Main rotor strap failed internally, causing main rotor blade grip to slip outwards about one-quarter inch, resulting in main rotor imbalance.

S series - After engine shutdown, tug and GPU were parked under rotor disc to supply power for the removal of test flight instrumentation magnetic recording tapes. At very low rpm, rotor blade flexed down and hit tug steering wheel. Blade continued to rotate one more revolution before stopping.

AH-1 Class E mishap

S series - Transmission oil bypass light came on. Caused by malfunction of oil cooler drain valve.

AH-64 Class D mishap

A series - Entry was slightly early during standard autorotation and deceleration was excessive, causing tail wheel to touch down short of the lane. Main gear then hit hard, left side low. IP took control and landed.

Cargo helicopters

CH-47 Class D mishap

B series - Aircraft was on the ground with engines at ground idle. Flight engineer was inside aircraft winching a PU-260 generator trailer out. Crew chief was outside watching for side clearance of the trailer. Two members of the supported unit were holding the tongue of the trailer as it winched out. As the trailer approached the ramp area, the two people holding the tongue let it drag on the floor, stopping the winch. Hole was torn in aircraft floor.

CH-47 Class E mishaps

C series - No. 2 engine torque would not match with No. 1 engine. Caused by failure of No. 2 engine N2 actuator.

D series - As aircraft was on the ground with engines running, crew smelled unusual odor and felt high frequency vibration in controls. Metal filings appeared on cabin floor. Maintenance inspection revealed extensive rotational damage to axial impeller fans in combining transmission oil cooler assembly.

Observation helicopters

OH-58 Class D mishaps

C series - Postflight inspection revealed small hole below refueling port. Aircraft had been landed on rugged terrain.

A series - N2 fluctuated during pickup to hover, and rpm would not stabilize. N2 governor assembly was replaced.

C series - During preventive maintenance check, crew chief found several yards of TOW wire wrapped around mast, control tubes, and swashplate assembly. Aircrew did not notice anything abnormal during night NVG flight.

OH-58 Class E mishaps

C series - While hovering, pilot misjudged clearance from trees. Tail rotor blade hit some small trees.

(continued on back page)

A position you can live with

Your chances of surviving a crash and escaping serious injuries are greater if you assume a protective position which reduces flailing of the head, arms, and upper torso during abrupt deceleration. The protective crash position differs somewhat depending on where you sit, your restraint system, and type of aircraft.

If your restraint system is composed of a lapbelt and shoulder harness, the recommended crash position is to sit as nearly upright as possible, lapbelt snug, shoulder harness in manual lock, and without slack between the chest and the straps. With the shoulder harness locked, the body is relatively stabilized to spread crash forces over a longer, more tolerant area of the body when horizontal forces are generated. With vertical forces the locked shoulder harness ensures a vertically erect, stable, and untwisted spinal alignment as well. This position is similar to that recommended for ejection, as in the OV-1; i.e., head and shoulders placed firmly against the back of the seat. The upright position permits the vertical impact to be absorbed by the spinal column in the direction in which it was designed to absorb impacts, the vertical axis. If you are not doing the flying, place your feet on the floor, not on the pedals, and keep your hands off the controls.

If your restraint system consists of a lapbelt only, assume the forward-folded knee-chest position. This position is attained by bending forward at the waist with the feet firmly on the floor and the chest resting on the knees. The position is held by folding and locking the arms around and behind the thighs with the hands and placing the head face down between the knees. This position will likely reduce flailing of the head, arms, legs, and upper torso during abrupt horizontal deceleration, thus preventing injury. It will prevent whiplashing of the spine, decreasing the possibility of fractures. Further, it will tend to reduce the loads sustained by the occupant's seat and thus decrease the likelihood of seat failure. The forward-folded knee-chest position is recommended regardless of whether you sit facing forward, sideward, or rearward on present Army aircraft troop seats (except the Black Hawk, which has shoulder harnesses).

Sitting upright without a shoulder harness is not recommended because of the difficulty in remaining upright by force of muscles alone. The forward-folded knee-chest position prevents flailing of the upper torso and possible injury caused by forceful flexing, because the spine is already flexed and held in position by the locked arms. Finally, the forward-folded knee-chest position offers a smaller target for dislodged missiles within the aircraft or objects that may penetrate your livable space.

It doesn't matter whether the crash forces are vertical or horizontal. The crash position is the same. ■

Forward-folded knee-chest crash position.

Fuel leaks

The following message recently distributed by the Air Force points out a problem with fuel leaks from vehicles/equipment, much of which belongs to the Army, being hauled in aircraft.

"1. Last year we had eight confirmed hazardous material fuel leaks. This year we have already had six fuel leaks.

"2. When leaks occur aboard an aircraft, the lives of all personnel aboard are endangered, and the loss of an aircraft could occur. In most incidents, the missions abort or are diverted into another station. These unnecessary events can be avoided if our personnel properly perform their assigned duties.

"3. In every substantiated incident the cargo was improperly prepared and inspected or not inspected at all.

"4. The majority of fuel leaks are a result of improper fuel levels. Verifying the fuel level is one of the most critical points when inchecking vehicles or equipment. It is imperative that our cargo incheckers/inspectors understand that their inspection is usually the last inspection before the cargo is airlifted. Nothing less than 100 percent quality control is acceptable. . . ." ■

Mishap briefs

Inspection revealed no damage to blade.

C series - Pilot felt high frequency vibration in airframe and antitorque pedals during hover. Tail rotor was out of balance due to normal wear and tear.

A series - Master caution and d.c. generator lights came on. Caused by failure of generator.

Training helicopters

TH-55 Class C mishap

A series - During standard autorotation training maneuver, student pilot allowed throttle to come out of override as aircraft was leveled from inadequate deceleration. Leveling action was aggressive. Aircraft touched down downwind, causing excessive ground speed. Aircraft slid 189 feet before leaving the lane. Left skid dug into soft dirt, breaking left oleo struts. Aircraft rolled over, with damage to main and tail rotor blades, tail boom, landing gear, and canopy.

Fixed wing

C-7 Class E mishaps

A series - Landing gear failed to retract after takeoff. Gear was verified down and locked, and aircraft was landed. Caused by broken wire at right main landing gear weight switch.

A series - Engine ran rough during flight. Caused by failure of No. 13 cylinder of No. 1 engine.

U-21 Class E mishap

A series - Fuel began to siphon from left nacelle tank during flight. Suspect fuel cap not seated correctly.

C-12 Class E mishap

C series - No. 2 fire warning light came on during flight. Caused by failure of upper fire detector.

Maintenance

UH-1 Class E mishaps

H series - Master caution light came on. Forty-two degree gearbox chip detector wire had chafed against tail boom, causing short.

H series - Transmission oil pressure fluctuated and then dropped to 30 pounds. Caused by pinched O-ring.

H series - Pilot felt slight binding in cyclic during hover. Incorrectly installed cotter pin in cyclic control tube clevis intermittently came into contact with airframe, causing binding in cyclic stick.

AH-1 Class E mishaps

S series - Engine oil temperature was 110 degrees to 115 degrees during runup. Shop towel left in oil cooler fan compartment was drawn into fan, causing bearings to freeze.

S series - Engine oil pressure dropped to zero during runup. Engine oil return line was not seated correctly.

CH-47 Class E mishaps

C series - No. 1 engine rpm could not be adjusted with normal engine trim during taxi. N1 control box was wired incorrectly.

D series - No. 2 engine fire light came on. Caused by chafed fire detection element.

U-8 Class D mishap

F series - Aircraft was in high-speed dive. Just before pullout, crew chief heard banging sound from right side of fuselage. Inspection panel had come off and hit fuselage. Suspect panel was not installed correctly.

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

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Colonel, Aviation
Commander, Army Safety Center

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Followups

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Utility helicopters

UH-1 Class A mishap in 7 Aug 85 issue (8549) □ Aircraft was on a tactical training flight. As the pilot was making a left turn around a hill, the rotor blades hit a 20-foot rock outcropping on the upsloping terrain. Control was lost and the aircraft crashed. The pilot had flown the route routinely without difficulty.

UH-60 Class A mishap in 1 May 85 issue (8534) □ Aircraft was on final approach to a stagefield when the yellow main rotor spindle failed in fatigue at the first thread root. The blade was thrown from the aircraft. The resulting dynamic imbalance caused the black and blue main rotor blade spindles to fail within a few degrees of rotation and also depart the aircraft, causing a progressive in-flight breakup. The only abnormality found during a preliminary inspection of the spindle, the elastomeric bearing, and the retaining nut was that the threads of the yellow spindle deviated along their helical path. Depot analysis concluded this deviation exceeded the limits allowed and contributed to the spindle failure by concentrating or focusing the stresses to induce the subsequent fatigue and ultimate spindle fracture.

Attack helicopters

AH-1 Class A mishap in 27 Mar 85 issue (8525) □ As the aircraft was entering GCA traffic to complete a night vision goggle training mission, the main rotor system flapped excessively, resulting in mast bumping and rotor separation. Control was lost and the aircraft crashed. Cause of the excessive flapping has not been determined.

AH-1 Class A mishap in 5 Jun 85 issue (8542) □ The crew had just finished simulating engagement of a tank and were flying over the tank to get the "buzz" number on top of the tank for accountability purposes. The pilot was flying at an airspeed of 30 to 40 knots and had descended to an altitude of 15 feet above the trees. When the pilot noticed the aircraft was descending through 15 feet, he applied collective pitch but not enough to stop the descent. The aircraft crashed through the trees and was destroyed. The pilot's attention was divided between searching for the tank, locating the tank on his map, looking for other aircraft in the immediate area, listening for a radio call from another AH-1, and flying the aircraft at a low altitude. As a result, the pilot did not recognize the critical situation and then applied too little collective too late.

Cargo helicopters

CH-47 Class B mishap in 26 Jun 85 issue (8544) □ Crew noticed a thunderstorm approaching and returned to the airfield. During shutdown, high winds caused the slow-turning aft rotor blades to flap excessively and hit the fuselage. The blades and fuselage were damaged. The pilots did not have sufficient warning of the storm or its severity because of inadequate weather facilities and services. The airfield does not have a weather facility and relies on a weather warning center for weather information. The warning center was notified of the storm but did not pass the information to the airfield. The CH-47 operator's manual does not provide guidance concerning aircraft orientation in relation to wind.

CH-47 Class A mishap in 8 May 85 issue (8535) □ While the aircraft was awaiting clearance to taxi into the POL area, the aft transmission ruptured, causing the rotor system to dephase. The fore and aft rotor blades struck one another, resulting in the forward rotor pylon separating from the aircraft. The aft rotor pylon collapsed to the left onto the No. 1 engine. Transmission failure was caused by misalignment of the second stage planetary gear assembly bearing retention bolt and retainer plate, which allowed the bearing retention bolt to fall out of the second stage carrier housing post. The retention bolt and plate came out of its slot because, during manufacture, the bolt was not rotated the full 90 degrees required to properly seat the bolt head in the carrier slot.

Observation helicopters

OH-58 Class A mishap in 29 May 85 issue (8538) □ While aircraft was at an out-of-ground-effect hover, the pilot heard two loud noises. He immediately reduced collective and applied forward cyclic. The aircraft descended into the trees and crashed on its left side. Engine failure was caused by intergranular corrosion of the fifth stage compressor rotor which resulted in accelerated deterioration and failure of a compressor blade. Corrosion was caused by failure to comply with published maintenance procedures to remove salt water contamination. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

H series - Crew heard several loud bangs and rotor rpm decreased during takeoff. Ground witnesses saw intermittent exhaust flames. Aircraft crashed in sod field. Four of the five occupants were injured. Engine power loss was caused by power turbine failure.

UH-1 Class D mishap

H series - Aircraft landed hard, damaging skid tube. Darkness and dust reduced visibility.

UH-1 Class E mishaps

H series - Battery exploded shortly after starter was engaged.

H series - Crew smelled paint thinner odor after takeoff. One of the passengers had a carton of mixed painting supplies sealed with masking tape. One of the paint containers leaked a nonwater base silver paint over much of the cabin interior.

V series - Master caution and hydraulic lights came on during landing. Caused by failure of hydraulic pressure switch.

H series - Transmission oil pressure light came on, and oil pressure gauge dropped to 37 psi. Caused by faulty pressure relief valve.

H series - Low rpm audio activated, and engine tachometer went to zero. Caused by failure of N2 tachometer generator drive shaft.

UH-60 Class D mishaps

A series - Aircraft picked up slingload consisting of jeep and trailer. Chain leg on sling was hooked around the bottom of the jeep lift clevis instead of through it. About 2 minutes into the flight, chain leg worked its way loose and left front of jeep dropped, buckling the load. Jeep and trailer were bent when they were dropped from 2 feet. Rigger did not rig load properly, and load was not inspected.

A series - Crew picked up slingload in LZ. Crewmember on pilot's side was looking out right side of aircraft, to the rear. Crewmember told pilot to move to the right, but he meant to say left. Main rotor blades hit small tree, damaging tip caps.

UH-60 Class E mishaps

A series - No. 1 tail rotor servo caution light, No. 2 tail rotor advisory light, and backup pump advisory light came on during takeoff. Caused by failure of No. 1 hydraulic pump.

A series - No. 2 fuel pressure light came on during approach for landing. Fuel leak at main fuel line quick disconnect on No. 2 engine was caused by failure of O-ring.

Attack helicopters

AH-1 Class D mishap

S series - Aircraft hit bird during night flight. Pitot tube was broken off.

AH-1 Class E mishaps

S series - Master caution, alternator, and rectifier lights came on. Broken alternator quill lock nut caused unbalanced condition in alternator.

S series - Master caution and transmission oil bypass lights came on. Caused by malfunction of transmission oil bypass manifold.

S series - Engine oil pressure dropped to zero during landing. Caused by failure of oil pressure transducer.

S series - Master caution and transmission oil hot lights came on. Transmission oil temperature was 110°

FY 86 Class A Mishap Countdown

		FY 85			FY 86	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	1-13 Nov	**1**	**1**
	December	5	5			
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**4**	**1**

C., and engine oil temperature climbed to 140 degrees. Caused by seizure of oil cooler fan bearing.

Cargo helicopters

CH-47 Class E mishaps

B series - No. 1 engine chip detector light came on during hover. Caused by failure of engine transmission.

C series - APU motor pump failed during shutdown. Caused by sheared shaft in pump.

Observation helicopters

OH-6 Class E mishap

A series - TOT exceeded limits by 13 degrees during start. Pilot did not close throttle before limits were exceeded.

OH-58 Class E mishaps

A series - Pilot's door blew open during takeoff. Pilot did not ensure door was latched correctly before takeoff.

A series - Engine failed during runup. Caused by fuel contamination. The day before, maintenance personnel drained the fuel tank, refueled, did a test flight, and then washed the aircraft. Because of an oversized seal on the fuel receiver, water leaked into the fuel tank when aircraft was washed. Pilot did not recognize the water in the fuel sample bottle during early-morning preflight.

A series - Transmission oil hot light came on during hover. Transmission oil cooler duct contained grass and weeds. Aircraft had been operating in grassy environment.

C series - Torque gauge fluctuated and engine flamed out during test flight. Caused by failure of double check valve.

A series - Fuel filter light came on during flight. Caused by contaminated fuel.

Training helicopters

TH-55 Class C mishap

A series - Solo student was on second approach to lane. On short final, aircraft was seen in a climbing right turn which developed into a rapid right spin. During the spin, aircraft descended and hit the sod between the parking area and the lane. Aircraft turned over several times and came to rest on left side.

Fixed wing

U-21 Class E mishap

H series - Right engine would not restart after being shut down in flight. Caused by malfunction of ignitor plugs.

C-12 Class D mishap

C series - As C-12 was being refueled, an Air Force F-4, which was parked behind C-12, started its engines. Refueling was stopped. As F-4 taxied out of parking area, pilot used excessive power to start aircraft moving. Wind blast from F-4 forced C-12 rudder against stop and damaged the skin.

C-12 Class E mishap

D series - Crew smelled electrical odor during flight. White smoke started coming out of air vents. Crew followed emergency procedures and landed. Caused by failure of vent blower.

OV-1 Class E mishap

D series - Cockpit filled with smoke and fumes during taxi. Caused by failure of voltage regulator.

Maintenance

UH-1 Class E mishaps

H series - Pilot felt stiffness in controls during flight. Loose clamp allowed wire bundle to cause binding at lower bellcrank of pilot's cyclic control.

H series - Postflight inspection revealed fuel on engine deck. Fuel control servo filter seal was installed incorrectly.

H series - Compressor stall occurred during pickup to hover. Mechanic had left rag inside engine intake.

UH-60 Class E mishap

A series - Stabilator failed during flight. Stabilator actuator was out of adjustment.

AH-1 Class E mishaps

S series - Transmission oil pressure fluctuated during hover. Transmission sump drain cock was not closed.

S series - Gunner's N1 and tgt gauges failed during runup. Cannon plugs to N1 and tgt gauges were not connected.

S series - Crew chief saw hydraulic fluid leaking from T fitting located right of forward fuel boost pump from lateral servo. Fitting was overtorqued, causing it to crack.

OH-58 Class E mishaps

C series - Airspeed indicator failed during takeoff. Pitot and static lines were reversed during pitot static test.

A series - Following hovering autorotation, IP got out of aircraft and noticed excessive oil leak from transmission area. Main transmission input quill had to be replaced.

U-21 Class E mishap

G series - After takeoff, when gear handle was moved to retract gear, gear would not retract. Caused by incorrect rigging of safety switch and a bent electrical pin in cannon plug.

Safety messages

- Maintenance information message concerning inspection/repair of UH-60 tail rotor blade assembly (MIM-UH-60-MEM-85-07, 302100Z Oct 85).
- Maintenance information message concerning UH-60 tail rotor drive shaft spherical washer (MIM-UH-60A-85-MEM-09, 301730Z Oct 85).

For more information on selected mishap briefs, call AUTOVON 558-4198/4202.

Thirteen receive Broken Wing Award

Thirteen aviation crewmembers received the Broken Wing Award from July through October 1985.

Captain James D.H. Bacon
Detachment 1, HQ STARC,
Hawaii Army National Guard,
Wheeler AFB, Hawaii

Captain Terry L. Caughran
213th Combat Aviation Company,
APO San Francisco 96271

CW2 Kenneth D. Collier
1st Special Operations Command,
Fort Bragg

CW3 Thomas E. Hemphill
D Company, 38th Aviation Battalion,
Missouri National Guard,
Warrensburg, Missouri

James M. Hudson, DAC
120th Army Reserve Command,
Columbia, South Carolina

CW2 Richard L. Laukka
A troop, 1st Squadron,
6th Cavalry, 6th Cavalry Brigade,
Fort Hood

Archie D. Lea, CAC
U.S. Army Aviation Center,
Fort Rucker

SP5 Paul A. Leonard
Company A, 82d Combat Aviation
Battalion, 82d Airborne Division,
Fort Bragg

WO1 Jimmy L. Moore
HHT, 4th Squadron, 7th Cavalry,
2d Infantry Division,
APO San Francisco 96251

Joseph H. Powell, CAC
U.S. Army Aviation Center,
Fort Rucker

CW3 Michael F. Vigliotte
B Company, 228th Attack Helicopter
Battalion, 1st Cavalry Division,
Fort Hood

CW2 Michael L. Weddington
C Troop, 1st Squadron,
17th Cavalry, Fort Bragg

CW2 Jack R. Wingate
20th SF Group,
Alabama Army National Guard,
Birmingham, Alabama

PRAMs addressed to NSC

AR 385-40 requires that a Preliminary Report of Aircraft Mishap (PRAM) be sent to the Naval Safety Center when certain aircraft are involved. Some of you have been addressing these PRAMs to Commander, NSC. Many of the PRAMs addressed this way are going to the Naval **Supply** Center, not the Naval **Safety** Center.

Please ensure that the Naval Safety Center is spelled out as per paragraph 5-11c (13) of AR 385-40 when they are an addressee on a PRAM. ■

U.S. ARMY SAFETY CENTER

Report of Army aircraft mishaps published by the U.S. Army Safety Center, Fort Rucker, AL 36362-5363. AUTOVON 558-2062. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Direct communication is authorized by AR 10-29.

Terence M. Henry
Colonel, Aviation
Commander, Army Safety Center

DEPARTMENT OF THE ARMY
United States
Army Safety Center
Fort Rucker, Alabama 36362-5363

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20 November 1985

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Report of Army Aircraft Mishaps

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - Engine inlet caution light came on during start. Crew failed to remove engine inlet cover during preflight. Short shaft and cowling were damaged.

UH-1 Class E mishaps

H series - Master caution and tail rotor chip detector lights came on. Caused by defective 90-degree gearbox.

H series - Master caution light came on, and loud screeching sound was heard. Caused by failure of hydraulic servo.

H series - Electrical fire during hover was caused by defective windshield wiper motor.

UH-60 Class D mishaps

A series - As aircraft hovered over tent, rotorwash blew tent down. Tent fell onto stove and caught fire. Tent was located too close to hot POL points. Pilot did not maintain adequate distance from tent.

A series - Passenger accidentally activated M13 flare in rear of aircraft during hover, causing a whiteout condition for the pilots, who were wearing night vision goggles. Aircraft hit landing pad in tail-low attitude, collapsing tail strut and damaging ADF antenna and skin.

UH-60 Class E mishaps

A series - Engine-out audio and warning light activated. Torque on engine went to zero. Engine failure was caused by failure of power takeoff assembly and bearings.

A series - Rotor rpm rose to 105 percent, and No. 1 engine flamed out. Caused by defective linear actuator.

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	1-20 Nov	**2**	**1**
	December	5	5			
2nd Qtr	January	5	0			
	February	3	2			
	March	9	14			
3rd Qtr	April	2	3			
	May	4	0			
	June	1	0			
4th Qtr	July	5	1			
	August	2	1			
	September	3	2			
	Total for Year	46	31	Total to Date	**5**	**1**

Attack helicopters

AH-64 Class E mishaps

A series - Left brake locked and main tire failed during rollout. Rated student pilot indicated he did not lock the brake. No discrepancy could be found with wheel or brake system.

A series - Smoke was seen coming from aft transmission area during flight. Postflight inspection revealed large amount of oil around transmission. Caused by failure of shaft-driven compressor.

A series - Primary hydraulic pressure light would not go out during runup. Caused by failure of hydraulic pressure switch and air data processor.

AH-1 Class D mishap

S series - Bird hit and broke pitot tube as aircraft was in cruise flight at night.

AH-1 Class E mishaps

S series - Pilot, told that weather was 500-foot ceiling and 1 mile visibility, requested and was given a special VFR departure. Pilot took off, made a closed traffic pattern, and landed. He reported to tower that weather was less than 300 feet and one-half-mile visibility.

S series - Popping sound was heard during flight. Bird remnants were found on airframe.

Cargo helicopters

CH-47 Class E mishaps

C series - As aircraft was being loaded, crew chief noticed hydraulic

Mishap briefs

fluid leaking from utility cooler core. Caused by failure of cooling core on hydraulic oil cooler fan.

B series - No. 1 engine emergency beep trim system failed to increase during runup. N2 section of fuel control stuck in one position, causing N2 actuator to burn up.

CH-54 Class E mishap

A series - Aircraft yawed right and left, and loud grinding noise was heard. No. 1 engine spline coupling on main gearbox had severed at gear plate face.

Observation helicopters

OH-58 Class D mishaps

C series - On approach to confined area with right quartering tailwind, pilot saw torque go to 90 percent, started reducing collective, and landed. After repositioning to another area and going through shutdown procedures, aerial observer told pilot he saw torque exceed 115 percent during reposition.

D series - Bird hit and broke pilot's windscreen during night flight.

OH-58 Class E mishaps

C series - Pilot applied excessive collective during simulated engine failure/termination with power. Aircraft was overtorqued for 1 second.

C series - Starter button was depressed and igniters were heard. After N1 stabilized, throttle was opened to idle. There was no increase in N1, turbine output temperature, or engine noise. Start was aborted. Fuel boost pump had been replaced before aircraft was started. When the whole fuel system had time to pressurize, the aircraft started.

Fixed wing

C-12 Class E mishap

C series - Fuel was seen coming from right engine nacelle during rollout after landing. Nacelle one-way check valve stuck in closed position, causing overpressurization of fuel cells.

T-42 Class E mishap

A series - Crew smelled smoke and burning wires when landing gear handle was placed down. Gear-down light did not come on. Tower checked gear, and aircraft was landed without incident. Caused by failure of gear-down stop bracket locks.

U-21 Class E mishaps

A series - Fuel was seen siphoning from right wing tank cap after takeoff. Cap was secured incorrectly.

A series - Crew heard loud bang, and aircraft yawed to left. IP saw flames and sparks coming from right exhaust pipe of No. 1 engine. Landing was made without incident. Caused by engine failure.

Maintenance

AH-1 Class D mishap

S series - Left engine access door was left open and resting against exhaust pipe during ground run. Inlet cooling scoop was damaged.

AH-1 Class E mishap

S series - Transmission oil temperature rose during approach. Transmission oil cooler cooling fins were coated with dust and dirt. Quick disconnect fitting on line from transmission oil bypass manifold was not installed correctly, causing partial restriction to oil flow.

C-12 Class E mishaps

C series - Gear in-transit light would not go out and gear warning horn sounded when gear handle was placed in up position. Gear in-transit microswitch was overpainted in open position.

C series - When gear was retracted, red transit lights in handle stayed on. Gear-up limit switch was out of adjustment.

Safety messages

• Safety-of-flight maintenance mandatory message concerning torque stabilization of main rotor pitch horn attachment bolts on UH-60 (UH-60A-85-25, 301700Z Oct 85). Summary: Maintenance manuals do not currently require a torque check of the horn attachment bolts after a new spindle assembly or control horn is installed. These bolts are required to be checked every 9 to 11 flight hours until stabilized. This message provides inspection and torque check procedures. Contact: Roger Redick, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning correction to safety-of-flight message UH-60A-85-25 (UH-60A-85-26, 032200Z Nov 85). Summary: UH-60A-85-25 message listed incorrect serial numbers for affected aircraft. This message lists correct serial numbers, adds part numbers, and changes procedure in paragraphs 9d and e. Contact: Roger Redick, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of the AH-1/TH-1/TAH-1 and UH-1M main rotor hub for proper clearances between the extension assembly and grip assembly (UH-1-85-09, AH-1-85-07, 051610Z Nov 85). Summary: Extension assemblies have been received from supply with excess material on the forge flashing at the trailing edge. This can cause the extension assembly to chafe against the inner side of the grip. Main rotor hubs will be inspected for proper clearance between the extension assembly and grip assembly. Contact: David Giratos, AUTOVON 693-3300, commercial 314-263-3300.

U.S. ARMY SAFETY CENTER

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Terence M. Henry
Colonel, Aviation
Commander, Army Safety Center

Stacom

Standardization Communication

Clarification to AR 95-1

Paragraphs 1-9b and 2-22c, AR 95-1, prevent personnel who are not rated aviators from starting, running up, and taxiing helicopters. This restriction does not apply to the operation of auxiliary power units by nonrated personnel who are required to perform maintenance checks.

Origin and concept of STACOM

The Deputy for Standardization (now the Directorate of Evaluation and Standardization (DES)), U.S. Army Aviation Center, assumed the expanded mission of worldwide aviation standardization assistance and evaluation as an extension of DCSOPS, DA, November 1974. As knowledge was gained of the common problems and deficiencies found in worldwide aviation standardization, it was concluded that often a lack of understanding or misinterpretation of current aviation policies and procedures was a significant obstacle to effective implementation of the DA Aviation Standardization Program.

Since DES was the focal point of aviation standardization, the decision was made by the Commander, Army Aviation Center, that DES would establish and maintain direct communication with the field regarding aviation standardization matters. This was to be accomplished by a 24-hour telephone answering service and frequent articles in **Flightfax** under the STACOM heading. The telephone numbers are AUTOVON 558-3589 during duty hours and 558-6487 after duty hours. FTX number is 533-xxxx. Commercial number is area code 205, 255-xxxx.

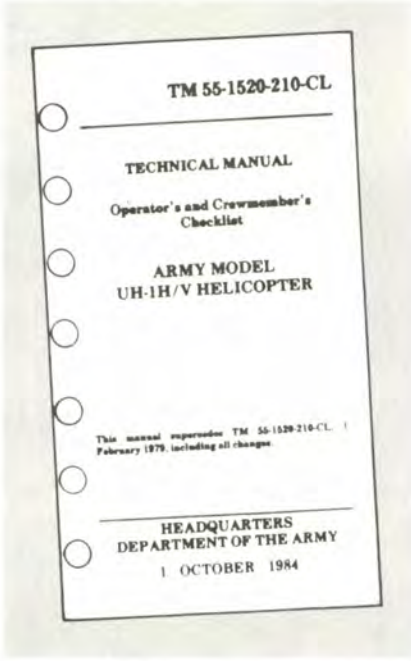
Flightfax was chosen as the "parent" publication because of its frequency of publication and wide distribution. STACOM was to serve primarily as a means of directly disseminating necessary information to assist in correcting the deficiencies and misunderstandings noted in aviation unit standardization programs. STACOM No. 1 was published 18 February 1976. STACOM would also serve as a forum for response to selected questions, as a method of alerting the field to important changes to operating procedures, policies, etc., and as a means for DES to discuss specific areas of aviation standardization.

Although references to and interpretation of Department of the Army MACOM-level directives and Federal aviation regulations appear in STACOM, the publication is informative only. The Directorate of Evaluation and Standardization continues to encourage direct communication for official interpretations of your aviation-related problems/questions and will respond by official written communication.

Being informative in nature and for use as needed by the aviation community, there is no official requirement to maintain all copies of STACOM on file. However, AR 385-95, par. 2-17h, requires that aviation safety publication libraries be maintained by all aviation units. One of the items contained in these libraries should be current issues of **Flightfax,** normally, as a minimum, copies of the previous 12 months, which includes STACOM. STACOMs do serve as a means to disseminate up-to-date information to aviation personnel, allowing correction of deficiencies and misunderstandings regarding Army aviation programs and publications. Commanders should declare STACOM the official source of guidance until changes are made to the respective regulations. STACOMs containing information which will be incorporated into regulatory publications will publish the target date for printing of the official change to the publication.

Change 1 to TM 55-1520-210-CL

Change 1 to TM 55-1520-210-CL contained new tabular performance charts: Maximum Torque Available - 30-Minute Limit, Maximum Gross


TM 55-1520-210-CL

TECHNICAL MANUAL

Operator's and Crewmember's Checklist

ARMY MODEL
UH-1H/V HELICOPTER

This manual supersedes TM 55-1520-210-CL, 1 February 1979, including all changes.

HEADQUARTERS
DEPARTMENT OF THE ARMY
1 OCTOBER 1984

Weight (OGE), Torque Required to Hover at Maximum Gross Weight (OGE), and Torque Required to Hover at Two Feet at Maximum Gross Weight (OGE). These were added by Army Aviation Systems Command in response to recommendations made concerning issues presented at the 1983 Army Aviation Policy Committee. The charts were developed to assist in performance planning, to provide an easy-to-use device to replace some -10 graphics in the cockpit, and to be applicable to the majority of tactical terrain flights where hover OGE capabilities are required. The use of the tables does not substitute for comprehensive premission performance planning.

When tabular charts are used as a source of performance information, there is no requirement to enter the data found in these charts on a PPC. An example of how the charts may be used follows:

Known:

Pressure altitude = 396 feet.

Free air temperature = +27° C.

Wanted:

Maximum gross weight for hover OGE.

Torque required to hover OGE at that gross weight.

Torque required to hover IGE at that gross weight.

Method:

1. Find the chart that depicts the range of FAT and pressure altitude above. Since temperatures are shown for each 5° and altitudes appear at 500 foot increments, round known FAT **up** to nearest 5° C. (The numbers are rounded up rather than down to "safe-side" the planning.) In this example, 500 feet and +30° C. will be used (page P-17).

2. Enter PRES ALT FT at 500; move right to the block under 30° C. FREE AIR TEMPERATURE.

3. The top number (886) in the block represents 8860 pounds maximum gross weight to hover OGE. It is the maximum gross weight for hover OGE with the maximum torque available for these conditions.

4. The second number (44) is the torque required to hover OGE at 500 feet, +30° C., and 8860 pounds. It is also maximum torque available for 500 feet and +30° C. If an aviator desires to confirm the maximum torque available, he may turn to page P-11 and, using the same method, read 43.5 psi. Yes, there is a .5 psi difference, but it is resolved by using the "rounded" number on page P-17. Anytime the top number in the block is less than 950, the second number is always maximum torque available. When the top number in the block is 950, the second number indicates that at least that torque value is available; there may be more torque available but never less.

5. The bottom number in block (36) is the torque required to hover at a gross weight of 8860 pounds IGE (2 feet). This value is used at a hover as a go-no-go check. If the helicopter hovers IGE (2 feet) at or less than 36 psi, takeoff may be attempted.

6. Torque values outlined in tabular data are calibrated values and should be converted to indicated values prior to use in the cockpit. ■

STACOM 113 20 Nov 1985

Prepared by the Directorate of Evaluation and Standardization, USAAVNC, Fort Rucker, AL 36362-5000, AUTOVON 558-3589 during duty hours, 558-6487 after duty hours. Information published here generally precedes the formal staffing and distribution of Department of the Army official policy. This information is provided to all commanders to enhance aviation operations and training support.

TURNER E. GRIMSLEY
Colonel, Aviation
Director, DES

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24 September 1986

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Report of Army Aircraft Mishaps

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - Collective was reduced too rapidly during upslope landing. Aircraft rocked back and tail skid hit the ground. Aircraft rocked forward and aft several times, causing main rotor blades to flex down and hit wire strike protection system. Damage to main rotor blades and lower WSPS was found during postflight inspection.

UH-1 Class D mishap

H series - Aircraft was engaged in low-level door-gunnery training. Door gunner engaged targets on left side, then, as aircraft approached end of range, door gunner began engaging targets just in front of aircraft. As copilot made climbing left turn to exit range, debris from impacting rounds struck and cracked copilot's window. PIC allowed door gunner to fire too close to aircraft just before it made a turn. SOP is being revised to prevent recurrence.

UH-1 Class E mishaps

H series - Leak in fuel hose assembly developed during flight. Caused by deterioration of hose.

H series - During final approach, engine oil filter seal ruptured causing oil to be pumped overboard.

H series - Worn pitch change rod end bearing caused severe vibration during takeoff.

UH-60 Class D mishaps

A series - During takeoff from confined area, pilot misjudged clearance and allowed main rotor blade to hit a tree branch.

A series - While aircraft was hovering in LZ, rotorwash pulled tree branch into rotor, causing damage to three tip caps.

UH-60 Class E mishaps

A series - During engine start, starter didn't drop off line when No. 1 engine caution light went off. Engine NG remained at 23 percent starter speed. Half-moon-shaped piece of metal from APU check valve was found stuck in No. 1 engine start bleed valve.

A series - Stabilator failed in automatic mode during flight. A few minutes after resetting, it again failed. Aircraft is awaiting replacement of stabilators. Stabilator on another aircraft also failed during flight, followed by caution lights for flight path stabilization, collective, and airspeed. Maintenance replaced stabilator actuators.

Attack helicopters

AH-1 Class C mishap

F series - Aircraft was at NOE altitude. Crew felt bump in cyclic during

(continued on next page)

FY 86 Class A Mishap Countdown

	Month	FY 85 Class A Mishaps	FY 85 Army Fatalities	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities
1st Qtr	October	3	0	October	**3**	**0**
	November	4	3	November	**5**	**1**
	December	5	5	December	**1**	**1**
2nd Qtr	January	4	0	January	**3**	**4**
	February	3	2	February	**3**	**2**
	March	9	14	March	**4**	**3**
3rd Qtr	April	2	3	April	**1**	**8**
	May	4	0	May	**1**	**0**
	June	1	0	June	**2**	**2**
4th Qtr	July	5	1	July	**5**	**3**
	August	2	1	August	**3**	**1**
	September	3	2	1-24 Sep	**3**	**2**
	Total for Year	45	31	Total to Date	**34**	**27**

Mishap briefs

left pedal turn around tail. As right cyclic was applied, aircraft struck top of tree and descended slightly into trees before crew could maneuver out and land. Leading edge of one main rotor blade was destroyed and tail rotor blade was punctured.

AH-1 Class E mishaps

E series - Aircraft was taxiing. Crew heard three or four loud reports and PIC took controls. Suspect engine compressor stall.

E series - During hover, smell of burning plastic came from ECS vent. Fumes continued coming from vent after aircraft landed and ECS was turned off. Inspection showed fumes were coming from alternator. Caused by failure of alternator bearing.

AH-64 Class E mishaps

A series - Pilot had completed fuel management test during acceptance test flight. CPG began fuel test by placing tank select switch in aft position. No. 2 engine fuel psi warning light came on and engine flamed out. Attempt to restart was unsuccessful. Caused by defective CPG tank select switch.

A series - During flight at 140 knots, stabilator programmed to 20 degrees trailing edge down (TED), with no failure indication. Stabilator returned to zero degrees TED when aircraft slowed to 80 knots. Maintenance replaced airspeed transducer.

A series - Stabilator caution light and audio warning came on in flight at 900 feet msl and 100 knots. Omnidirectional airspeed sensor was replaced.

Cargo helicopters

CH-47 Class E mishaps

D series - Transmission oil temperature on No. 1 engine increased rapidly during flight. No. 2 engine and combining transmission temperatures began increasing on final. Caused by defective transmission fan assembly.

D series - During takeoff, No. 2 engine appeared to have static beep failure. Caused by failure of N2 actuator.

CH-54 Class B mishap

A series - Cable snapped while aircraft was lifting external load. Hook swung up, striking one main rotor blade and right landing gear. One-on-one vibration developed and crew immediately landed. Main rotor blade was destroyed. Sheet metal damage occurred during landing. 8649

Observation helicopters

OH-6 Class C mishaps

A series - During runup for MOC, pilot pushed idle stop release ring and rolled throttle to what he thought was fuel-cutoff point. Ring didn't go all the way forward. TOT immediately went to 1010° at starter engagement. Caused by failure of idle stop release ring to operate properly.

C series - Pilot failed to apply enough

collective to cushion touchdown during autorotation. IP was late with corrective action. Damage to tailboom and fuselage amounted to $19,000.

OH-6 Class E mishap

F series - Transmission oil pressure low warning light came on during flight. Aircraft landed and shut down. During rotor coastdown, pilot of another aircraft hovered too close to rear of first aircraft. Slowly-turning main rotor

blades of first aircraft flexed down, hitting and denting its own tailboom.

OH-58 Class D mishap

A series - During range sweep prior to gunnery fire, copilot noticed TOW wire inside his door. Aircraft landed and TOW wire was found wrapped around swashplate and pitch change link. IP had failed to see TOW wires in flight path.

OH-58 Class E mishaps

C series - Cyclic became stiff and

(continued on page 4)

Stacom

Standardization Communication

Safety awareness boards

Safety awareness boards are used by commanders as an important part of their aviation accident prevention plan. Normally, these boards are placed in high-visibility areas: orderly rooms, billets, hangars, motor pools, and major maintenance shops. To be effective, these boards must be properly maintained and attractive. During an assistance visit some time back, we found a unit safety awareness board that not only meets all of the information requirements, it displays the information in an attractive manner.

Construction

- Plywood sheet, ½ inch by 4 feet by 8 feet
- White background with 2-inch green border
- *Aviation Digest*, *Flightfax*, *Driver*, and *Countermeasure* publications mounted on two-ring clipboards.
- DA Form 2696R: Operational Hazard Report (OHR); DA Form 4755: Unsafe Working Conditions (UWC); Safety Council minutes, inspections; and urgent information, mounted behind plexiglas or glass in a wooden frame.
- FOD, photos, and monthly special emphasis subjects, mounted on corkboard.
- *PS Magazine* mounted on small hook.
- Earplug box mounted to right side of board. (See illustration for proper placement of items.)

Board currency

- Monthly safety publications will be kept on clipboards for 1 year, then filed in a three-ring binder.
- *PS Magazine* will be changed and filed monthly.
- Special emphasis subjects will be changed monthly.
- Poster and FOD display will be changed monthly.
- Photos changed quarterly.
- Urgent information changed as required.
- Unit Safety Council minutes and results of last inspection will be kept until replaced by new minutes and inspection and then filed.
- Earplugs will be replaced by the hearing conservation officer as required. ■

—a special thanks for sharing their plan for an effective safety awareness board to members of the 2d Armored Cavalry Regiment

STACOM 118 24 September 1986

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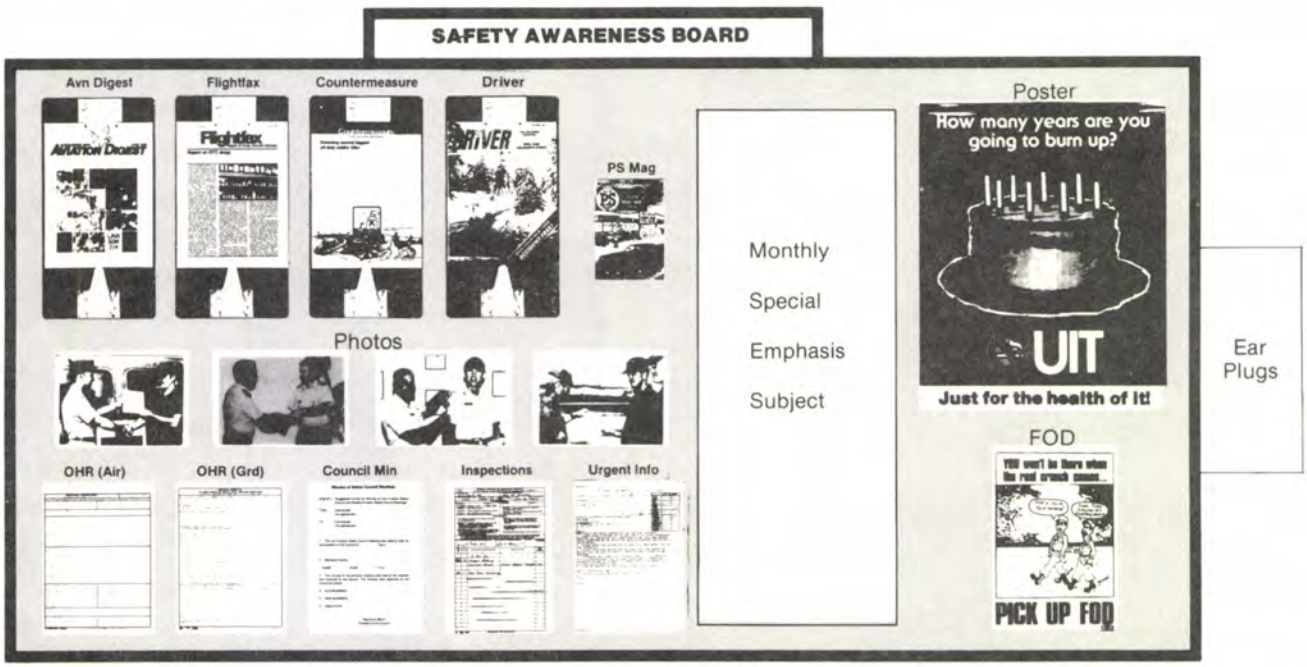
JOHN C. SHAW, JR.
LTC, Aviation
Director, DES



Mishap briefs

hard to control during takeoff. Hydraulic caution light flickered then remained on during downwind. Caused by failure of hydraulic line.

C series - While performing OGE hover check prior to test firing, aircraft began to settle. Pilot noticed N2 drop to 97 percent. At about 10 feet agl, pilot applied power and N2 dropped to 93 percent. Rpm light and audio came on and torque went to 105 percent for about 2 seconds. No TOT overtemp was noticed. Maintenance inspection showed no internal damage or reason for inadequate power.

C series - Aircraft was on NVG flight. During approach to landing, crew saw sparks coming from overhead panel. Maintenance could find nothing wrong with electrical system.

Fixed wing

RG-8 Class A mishap

A series - Aircraft was on training mission; one IP was taking a final check ride. While flying traffic pattern, aircraft crashed. 8650

T-41 Class A mishap

B series - During approach to landing, aircraft landed hard, rolled, and crashed. 8651

C-12 Class E mishap

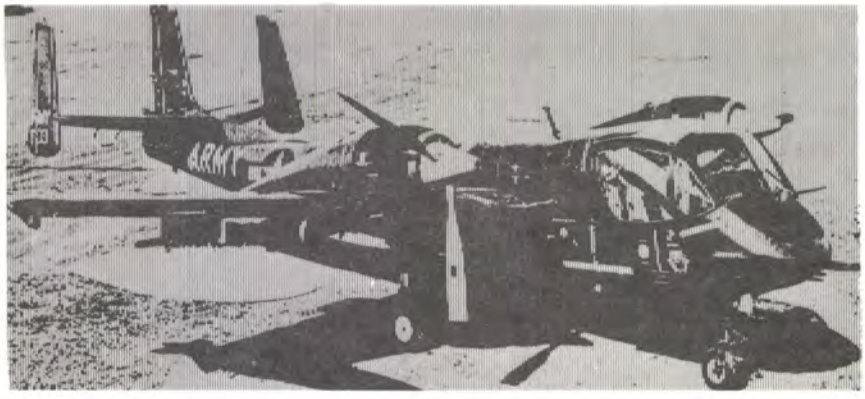
C series - During level flight, crew chief noticed fuel coming from aft portion of right engine nacelle. Caused by leak in fiberglass resin seal for right nacelle fuel tank probe.

OV-1 Class E mishaps

D series - Position indicator for nose wheel showed unsafe condition. Caused by failure of direct control valve in landing gear dump system.

D series - During flight, No. 1 engine had a series of rapid compressor stalls before it quit completely. EGT rose to 800° C. before engine could be shut down. Engine has been removed to determine cause.

D series - Pilot noticed high-frequency vibration and loud humming noise during flight. Caused by broken flexible valve hose for environmental control unit.



T-42 Class E mishaps

A series - Aircraft developed low-frequency vibration after takeoff and No. 2 propeller rpm fluctuated at high setting. Caused by failure of right magneto.

A series - After takeoff, left engine failed at 100 to 150 feet agl. Caused by failure of boost pump.

A series - No. 2 engine wouldn't develop power. Maintenance couldn't unfeather prop either with power or manually. Caused by failure of propeller governor. Prop had accumulated 10 hours since last overhaul.

U-21 Class E mishap

G series - ELT activated during flight. Caused by heavy turbulence.

Maintenance

AH-1 Class E mishap

S series - During NVG hover, IP

noticed fluid on ramp. Aft fuel pump was leaking. Aft fuel sump drain wasn't seated properly. Sump drain will be replaced.

AH-64 Class E mishap

A series - Before flight, MOC was performed on pilot's fuel panel switches. Aft and normal crossfeed switch positions operated correctly. When crossfeed switch was placed in forward position, No. 2 engine pressure light came on and engine flamed out

Mishap briefs

after about a minute. Wires to fuel crossfeed switch had been connected backwards, causing shutoff of fuel to No. 2 engine.

CH-47 Class E mishaps

C series - No. 2 engine failed during HIT check. Loose P1 airline on fuel control of No. 2 engine caused engine to fail due to fuel starvation.

C series - During ramp check after takeoff, crew chief saw No. 2 hydraulic boost was leaking from top fitting. Preformed packing had deteriorated, allowing fluid to leak. No. 2 hydraulic manifold had been taken from another aircraft. Old seal was dry when installed and it also had been pinched.

C series - No. 2 engine wouldn't motor during start. Two wires on engine start circuitry were broken at dephasing lever mechanism on C-box. APU remained on line but developed excessive oil leak which resulted from failure of plain seal on APU tachometer generator.

C series - No. 1 rectifier caution light came on in flight, followed by No. 1 generator off caution light with no bus tie. No. 1 rectifier came back on line with bus tie but generator wouldn't reset. Generator control wire under tunnel cover was chafed.

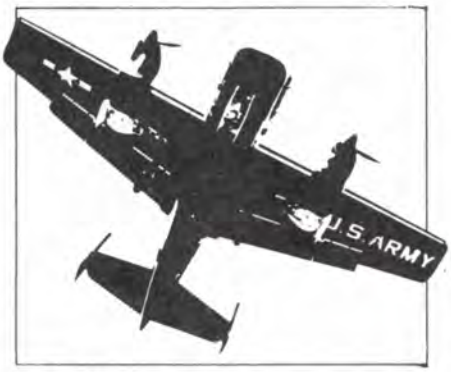
OH-58 Class E mishaps

A series - Pilot applied power after climbout. As TOT passed through 600° C., N2 drooped to 96 percent. Low rpm light and audio came on. When pilot lowered collective to full down, N2 returned to 100 percent with full beep. N1 stabilized at 62 to 63 percent. When power was again applied, N2 drooped to 96 percent. Caused by improper installation of copilot's collective.

A series - Engine oil temperature rose to 115° C. and engine oil pressure dropped to 110 psi with power at 95 rpm. Oil cooler duct was clogged with grass and dust.

A series - Aircraft had total electrical failure when starter button was pushed. Platoon sergeant hadn't readjusted aircraft voltage regulators as required before deployment to hot environment.

C series - During flight, transmission oil pressure gauge steadily decreased until it reached 28 psi then fluctuated between 28 and 15 psi. Caused by clogged oil pressure switch.



OV-1 Class E mishap

D series - During before-landing check, pilot noticed intransit indication on left main gear. Left gear downlock switch was out of adjustment.

SD3-30 Class E mishap

Crew noticed low oil pressure on No. 1 engine and fluctuating torque indicator. Mechanic failed to secure oil cap/dipstick, causing loss of 4 quarts of oil.

Safety messages

- Safety-of-flight technical message concerning one-time inspection of transmission support fittings (OH-58-86-06, 271940Z Aug 86). Summary: AVSCOM has been notified that a unit has received two OH-58C helicopters from CCAD with aluminum transmission support fittings installed. Further, a mixture of aluminum and steel fittings were received when replacements were drawn from local supply. TM 55-1520-228-23P, Figure 23, shows only steel fittings, forward and aft. Aluminum fittings were replaced with steel fittings during the OH-58C conversion program due to increased available power and higher gross weight. OH-58A aluminum fittings were to be replaced with steel fittings by attrition. Purpose of this message is to direct a one-time inspection of all OH-58C aircraft to assure that steel fittings are installed. If aluminum fittings are installed, specified operating restrictions and special inspections are required until replacement is made. Contact: CPT William Knight, AUTOVON 693-3300, commercial 314-263-3300.
- Maintenance information message concerning status of helical cluster gear on OH-6A and OH-58A series aircraft with T63-A-700 engines (MIM-OH-58-86-ME-05 and MIM-OH-6-86-ME-07, 292100Z Aug 86).
- Maintenance information message concerning advance notification of change to TM 55-1500-328-25 (MIM-GEN-86-MEM-03, 301700Z Aug 86).
- Safety-of-flight maintenance mandatory message concerning one-time inspection of M97 series turret spring pins and saddle shaft mounting bolts in TAH-1S, AH-1E(ECAS), and AH-1F(MC) aircraft (AH-1-86-05, 102100Z Sep 86). Summary: AMCCOM reported that antirotation spring pins on four AH-1 Cobras have recently failed; two during live firing. This resulted in ball mount backing off the mounting bolt and separating from rear support on M97 series turret saddle, allowing back of M197 cannon to drop down and cannon to fire erratically. General Electric reported M197 turret

(continued on back page)

Mishap briefs

saddle shaft mounting bolts may have had insufficient torque applied to them. This could result in excessive saddle movement and elevation errors during live firing. Purpose of this message is to require one-time inspection of M97 series turrets for condition of spring pins and for proper torque on shaft mounting bolts. Contact: CPT W. Knight, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of tail rotor assembly on OH-6/H-6 series aircraft (OH-6-86-11, 102030Z Sep 86). Summary: Due to loss of abrasion strips on tail rotor blades in recent months, referenced technical bulletins were published and issued to the field to correct the problem. It is believed that a few tail rotor blades (P/N 369A1613-7M) had shop air pressure applied internally during modification process. These blades were in a lot of 30 tail rotor assemblies (P/N 369A1620-609). This message provides procedures for a one-time inspection of these cited blades and assemblies. Contact: CPT W. Knight, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning AH-64A series aircraft, fire control computer battery replacement (MIM-AH-64-86-ME-01, 051530Z Sep 86).

• Maintenance information message concerning OH-58A and C model aircraft hydraulic reservoir cover (MIM-OH-58-86-ME-02, 102000Z Sep 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

More correspondence subcourses available for aviation safety officers

The 22 January 1986 issue of *Flightfax* announced the Aviation Safety Officer Correspondence Course (ASOCC) and listed 10 available subcourses. Nine additional ASOCC subcourses are now available:

• AVO 570 - Shop and Flightline Safety

• AVO 581 - Legal Aspects of Safety

• AVO 582 - Safety Office Administration

• AVO 583 - Armament Safety

• AVO 585 - Measuring Safety

• AVO 588 - Math Review

• AVO 589 - Weight and Balance

• AVO 590 - Crash Dynamics

• AVO 596 - Human Factors and Group Dynamics

Aviators desiring to enroll in the ASOCC should call Fran Souders, Directorate for Plans, Programs and Professional Development, U.S. Army Safety Center, AUTOVON 558-3164/4479, FTS 533-3164/4479, or commercial 205-255-3164/ 4479. ■

U.S. ARMY SAFETY CENTER

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