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Flightfax®
Report of Army Aircraft Mishaps

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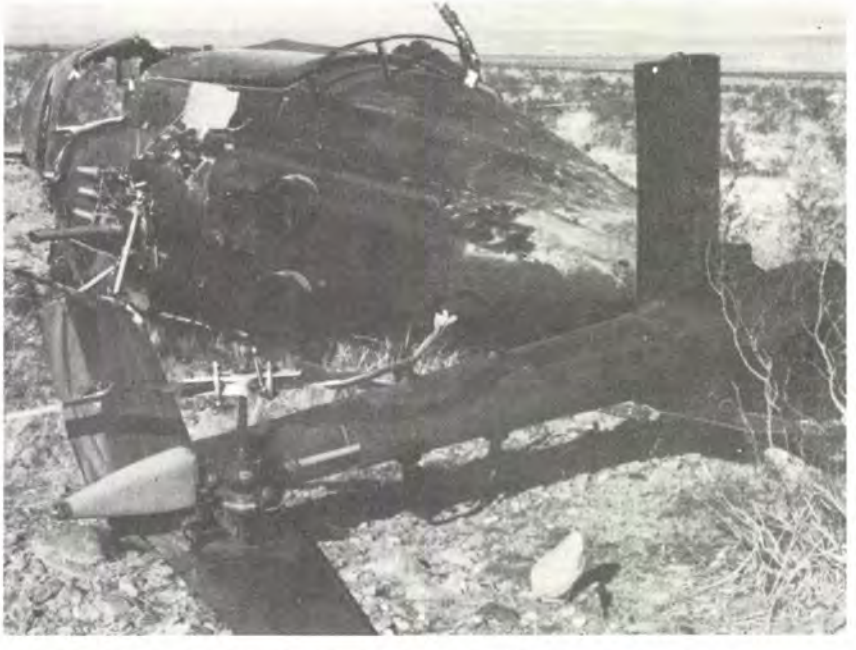
It could have been prevented

The four aircraft, two AH-1s and two OH-58s, had deployed to the training site 4 days earlier to participate in a mock battle exercise. The crews were given a mission briefing and had finished preflighting their aircraft; then the mission, which had been scheduled for early morning, was delayed by bad weather. It was actually mid-afternoon before the helicopters took off for the training site.

During the mock battle, one of the AH-1s developed a problem with its Multiple Integrated Laser Engagement Simulation (MILES) equipment and returned to home base. After about an hour, the second AH-1 was told to return to the Forward Area Refueling Point (FARP). The Cobra and one of the OH-58s left for the FARP with the OH-58 leading by about 500 meters.

The second OH-58 accomplished a target handoff to a relief team before leaving the battle area to refuel. About 5 kilometers short of the refueling point, the second aircraft crossed a ridgeline and merged into the flightpath of the other OH-58. The aircraft collided and crashed. The PIC of the first OH-58 was killed and the other three pilots were injured.



Neither of the OH-58 crews saw the other aircraft

The pilots of the second OH-58 had just transferred control of the aircraft when the mishap happened. The copilot, who had been navigating, closed his map and reached for the controls. Their destination was ahead and to the left; and that's the direction he looked. The PIC, in the right seat, was concentrating on locating their position on the tactical map. Only a few seconds passed before the aircraft collided.

If the pilots of the second OH-58 had been scanning all quadrants, they would have seen the other aircraft through the right windscreen in time to avoid collision. However, they never saw the aircraft they were overtaking and merging into. The pilots of the first OH-58 were equally unaware that the other aircraft was approaching from their left rear. Neither crew saw the other aircraft before they felt the impact.

The crew of the AH-1 saw both aircraft

The pilots of the AH-1, which was flying trail behind the first OH-58, saw the second OH-58 cross the ridgeline, but they failed to warn the first aircraft. Both aviators in the AH-1 were relatively inexperienced and, because they didn't believe the aircraft were going to collide, they elected not to break radio silence to warn the other aircraft. The importance of maintaining radio silence during tactical exercises had been emphasized in unit SOPs and mission briefings.

Traffic was heavy and local regulations were violated

Air traffic in the area where this mishap occurred is dense. In a 3-year period, aircraft landings at the nearby field had increased from 9,658 to 38,454; a 398-percent increase. There had also been a dramatic increase in the number of aircraft using airfield operations for flight following. Neither of the aircraft in this mishap had informed air traffic service personnel of their locations, although local regulations required that they do so.

Airfield facilities were inadequate

Not only had area traffic density

(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 - Mishap aircraft was trail in flight of six on troop insertion mission. Flight was at NOE altitude and the mishap aircraft was the lowest in the flight. The right chin bubble struck top of tree and shattered into the cockpit. Both pilots had their helmet visors down. Pilot was flying 40 to 50 knots into sun. He was too low and too fast for conditions and he didn't see the tree. As air mission commander, he was also involved in flight techniques of other members of the flight. The copilot saw the tree from the right seat, but misjudged clearance and failed to alert the pilot.

H series - IP demonstrated two low-level autorotations before having student attempt the third. IP failed to realize maneuver was too fast until aircraft skids contacted runway. Aircraft slid down runway 300 to 400 feet, yawed right about 45 degrees, and continued to slide off runway. Estimated cost of damage is $5,500.

V series - During flight, crew felt thump, followed by severe airframe vibration. Bird had struck white main rotor and tail rotor blades.

UH-1 Class E mishaps

H series - Master caution and transmission oil pressure lights came on during hover taxi and oil pressure began dropping. Caused by failure of transmission oil filter gasket.

H series - During takeoff to hover, N2 dropped to 6400 rpm. After landing, rpm couldn't be beeped up or decreased. Linear actuator was replaced.

H series - Aircraft developed vibration during flight. Caused by failure of engine short shaft.

UH-60 Class E mishaps

A series - No. 1 engine starter failed to disengage before 65-percent NG. IP moved engine power control lever to off position, turned off ignition switch, and removed air source. When lever was released, sequence repeated and fire guard saw black smoke coming from No. 1 engine compartment. IP suspected fire in engine and activated reserve fire bottle. No. 1 engine pneumatic starter was replaced.

A series - After No. 2 engine was started and stabilized, crew chief saw smoke billowing from exhaust. Couldn't be duplicated on MOCs. Engine had been in storage about 4 years. Suspect No. 4 bearing seal hadn't seated properly, allowing oil to pool in engine exhaust.

A series - During flight, boost servo and master caution light came on. Caused by failure of boost servo.

Attack helicopters

AH-1 Class D mishaps

E series - During low-level, high-speed turn, 20mm cannon slewed past turret stops, striking turret, TSU, and wire strike prevention assembly. Caused by failure of switch assembly elevation.

G series - Aircrew failed to ensure tail rotor drive shaft cover was secured following preflight inspection. Damage to cover amounted to nearly $200.

AH-1 Class E mishaps

P series - During simulated engine failure at altitude, copilot/gunner's torquemeter froze at 70 percent. Torquemeter was replaced.

S series - During runup checks, engine oil pressure showed more than 100 psi. Caused by failure of connector plug receptacle.

AH-64 Class E mishaps

A series - No. 1 engine accelerated to 60-percent NG during runup, then failed. On second attempt, engine failed to accelerate past 23-percent NG. Suspect failure of No. 1 crossfeed valve.

A series - While performing range sweep, crew noticed fumes and smoke in both cockpits, followed by a shaft-driven compressor caution light. Shaft-driven compressor was replaced.

A series - No. 1 engine nose gearbox psi caution light came on during start/runup. Fault detection/location system indicated 85 psi in No. 1 NGB. Caused by failure of pressure switch.

A series - During downwind flight at 100 knots, 900 feet msl, No. 1 and No. 2 engine fire handle lights came on. Couldn't be duplicated. (continued on page 4)

Recap of AVSCOM messages

Following is a list of AIG 8881 addressed messages transmitted by AVSCOM (AMSAV-M) from 1 April through 30 June 1986.

UH-1-86-05 Safety-of-flight technical message concerning one-time inspection of tail rotor drive shaft nuts.

UH-1-86-06 Safety-of-flight technical message concerning one-time inspection of trunnion bearings.

UH-1-86-07 Safety-of-flight technical message concerning revisions to inspection of trunnion bearings.

UH-60A-86-06 Safety-of-flight technical message concerning stabilator/automatic flight control system control panel retrofit.

UH-60A-86-07 Safety-of-flight technical message concerning requirements for ungrounding UH-60A/EH-60A aircraft.

UH-60A-86-08 Safety-of-flight technical message concerning replacement of UH-60A/EH-60A stabilator actuator P/N 70400-06641-110, NSN 1680-01-115-9530.

UH-60A-86-09 Safety-of-flight maintenance mandatory message concerning inspection of oil cooler assembly on T700-GE-700/ 701 engine.

UH-60A-86-10 Safety-of-flight maintenance mandatory message concerning one-time staking of bearings on lever assembly, P/N 70400-02623-041, NSN 1560-01-083-6799.

UH-60A-86-11 Safety-of-flight maintenance mandatory message concerning revision to requirements for reporting ungrounding of UH-60A/EH-60A aircraft.

AH-1-86-03 Safety-of-flight maintenance mandatory message concerning comprehensive safety inspection of AH-1, TAH-1, and TH-1 series helicopters.

AH-1-86-04 Safety-of-flight operational message concerning one-time limited maintenance test flight and hydraulic systems check procedures for AH-1S series aircraft.

AH-64-86-08 Safety-of-flight technical message concerning replacement of mixer support bolts, lock washers, inspection of the mixer support bushings and pitch link rod ends.

AH-64-86-09 Safety-of-flight technical message concerning AH-64A laser boresight safety.

AH-64-86-10 Safety-of-flight maintenance mandatory message concerning inspection of oil cooler assembly on T700-GE-700/ 701 engine.

AH-64-86-11 Safety-of-flight maintenance mandatory message concerning one-time inspection of remote circuit breaker/relay K3.

AH-64-86-12 Safety-of-flight technical message concerning change to the serial numbers in the laser boresight message.

CH-47-86-01 Safety-of-flight technical message concerning one-time inspection of pitch link connecting bolts P/N 114R3650-13/-13B on CH-47B/C/D helicopters.

CH-47-86-02 Safety-of-flight technical message concerning one-time inspection of CH-47A rotor blades.

CH-47-86-03 Safety-of-flight operational message concerning CH-47D cold weather procedures.

CH-47-86-04 Safety-of-flight operational message concerning revision to message on CH-47D cold weather procedures.

CH-47-86-05 Safety-of-flight maintenance mandatory message concerning one-time and recurring inspection and correction of CH-47 series aircraft corrosion problems.

CH-47-86-06 Safety-of-flight technical message concerning one-time inspection of CH-47D aircraft longitudinal cyclic trim actuator operation.

CH-54A-86-04 Safety-of-flight technical message concerning one-time inspection of CH-54B pitch change link assemblies.

OH-6-86-02 Safety-of-flight emergency message concerning immediate grounding of H-6 series aircraft and commercial variants.

OH-6-86-03 Safety-of-flight emergency message concerning followup message on immediate grounding of H-6 series aircraft and commercial variants.

OH-6-86-04 Safety-of-flight emergency message concerning followup message on immediate grounding of H-6 series aircraft and commercial variants.

OH-6-86-05 Safety-of-flight maintenance mandatory message concerning recall of certain serial-numbered tail rotor blades on H-6 series aircraft and commercial variants.

OH-6-86-06 Safety-of-flight emergency message concerning followup message on immediate grounding of H-6 series aircraft and commercial variants.

OH-58-86-02 Safety-of-flight operational message concerning operating limitation of OH-58 aircraft with the controllable landing light installed, P/N 1560-OH-58-114-1, NSN 6220-01-102-8805.

OH-58-86-03 Safety-of-flight operational message concerning OH-58A and OH-58C series aircraft with MILES/AGES equipment installed.

T-42-86-01 Safety-of-flight technical message concerning one-time inspection to ensure fuel line is not chafing against heat and vent duct behind instrument panel.

U-8-86-01 Safety-of-flight technical message concerning one-time inspection of wing attachment fittings.

Addressees requiring copies of messages should contact their higher headquarters. ■

Mishap briefs

Cargo helicopters

CH-47 Class D mishap

C series - During runup checks, flight engineer saw something near the inspection panel where the propeller fan drive shaft connects to aft transmission. Cone tail fan assembly had cracked loose at retaining screws, causing damage to fan shaft assembly. Six other retaining screws remained secured in place.

CH-47 Class E mishaps

C series - After engine condition lever was advanced to flight position during engine runup, flight engineer saw fuel being vented from left aft auxiliary tank. Small particle had caused left auxiliary fuel check valve to lock in open position.

C series - During takeoff, No. 1 engine oil low caution light came on. Caused by failure of oil level switch.

Observation helicopters

OH-58 Class D mishap

A series - Aircraft was hovering at NOE altitude, less than 5 KIAS, when main rotor hit a small tree limb. Crew's inattention caused more than $5,000 damage.

OH-58 Class E mishaps

A series - During cruise flight at 400 feet agl, aircraft nosed down and pilot could feel vibration through his feet on the pedals. Caused by failure of bearing in oil cooler fan assembly.

A series - Master caution and inverter segment lights came on during flight and ac power was lost. Caused by inverter failure.

A series - Pilot felt high-frequency vibration develop in pedals during flight. Caused by worn tail rotor trunnion bearing.

Fixed wing

C-12 Class C mishaps

C series - Aircraft was in cruise flight at FL 260 under IMC. After about 5 minutes in smooth air with light snow and ice, aircraft flew out of cloud and crew heard loud explosion and saw lightning flash in front of aircraft. Aircraft shuddered momentarily, but instruments and radio operated normally. There were no indications on weather radar or stormscope of significant weather in area. Damage to radome, propeller blade, left outboard flap, and right elevator exceeded $17,000.

C series - Damage from multiple lightning strikes to engine and wing areas amounted to $80,000. Damage was found during preflight for next mission. Suspect lightning struck aircraft in clear air or during light rain showers. Crew noticed no indication of lightning strike during flight and closest lightning appeared to be 10 miles from aircraft.

G series - Isolated thunderstorm activity was forecast for route of authorized IFR training flight. Predominant flight conditions were light turbulence and rime ice. Aircraft had been in IMC between FL 230 and FL 270 for 2 1/2 hours when weather radar indicated light to moderate precipitation ahead. Aircraft encountered light to moderate rime icing with cloud-to-cloud lightning but no intense precipitation. Crew saw bolt of lightning off side of aircraft close to the wing. Postflight inspection showed probable internal damage to No. 1 engine and radio. No. 1 propeller, right upper Dipole antenna, and lower transponder antenna were damaged.

C-12 Class E mishaps

C series - While aircraft was IMC at

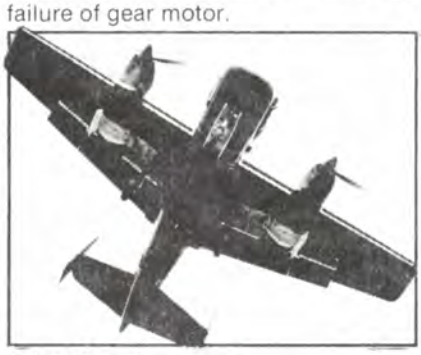
FY 86 Class A Mishap Countdown

	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	September	**2**	**2**
	Total for Year	45	31	Total to Date	**33**	**27**

18,000 feet in light icing, exterior of pilot's window cracked. OAT was -8° C. and all ice protection was on.

C series - During climb, crew smelled burning plastic. Play in forward vent blower fan motor bearings allowed arcing of blown motor brushes.

D series - During landing, pilot made three attempts to extend landing gear before he was successful. Caused by failure of gear motor.



OV-1 Class E mishaps

D series - No. 2 inverter circuit breaker popped twice during flight. Caused by failure of inverter motor generator.

D series - During descent, speed brake didn't extend and hydraulic pressure was zero. Caused by cracked hydraulic line in left landing well.

T-42 Class E mishaps

A series - During takeoff roll, left engine rpm dropped from 2500 to 2000. Caused by defective prop governor.

A series - With takeoff power and fuel pressure at normal, left engine rpm dropped to 2000. Caused by failure of No 2 engine left magneto.

U-21 Class C mishap

F series - Lightning damage to propeller was discovered during phase maintenance. Left outboard flap showed burn spots and No. 1 engine had to be replaced. Cost of damage was $56,000.

U-21 Class E mishap

H series - Master caution light came on in flight. Caused by failure of circuit card for warning system.

Maintenance

UH-1 Class E mishap

H series - Pilot noticed high EGT

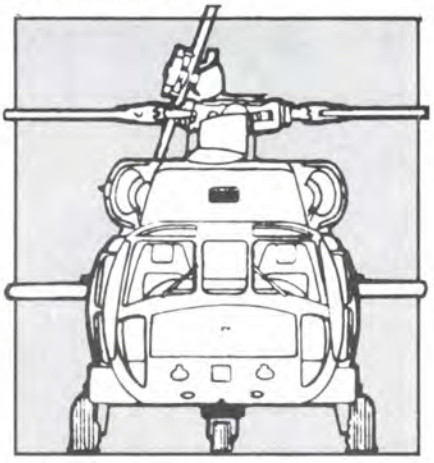
during takeoff. Corrosive material used to flush engine some time in past had collected on hot air solenoid valve, corroding the valve housing. Water from recent rain got into the break, causing the valve to short out.

UH-60 Class C mishap

A series - During engine ground run to check for oil leak, one mechanic asked another for a shop rag to wipe up oil around transmission input quill. Suction from engine intake pulled the rag from their hands into engine, causing nearly $75,000 in damage to No. 2 engine.

UH-60 Class E mishap

A series - Transmission oil temperature climbed beyond yellow zone during flight. Frayed wiring harness to transmission chip detector caused erroneous reading.



OH-58 Class E mishaps

A series - Transmission oil pressure warning light remained on when power was increased to flight idle during runup for MOC. No oil was circulating through pressure gauge. AVIM support personnel had changed input quill and failed to record draining of transmission oil.

C series - During approach to confined area, pilot found tail rotor control pedals were stuck. After a go-around and running landing, inspection revealed wire bundle and connectors weren't secured after removal of transponder and had become lodged in control linkage.

C-12 Class E mishap

D series - Landing gear failed to retract after takeoff. Emergency gear extension clutch handle wasn't properly seated.

OV-1 Class E mishaps

D series - Crew saw bluish-gray smoke in cockpit shortly after takeoff. Suspect seepage from line allowed fluid to contact hot Tacan unit.

D series - During runup, No. 1 engine P3 light wouldn't go out when power was advanced to takeoff. Crew chief failed to reconnect P3 line after installation of No. 1 generator. Disconnect wasn't recorded.

D series - Ten minutes after takeoff, No. 2 fuel pressure light came on and stayed on. Moisture caused fuel pressure switch cannon plug to lose contact.

D series - As climb power was set after takeoff, aircraft voltmeter and No. 2 generator ammeter indicated maximum voltage and load. Wing fuse holder had lost contact.

(continued on back page)

Mishap briefs

U-21 Class E mishap

H series - When landing gear was lowered, nose gear indicated unsafe condition. After gear was manually pumped down, tower personnel said gear appeared down and locked. Caused by out-of-adjustment down lock and warning switch.

Safety messages

• Safety-of-flight technical message concerning one-time inspection of AH-64A aircraft drive shaft couplings for proper assembly (AH-64A-86-15, 112130Z Sep 86). Summary: Improperly installed couplings have been discovered on AH-64A aircraft. This is a recurrence of the same problem which was the subject of AVSCOM message AH-64A-85-03, 182200Z Jul 85. This is a repeat inspection. Purpose of this message is to direct inspection of drive shaft couplings for proper installation. A check of all similar couplings for improper installation is also required. Contact: CPT William Knight, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message concerning changes to operators manual and crew checklist for NVG operation of OH-58C aircraft only (OH-58-86-07, 151330Z Sep 86). Summary: Purpose of this message is to direct immediate operational changes to operators manual, TM 55-1520-235-10, and crew checklist, TM 1520-235-CL, for NVG operation. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning proper installation of loop clamp P/N EAB70003, NSN 5340-00-990-9298 on AH-1S(MC) aircraft S/N 66-15249 through 71-21051 (MIM-AH-1-86-MEM-06, 181830Z Sep 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

It could have been prevented

sharply increased, airfield facilities also showed a definite need for updating. These conditions did not contribute to the mishap, but they were unsafe. For example:

• Although a control tower was in place, it was not operational.

• There were no navigational aids on the airfield. If an aircraft went inadvertent IFR while in the training area, the closest airfield was nearly half an hour away. A crew flying training missions could easily find they lacked sufficient fuel to fly that far.

• There was no capability for monitoring emergency frequencies.

• No fire truck was stationed at the airfield.

It could have been prevented

Like most accidents, this one could have been prevented.

If the pilots of the second OH-58 had been scanning to their right, they would have seen the other aircraft.

If the pilots of the AH-1 had realized the other aircrews didn't see each other, they could have warned them what was happening.

If they had been more experienced, they probably would have broken radio silence and warned them anyway.

If the accident had been prevented, an Army aviator would still be alive. ■

U.S. ARMY SAFETY CENTER

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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 - While aircraft was at 80-foot hover, rappeller lost brake hand, and belay person was unable to prevent hard impact with ground. Rappeller was treated at hospital for leg and back injuries and released.

UH-1 Class E mishaps

H series - Aircraft was on maintenance test flight after replacement of left cyclic servo. During power cylinder check, crew heard grinding noise from servo area accompanied by cyclic lockup. Caused by failure of right cyclic servo.

H series - Twice when HIT check was attempted, engine rpm bled off. Caused by failure of overspeed governor.

H series - During hover for departure, copilot noticed pedals were stiff. Tail rotor servo lower boost valve was replaced and tail rotor cable tension was readjusted.

H series - N2 stopped at 12 percent during start. Caused by failure of start solenoid valve.

H series - Rpm warning light came on and N2 tachometer went to zero during flight. N2 tachometer generator shaft had sheared.

H series - During cruise flight, cyclic moved hard right forward and aircraft immediately rolled right with extreme nose-low attitude. IP, who was at controls, responded with counter pressure and had pilot switch off hydraulic control switch. In response, aircraft pitched nose up. Crew made uneventful running landing. Caused by internal failure of left cyclic irreversible valve.

UH-60 Class D mishap

A series - Crew of trail aircraft in flight of two noticed what appeared to be paper blowing from lead aircraft. When they closed to investigate, they saw left APU access door was missing, and right access door was unrestrained and flapping. After landing, damage was found to main rotor blade which had been struck by the APU access door when it blew off. The door hinges were broken at the mounting points. The missing door couldn't be found and whether the mishap was caused by materiel failure or human error cannot be determined.

UH-60 Class E mishaps

A series - Crew heard grinding noise when No. 1 engine was started. Caused by internal bearing failure in blower particle separator.

A series - Aircraft began to shudder during takeoff. Antiflap bearing on main rotor blade became unseated, causing it to jam.

Attack helicopters

AH-1 Class D Mishap

F series - When power was reduced during landing, crew noticed airframe

(continued on next page)

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	1-8 Oct	2	3
	November	5	1			
	December	1	1			
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	2	3

Mishap briefs

vibration. Apparently, both tail rotor blades had been damaged by tree strike. Crew had not noticed strike or felt vibration during flight.

AH-1 Class E mishaps

F series - During short final, aft fuel boost pump light came on. Fuel boost pump was replaced.

F series - Aircraft was at OGE hover during NVG mission when transmission hot temperature light came on. Temperature gauge showed 112° C. for 2 minutes. Cause unknown.

P series - Engine oil pressure rose to 125 psi for 2 minutes during flight. Caused by failure of No. 3 and 4 bearing pack in engine.

AH-64 Class D mishap

A series - Damage to No. 1 engine drive shaft and No. 1 engine deice cable was found during postflight inspection. Caused by inadequate clamp restraint for No. 1 deice cable in area of nose gearbox fairing. Damage was more than $3,500.

AH-64 Class E mishaps

A series - Aircraft was being shut down due to armament malfunction when No. 1 generator seal was found leaking. Generator seal was replaced.

A series - After refueling, fuel began leaking excessively from closed-circuit refuel port. Poppet valve was replaced.

A series - During runup, utility hydraulic low light came on and pressure dropped to zero. Hydraulic fluid could be seen on ground under aircraft. Maintenance replaced utility hydraulic pressure return line.

A series - Hot battery light came on during cruise flight. Battery was replaced.

Observation helicopters

OH-6 Class E mishap

A series - During flight, fuel filter light came on intermittently then stayed on for about a minute. Caused by failure of fuel filter element.

OH-58 Class D mishaps

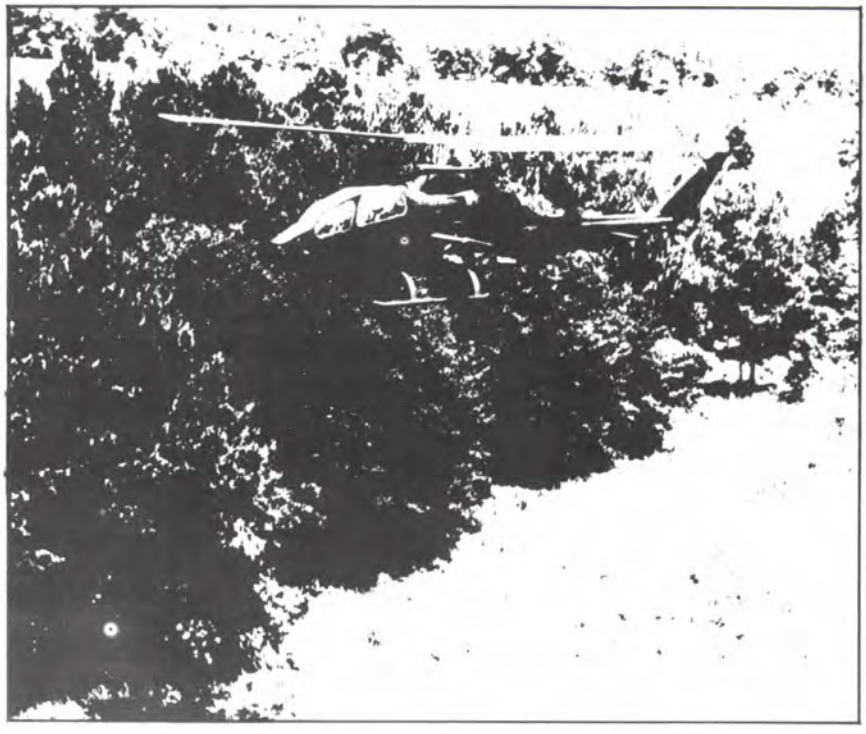
C series - During postflight after third flight of day, crew found damage to both main rotor blades from tree strike. Blades were repairable and sudden stoppage inspection showed no further damage.

C series - Pilot was holding aircraft door open with his knee while using both hands for another task. Nearby Cobra lifted off and rotorwash blew door open, tearing hinge off OH-58.

OH-58 Class E mishaps

A series - During postflight, pilot found oil around transmission cowling. Oil cap wasn't properly seated, allowing two pints of fluid to leak out during flight.

A series - When collective was raised during takeoff, N2 dropped to 100 percent and rotor rpm warning light and audio came on. Rpm regained 102 percent when collective was held, but when it was raised again, N2 again dropped. The same thing happened during three attempts. Caused by governor failure.



A series - Rear-seat passenger smelled fuel during flight. Caused by leak at elbow between fuel tank line and main engine fuel valve.

A series - Cyclic became stiff in all quadrants during hover/taxi. Caused by failure of magnetic brake.

C series - N2 needle fluctuated during engine runup from idle to full throttle. N2 was decreased to 94 percent, then increased to 102 percent where it remained despite attempts to decrease N2 to 100 percent. Caused by failure of linear actuator.

Fixed wing

C-12 Class E mishap

D series - No. 2 engine torque went to 106 percent during short final and couldn't be controlled by power lever. Caused by failure of No. 2 fuel control.

OV-1 Class E mishaps

D series - During cruise flight, No. 3 inverter failed and ammeter spiked to about 810 amps for 30 seconds. Caused by failure of No. 3 inverter and K5 relay.

D series - Pilot was testing fuel boost pump during engine runup. As he placed pump test switch in forward position, fuel boost light came on. Caused by failure of aft boost pump.

D series - During completion of after-takeoff check, gear handle intransit light remained on, and all three indicators showed gear up. Maintenance couldn't duplicate.

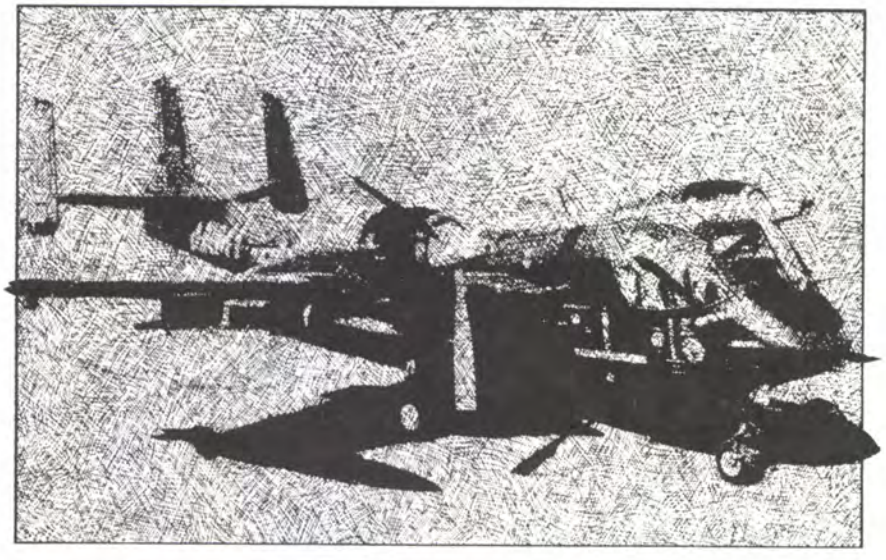
SD-3-30 Class E mishaps

Left hydraulic light came on shortly after brake release and before takeoff. Caused by failure of left hydraulic pump.

During takeoff roll, both left and right hydraulic lights came on. No. 1 high pressure relief valve failed in open position, causing loss of system pressure.

U-21 Class E mishaps

A series - No. 1 engine showed plus 33-degree increase in HIT check during runup check. No. 1 engine had shown slowly-increasing HIT check over past 18 months. Inspection revealed numerous cracks and hot spots inside burner can.



H series - Left fuel transfer caution light came on during flight. Caused by failure of left fuel transfer pump.

Maintenance

UH-60 Class E mishap

A series - Vertical vibration occurred during hover check. Caused by dirty antiflaps.

OH-58 Class D mishap

C series - When IP closed copilot's door, he saw sparks coming from overhead console. Wrench left between rheostat and a circuit breaker by maintenance personnel caused arcing, melting rheostat. (continued on back page)

ALSS-GRAM

Something new added to Aviation Life Support System (ALSS)

The AMC Product Management Office for Aviation Life Support Equipment (ALSE) is proud to join forces with the Army Safety Center in an effort to provide you the latest information on the ALSS. We'll keep you up to date by publishing these ALSS-GRAMs in *Flightfax*, and we will also answer questions from your calls and letters in this column.

First, a little about who we are and what we can do for you. You're probably already familiar with the PEARL articles each month in *Army Aviation Digest*. If so, then you know that we are the central point of contact for the Aviation Life Support System Program. Now, "What can we do for you?"

The greater part of our effort is directed toward assistance visits, although we also make inspections. These assistance visits and inspections are conducted jointly with the MACOMs. There are some very good ALSE programs going on out there and our assistance teams have one thing uppermost in mind—to help you make them even better. When we make an assistance visit or an inspection, our goal is the same as yours; to make the maintenance, operation, and repair of this critical equipment "the best that it can be." We can't afford to settle for less than the best when we're dealing with equipment for the protection, survival, and rescue of Army aviation personnel.

To get ALSS information to you in record time, we will publish it in *Flightfax*. If we have more information about a subject later, we'll follow up on it in the monthly PEARL articles in *Army Aviation Digest*.

ALSS questions and answers

Q. What is being done to review and update AR 95-17: The Army Aviation Life Support System Program?

A. The need for an early review and update of AR 95-17 was emphasized at an ALSE symposium in St. Louis on 19-21 August 1986. We are currently reviewing AR 95-17 for update.

Q. We sometimes are required to pilot C-12 aircraft. Are we required to wear SPH-4 flight helmets?

A. Paragraph 2-6, AR 95-17: The Army Aviation Life Support System Program is being updated by changing the last sentence of subparagraph b to read, "The flight helmet requirement does not apply to the C-12, T-42, and U-21 aircraft *used for passenger service*. Flight helmets may be worn in these aircraft when desired."

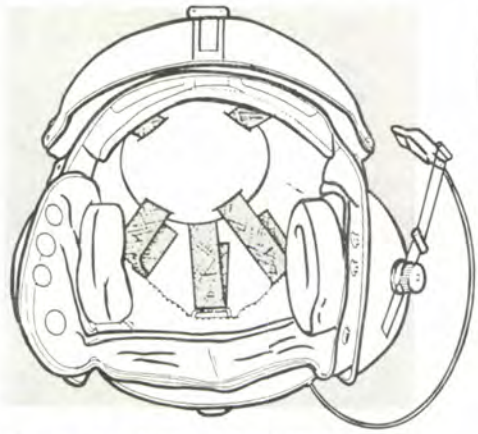
Q. How many first-aid kits for Army aircraft are authorized for the CH-47D?

A. The normal number of first-aid kits authorized for the CH-47D is seven. If additional kits are required for special missions, refer to Common Table of Allowances (CTA) 8-100. The CTA is your authority to secure the kits you need.

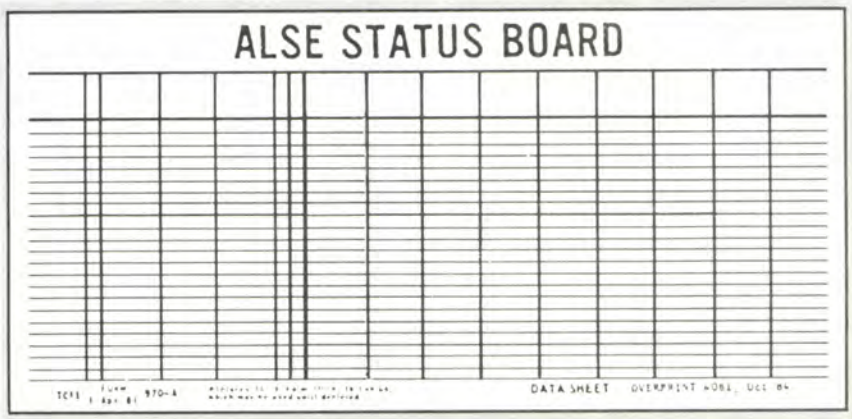
Q. Is there an ALSE Status Board available somewhere in the Army?

A. No, we hope to have an ALSE Status Board available soon, but we do not have one now. Until one is available, however, you can make an ALSE Status Board locally; or you can adopt a form developed by the ALSE Training Office at the U.S. Army Logistics Center and School, Fort Eustis, VA. The form can be found in FM 1-508-1, p. C-6, Figure C-11.

Q. I have been having problems with my SPH-4 helmet slipping. What can be done to prevent this from happening?



A. We have taken a hard look at this situation and we've coordinated the following solution to take care of this problem. Slippage of the SPH-4 helmet adjustment straps can be prevented by hand-tacking the adjustment straps with one or two turns of cotton or Nomex thread. Make sure the knot used to secure the thread is on top of



the strap so that it won't contact the wearer's head.

Q. What are the authorized uniforms for flight and aircrew personnel?

A. The only items of flight clothing currently authorized for issue are listed for you here.

—The two-piece Nomex Camouflage uniform is a developmental item and is currently in the design phase.

—The old two-piece Nomex aviators/tanker uniform is still authorized for combat vehicle personnel only. The uniform consists of:

- Shirt, Hot Weather, LIN No. T030002
- Trousers, Hot Weather, LIN No. X35980

Note: DALO-TST POC is Shirley Bryant, AUTOVON 224-7344.

Q. Are there any new ALSE/survival schools available to Army personnel?

A. Yes, effective 1 October 1986, the Army Western Region ALSE/Survival School (AWTASS) was established as a Sixth U.S. Army Area School collocated with the 6229th U.S. Army Reserve Forces School (USARFS), Vancouver Barracks, WA. The school's mission is to provide ALSE training for ALSE technicians and officers as well as survival training for aircrew personnel.

Quota control and course enrollment are handled by telephone; there's no paperwork required. The primary number to call to schedule courses or receive additional information is the 6229th USARFS, commercial 503-285-5577 or 206-694-8761. If you don't have access to a commercial line, you may call Sixth U.S. Army, Aviation Division, AUTOVON 586-4133/3883.

Standardization of Flight Uniform and Aviator Jacket

Item	Climatic Zones
Coverall, Flyers, LTWT, sage green	All
Jacket, Cold Weather, CVC/Aircrewman, OD	All
Jacket, Flyers,LTWT, OD	All
Hood, Extreme Cold, sage green, CWU-45/P	V-VII
Trousers, Extreme Cold, sage green, CWU-17/P	V-VII

FY 87 Course Schedule

Dates	Type of Course	Course No.
7-8 Oct 86	Overwater Survival	8701W
16-21 Nov 86	Basic Land Survival	87025B
18-19 Nov 86	Overwater Survival	8703W
30 Nov-20 Dec 86	ALSE ASI2Q Course	8704AQ
11-16 Jan 87	Cold Weather Survival	8705SC
25-30 Jan 87	Cold Weather Survival	8706SC
I-6 Feb 87	Cold Weather Survival	8707SC
8-13 Feb 87	Cold Weather Survival	8708SC
24-25 Mar 87	Overwater Survival	8709W
5-10 Apr 87	Basic Land Survival	8710SB
12-17 Apr 87	Basic Land Survival	87115SB
14-15 Apr 87	Overwater Survival	8712W
19-24 Apr 87	Basic Land Survival	8713SB
3-8 May 87	Basic Land Survival	8714SB
10-15 May 87	Basic Land Survival	8715SB
12-13 May 87	Overwater Survival	8716W
4-5 Aug 87	Overwater Survival	8717W
15-16 Sep 87	Overwater Survival	8718W

Give us a call

We hope these new ALSS-GRAMs will benefit both commanders and ALSE users. Give us a call and tell us what we can do to help you with your ALSE programs. You can reach any of the people listed below by calling: Deputy for Aviation Life Support Equipment, AUTOVON 693-3215, commercial 314-263-3215.

Title	Name	Area of Responsibility
Deputy	A.B.C. Davis, Jr.	Chief, Logistics/Readiness
Assistant Deputy	Harlyn Hubbs	Senior Logistics Management
Logistics/Readiness	Jim Dittmer	Mission/Environmental Equip
Logistics/Readiness	Boone Hopkins	Egress/Survival/Rescue Equip
ALSE Specialist	SFC Ed Bruck	Maint/Training/Admin Officer

ALSS-GRAM 1 8 October 1986

Prepared by the Deputy AMC Product Management Office, Aviation Life Support Equipment, 4300 Goodfellow Blvd, St. Louis, MO 63120-1798, AUTOVON 693-3215, commercial 314-263-3215. Information published generally precedes normal staffing and distribution of Army official policy and is intended as advance information to enhance the critical area of ALSE.

A.B.C. Davis, Jr.
Deputy AMC Product Manager
Aviation Life Support Equipment

Mishap briefs

OV-1 Class E mishap

D series - Aircraft was at 16,000 feet msl, in light to moderate icing. During turn, pilot noticed airspeed decreasing to about 120 KIAS, then aircraft entered prestall buffet. Attempting to prevent aircraft from stalling, pilot activated deice boots and increased power levers from 52- to 65-percent torque. When No. 1 engine went into compressor stall, pilot further reduced power to 50-percent torque, requested clearance to descend to gain airspeed, and landed. Bleed bands were found to be out of adjustment.

Safety messages

• Safety-of-flight technical message regarding one-time inspection of OH-58A/C helicopters which have MWO 55-1520-228-50-26 installed (OH-58-86-08, 241500Z Sep 86). Summary: Information in this message is provided to clarify/answer questions from the field concerning the engine power droop retrofit modification kit, MWO 55-1520-228-50-26. This message applies to aircraft previously modified or presently under modification. The data in paragraph 9 is to be used by the field until official changes are published. MWO 50-26 has also been updated to reflect changes in this message. Contact: CPT William Knight, AUTOVON 693-3300, commercial 314-263-3300.

• AVSCOM safety-of-flight technical message, OH-58-86-08, 241500Z Sep 86, regarding one-time inspection of OH-58A/C helicopters which have MWO 55-1520-228-50-26 installed was transmitted to all activities for information only. This message (TRADOC 242130Z Sep 86) directs all TRADOC units to take action required to comply with AVSCOM safety-of-flight message OH-58-86-08. Contact: SFC Wilson, AUTOVON 680-3246, commercial 804-727-3246.

• AVSCOM message, 241725Z Sep 86, regarding T63-A-700 engine compressor case and vane assemblies. Summary: Reference A, safety-of-flight maintenance mandatory message (OH-58A-85-05 and OH-6A-85-03, 261930Z Dec 85) regarding inspection of the T63-A-700 turbine engine compressor on all OH-58A and OH-6A helicopters; Reference B, AVSCOM AMSAV-SAIK, 102100Z Mar 86, regarding T63-A-700 engine case and vane assemblies; and Reference C, AVSCOM AMSAV-SAIK, 241930Z Mar 86, regarding modification to asset return procedure on T63-A-700 engine compressor case and vane assemblies. To prevent both supply and readiness impact, it is imperative that all unserviceable case and vane halves and/or compressor assemblies on hand be returned to Corpus Christi Army Depot as stated in references B and C. Contact: Mr. Blinn, AUTOVON 693-1353, commercial 314-263-1353.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

U.S. ARMY SAFETY CENTER

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Colonel, Aviation
Commander, Army Safety Center

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15 October 1986

Flightfax®
Report of Army Aircraft Mishaps

Let the system function

The three U-21s were on a self-deployment training flight, part of which would take the aircraft over water. Extensive preparations had been made for the mission, including installation of a 120-gallon ferry fuel cell in each aircraft. A lot of effort and time had gone into planning the route and computing the amount of fuel that would be needed for each leg of the flight. The crews had also been given water survival training, just in case.

The day before the mishap, the left fuel pressure on one of the aircraft had dropped to 20 psi, causing the pilot some concern. But when he asked the unit maintenance officer and technical inspector about it, he was told not to worry as long as the fuel pressure stayed in the green (15 to 50 psi).

On the day the mishap happened, this same aircraft was flying lead, followed at 1-minute intervals by the other U-21s. After about an hour of flight, the 120 gallons of fuel in the ferry tank were transferred equally to the wing tanks. Then the ferry tank was shut down and secured.

The flight remained uneventful until about 3 hours and 40 minutes into the flight when the pilot noticed his left fuel pressure had dropped to 10 psi. The fuel crossfeed switch was in the automatic position but no crossfeed light had come on to show that fuel was being crossfed. Assuming the left fuel boost pump was failing, and seeing no indication the automatic crossfeed was working, the pilot placed the crossfeed switch in the manual, open, position. Fuel pressure returned to normal.

Thirty minutes later, the fuel pressure began to fluctuate, followed by a slight yaw of the aircraft to the right. The pilot immediately turned toward the nearest land. Shortly thereafter, both engines failed and the pilot ditched the aircraft in the sea. The three crewmembers were picked up by a nearby ship and returned to land. No one was injured, but the U-21 sank in 200 feet of water. The aircraft was never recovered.

The major error. . .

The pilot's action in crossfeeding fuel was contrary to instructions in paragraph 2-34c(5) of TM 55-1510-709-10. When he saw that his left fuel pressure was 10 psi, he lacked confidence in the engine-driven fuel pump to provide fuel to the engine and decided to place the crossfeed switch in the manual position. (Automatic crossfeed doesn't begin until fuel pressure drops to 5 psi.)

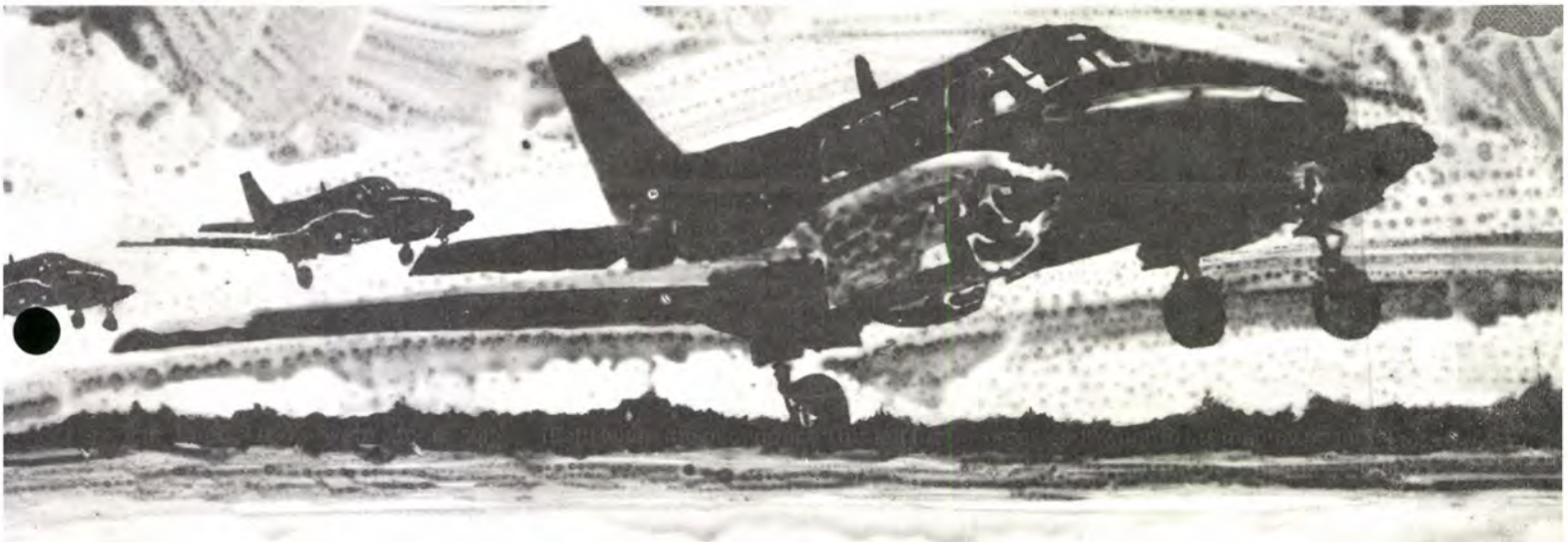
Because he had placed the crossfeed valve in the open position, there was nothing to tell the pilot when his left fuel boost pump completely failed. When all of the fuel in his right nacelle tank had been consumed, both engines became starved for fuel and flamed out. If he had done nothing to try to manage his fuel, and had permitted the fuel system to function as it was designed to do, he would have had more than enough fuel to reach his destination.

then another error. . .

Because he didn't want to be caught short on fuel if an emergency arose, the pilot elected to manage his fuel by periodically activating the fuel transfer test switch to keep his nacelle tanks full, which he estimated would provide 45 minutes of fuel for both engines or 1 1/2 hours for one engine. He didn't permit the nacelle tanks to empty normally so the wing capacity would gravity-feed into the nacelle tanks.

While it didn't contribute to the mishap, the pilot's action in periodically

(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 - Seconds before the aircraft came to a stop from running landing, the forward edge of strip welded on rear of right skid caught on a landing light protruding from runway surface. Right skid broke forward of aft crosstube attaching point. Fuselage came to rest on runway when skids and crosstubes collapsed, resulting in about $30,000 damage.

UH-1 Class E mishaps

H series - During flight at 1,200 feet msl, crew heard reports from engine. N1 was 96 percent, torque 27 pounds, and EGT went to 600° C. Caused by compressor stall.

H series - Crew felt feedback in pedals and cyclic during takeoff, and 5 minutes into flight aft pressure was felt. Caused by failure of hydraulic solenoid valve.

H series - Master caution and engine oil pressure lights came on during takeoff. Engine oil pressure and torque gauge dropped to zero and engine oil temperature increased to 110° C. Engine oil pump shaft had sheared.

UH-60 Class A mishaps

A series - During system test flight, crew reported mechanical problems with tail rotor. Aircraft was last seen in descending right turn before crashing and coming to rest on its left side. Tail cone was severed and three tail rotor blades broke off at hub. Crew was evacuated. 8701

A series - Aircraft was trail in flight of two going up a draw and over a ridgeline. Crew of lead aircraft heard radio call and saw mishap aircraft in steep left bank before it hit trees. All three crewmembers were killed. 8702

UH-60 Class E mishaps

A series - During takeoff with external load, chain at right front attaching point released, leaving full 200-gallon water trailer suspended by 3 sling legs. Crew jettisoned load at 50 to 75 feet agl. Suspect load was improperly rigged.

A series - Smoke from center console began filling cockpit during IFR flight at 6,000 feet; then master caution, trim, flightpath stabilization, and pitch bias actuator lights came on. Maintenance suspects automatic flight control system computer short circuited, causing internal electrical fire.

A series - During through-flight runup after 2-hour flight, main module sump chip light came on. Size of chips will require main module change.

Attack helicopters

AH-1 Class D mishaps

F series - Damage to tail rotor was noted during walk-around inspection after live-fire exercise. One blade will be replaced at cost of $2,000. Crew had not noticed tail rotor striking anything and there was no indication of tail rotor problem during flight.

S series - During postflight inspection, multiple dents were found in leading edge of metal erosion guards on both main rotor blades. Crew was unaware of any strikes during NOE MILES training mission.

AH-1 Class E mishap

F series - Collective and cyclic became stiff during approach for landing and stiffness worsened during go around. IP couldn't get collective to go down during final approach and made running landing by reducing throttle. Caused by failure of emergency hydraulic pump.

AH-64 Class E mishaps

A series - While landing from hover, aircraft had one wheel on the ground when it tried to make uncommanded roll to left. IP released DASE and landed. Aircraft had had the same problem the previous day. Maintenance couldn't duplicate the problem after either incident.

A series - Aircraft was being ground run during MOC of stores jettison system following retrofit. Aircraft had not been checked for removal of ejection cartridges before flight to retrofit facility or prior to MOC. Ejection cartridges fired and M-261 rocket launcher pods were slightly dented when they jettisoned to the ground.

Cargo helicopters

CH-47 Class E mishaps

C series - During flight, crew chief noticed excessive vibration in area of hanger bearing between Nos. 8 and 9 drive shafts. Problem couldn't be duplicated.

C series - During takeoff, crew chief noted hydraulic fluid leak in vicinity of utility hydraulic fan. Caused by failure of metal tube assembly.

Observation helicopters

OH-58 Class C mishap

A series - During hover, aircraft hit the ground causing approximately $30,000 damage. Cause is under investigation.

OH-58 Class D mishaps

C series - Range safety officer was in rear seat of aircraft conducting range survey. Aircraft had landed at road barricade that was to be removed. While aircraft was on the ground at full operating rpm, range safety officer motioned road guard toward aircraft without pilot's knowledge. As road guard approached aircraft, antenna of his PRC-77 backpack radio contacted the main rotor system puncturing upper and lower skin of main rotor blade. Result was nearly $9,000 in damage.

C series - During flight with aircraft doors removed, copilot leaned against armor panel causing it to open. Air pressure at 80 KIAS caused panel to break away from aircraft and panel wasn't recovered. Pilot had failed to properly secure panel. Damage was $1,800.

OH-58 Class E mishap

A series - During through-flight checks, pilot found tail rotor gearbox oil was contaminated. Hot days and cool nights had caused condensation in gearbox.

Fixed wing

OV-1 Class E mishap

D series - At 100 feet agl, during departure climb, master caution and No. 2 engine chip segment lights came on. When power was reduced to climb settings at 500 feet agl, lights went out. Further power applications and reductions produced same results. Chip detector cannon plug grounded out internally.

Maintenance

UH-1 Class E mishap

H series - Wipers had been on for about 30 minutes in heavy rain. During final approach, crew smelled and saw smoke in cockpit and copilot saw flames coming from upper cockpit bulkhead behind pilot. When wipers stopped, crew pulled circuit breaker and flames went out as aircraft landed. Resistor showed heat damage and evidence of internal arcing. Suspect dielectric material surrounding wire core failed due to overheating, allowing contact between wire and heat sink case. There was some internal play in wiper converter which may have caused binding and increased load on wiring and motor.

OH-58 Class E mishaps

A series - While conducting combat skills flight training, crew took off from confined area and climbed to 1,000 feet msl. When engine chip detector light came on, IP took controls and headed for only available open field. During descent, crew heard loud squealing noises from engine area and N2 began decreasing. About 200 feet agl, IP closed throttle and autorotated to ground. Loud noise was accompanied by high-frequency vibrations. After touchdown, crew smelled smoke and fumes in cockpit. Engine oil had been contaminated with sand or dirt, causing N1 section to fail. Engine was replaced.

C series - When start button was pressed, N1 only reached 5 percent, then slowly dropped to 2 percent. Avionics personnel performed radio checks without using external power, causing battery power to be low.

OV-1 Class E mishaps

D series - Pilot heard whining noise coming from No. 2 engine during engine start and hydraulic pressure indicated 2,000 psi. As prop lever was placed in maximum position and power lever to flight idle position, No. 2 engine hydraulic pressure dropped to zero. Caused by air trapped in hydraulic line due to removal and reinstallation of the clam shell door actuator.

D series - Aircraft had partial power loss on No. 1 engine at rotation speed during takeoff. Torque dropped from 88 percent to 80, and then 70 percent. P2 and P1 airlines had been disconnected and capped in preparation for engine internal flushing. After flushing, maintenance personnel failed to rehook P1 airline from fuel control to bleed band activator. Technical inspector overlooked error.

SD-3-30 Class E mishaps

During takeoff roll, both hydraulic lights came on and hydraulic pressure showed zero psi. Main system accumulator precharge pressure was low. Suspect main system accumulator has nitrogen leak past piston introducing gas into hydraulic system.

U-8 Class E mishap

F series - Failure of nose landing gear actuator was caused by a previous irregular structural repair which didn't allow actuator to be installed properly.

U-21 Class E mishap

A series - Flaps wouldn't retract during runup and crew noticed burning electrical smell. Sleeving insulation for flap motor mount screws wasn't installed.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	1 - 15 Oct	2	3
	November	5	1			
	December	1	1			
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	2	3

Let the system function

actuating the fuel transfer pump test switch in an effort to keep his nacelle tanks full was improper. The pilot actuated the switch before observing the proper operation of the nacelle tank fuel gauges. Paragraph 2-35a(2), TM 55-1510-209-10, describes top nacelle fuel quantity sensor failure, which is what occurred in this case. The result was a wrong indication of the quantity of fuel in the right nacelle tank; the side from which both engines were being fed.

and still another error

This crew was fortunate that their aircraft was ditched where a nearby ship could quickly pick them up because the life rafts issued to the unit for the self-deployment mission hadn't been adequately maintained.

Everyone got out of the aircraft without help and one of the crewmembers opened the fuselage escape hatch and threw the seven-man life raft out on the wing. But attempts to inflate the raft were unsuccessful. After it was unfolded and examined, they found the lanyard to the compressed air bottle was missing and one of the two hoses from the compressed air bottle to the raft was disconnected.

The aircraft remained afloat and stable long enough for all three occupants to inflate their individual life preservers. After about 15 minutes, the U-21 sank. Only about 30 minutes had elapsed from the time the aircraft was ditched until the crewmembers were safely aboard the rescue ship.

The most important lesson to be learned from this accident is that it never had to happen at all. If the pilot had done nothing to try to manage his fuel, and had permitted the fuel system to function as it was designed, the aircraft could have completed the flight and landed safely at its destination. ■

Army to put flight data recorders in Black Hawk

A contract has been let to Sundstrand Data Control, Inc. to provide the Army with 200 flight data recorders (FDRs) for installation in selected UH-60 helicopters.

This FDR records 66 channels of data onto a magnetic tape housed inside the FDR unit. The recorder is built to withstand the violence of an accident sequence, thereby preserving vital information which will provide focus and direction to an accident investigation team.

Recognizing that FDR data may not reveal the cause of the accident and the data processing is time consuming, it will add a new dimension to the investigation. The data from the recorder will serve as a tool to the investigation team in conduct of their investigation by providing both aircraft system and crew input information. With the complex systems in use in today's Army aircraft, it is vital that we get the clearest possible picture of each accident so that we can determine changes in pilot training or aircraft modification necessary to prevent the same type of accident from happening again. ■

—MAJ John Mainwaring, Engineering Division, Directorate for Systems Management

U.S. ARMY SAFETY CENTER

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Commander, Army Safety Center

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Report of Army Aircraft Mishaps

1.98 Class A Accident Rate Best Ever

The U.S. Army has just completed the safest year in Army aviation history. The fiscal year 1986 record-setting rate of 1.98 Class A accidents per 100,000 flying hours is the lowest rate recorded since Armywide aircraft accident data collection began in 1958. That year the Army's major accident rate was 54.3 accidents per 100,000 flying hours.

The FY 86 safety record was achieved while flying increasingly more demanding missions and high-risk night tactical operations, where a single performance error doubles the probability of a major accident.

The savings in human lives and equipment as a result of this improvement in aviation safety are significant and contribute to a stronger and more combat-ready Army. For comparison purposes, in 1982, the major aircraft accident rate was 3.23. Had this rate continued over the past 4 years, an additional 46 aircraft accidents would have cost more than $80 million, not to mention the loss of life, decreased combat capability, and impaired national security.

Credit for this fine FY 86 record goes to all the commanders, aviators, and aviation personnel who have enthusiastically accepted and supported the aviation accident prevention program. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - After landing, crew chief noticed vertical fin drive shaft cover was open. Sheet metal damage resulted from crew chief's failure to secure cover after preflight and pilot didn't check cover.

UH-1 Class E mishaps

H series - Rotor tachometer dropped to zero and rpm warning light came on during flight. Rotor tachometer generator shaft broke at transmission.

H series - Pilot was at the controls of aircraft during climbout from landing zone with full load of troops. At 100 feet agl, copilot noticed transmission oil pressure gauge indicated 25 psi, but there was no warning from master caution or segment lights. Aircraft immediately landed. Caused by failure of transmission oil pressure transmitter.

H series - Aircraft was in low-level flight when crew saw a kite close to aircraft. The kite was about 20 to 30 feet higher than the aircraft. The crew couldn't see any kite string, and the copilot told the pilot they might have hit it. After the aircraft was shut down, monofilament fishing line was found wrapped around the main rotor head, rotating swashplate, and tail rotor assemblies.

H series - During flight idle for shutdown, engine oil pressure gauge began fluctuating. Caused by failure of engine oil pressure gauge.

H series - During landing to field site, pilot failed to see obstacle and placed aircraft's nose too close to berm. Tip of wire strike protection system was broken off.

M series - During flight, fire warning light came on and stayed on. Caused by failure of fixed resistor.

UH-60 Class A mishap

A series - After rappell mission had been completed, one of the rappell masters decided to demonstrate Australian method of rappelling. During descent, one of the air transport tiedown fittings pulled loose from the aircraft's roof. The rappell master fell approximately 80 feet. 8703

UH-60 Class C mishaps

A series - During NOE flight, aircraft made right turn around tree line, slid laterally to the right, and struck two trees. All four main rotor blades sustained damage, primarily around tip caps. FOD caused damage to one compressor blade in No. 2 engine. Total cost was more than $28,600.

A series - While making terrain flight approach to a hover, copilot allowed aircraft to drift into trees. All main rotor tip caps were damaged when main rotor blades struck a tree.

UH-60 Class D mishaps

A series - Aircraft struck tall tree during NVG landing, destroying lower anticollision light.

A series - During runup, No. 1 starter wouldn't accelerate. Shaft on starter motor sheared.

A series - During takeoff for NOE flight, crew felt vibration in cyclic and airframe. Flap retainer broke, hitting main rotor blade and causing $7,500 damage.

UH-60 Class E mishaps

A series - Aircraft was at 3,500 feet agl, 70 KIAS, conducting sport parachute club jump training. Static line jumpers were assuming free-fall position for exiting aircraft by standing in door. Last jumper was standing when chute deployed inside aircraft. Chute was secured by jumpmaster. Jumpmaster was improperly positioned and

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	1 – 22 Oct	3	4
	November	5	1			
	December	1	1			
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	3	4

did not ensure static line had unrestricted movement. Suspect static line hung up on jumpmaster's foot.

A series - Four aircraft had stabilator problems. 1) Stabilator failed on short final and defective No. 2 stabilator actuator was replaced. 2) Stabilator light and audio came on at 1,000 feet agl, 100 KIAS; defective No. 2 stabilator actuator was replaced. 3) Stabilator was reset after failing at 30 KIAS. After picking up slingload, it again failed at 30 KIAS. No. 2 stabilator actuator was improperly receiving and reacting to signals. 4) Stabilator failed during takeoff at 50 KIAS. After slewing to zero and automatic reset, it immediately failed again. Stabilator amplifier was out of adjustment.

A series - Four aircraft had incidents involving antiflaps. 1) Bushing in antiflap assembly moved in toward flap restrainer, causing flap restrainer to become stuck. 2) Aircraft experienced uncommanded vertical bounce, caused by main rotor antiflap bushing slipping and causing antiflap to stick in extended position. 3) During runup with both engines at idle, pilots felt bumping and feedback in controls, caused by failure of main rotor antiflap bushing. 4) Aircrew was unaware that as aircraft left field site, part of antiflap assembly failed and was thrown from aircraft. Ground personnel notified operations and message was relayed from tower to aircraft, which by then was on short final. Displaced bushing in antiflap assembly caused binding of antiflap cam, resulting in antiflap assembly breaking away from main rotor blade.

A series - During flight, pitch bias actuator failed nine times in 3 minutes.

A series - During approach, APU wouldn't come on line. Recycling had no effect and crew heard loud rattling noise. Caused by excessively worn main bearing in APU.

Attack helicopters

AH-1 Class D mishaps

S series - Damage to leading edge of left stub wing from bird strike occurred during night mission and was found next day. Crew had noticed no indication of strike.

S series - After aircraft landed at unimproved field site, witness told pilot tail rotor had hit a small dead bush that had concertina wire tangled in it. Two-foot-high dead grass partially obscured bush and hid wire from sight. Dent in leading edge of one tail rotor blade and some skin separation of the other blade amounted to $3,700 damage.

AH-1 Class E mishaps

F series - Aircraft was on approach during NVG terrain flight about 60 feet above plowed field. Copilot, in rear seat, entered brownout condition and pilot took controls. During go around, aircraft overtorqued to 105 percent.

F series - Crew noticed strong odor during hot refueling. Alternator had failed.

S series - During hover, aircraft began uncommanded left roll. IP took control and disengaged SCAS system. Caused by failure of roll channel transducer.

S series - During engine runup at 6600 rpm, transmission oil bypass light came on. Caused by failure of pressure switch.

S series - Rpm dropped to 200 while aircraft hover taxied for takeoff. Shear pin in droop cam bellcrank was broken.

AH-64 Class E mishap

A series - Just before taxi for takeoff, target acquisition designation system became uncontrollable in elevation and slewed to full-up position. Fault detection location system indicated failure of ac torque amplifier.

Cargo helicopters

CH-47 Class D mishap

C series - During short final with external slingload, at about 250 feet agl, flight engineer reported load had been released. Pilot verified copilot's hands were nowhere near cargo release buttons. Cause under investigation.

CH-47 Class E mishaps

B series - Engine lost power during climb at 6,000 feet agl. N1 dropped to 75 percent, egt went from 610 to 150 degrees C., and rpm from 226 to 221. Caused by FOD damage to compressor section. FOD screens had been removed because of possibility of inflight icing.

B series - Crew heard loud noise during runup and flight engineer felt strong vibration from No. 2 engine fuel pump. Caused by failure of engine fuel boost pump.

C series - Taxi was stopped when crew chief smelled fuel. Fuel had leaked from forward left auxiliary tank, but when aircraft was run up, condition couldn't be duplicated. Fuel may have overflowed from filler neck and been trapped between fuel pod and skin.

C series - During hot refueling, flight engineer noticed hydraulic fluid coming from aft gearbox area. There were no cockpit indications of problem and cause is unknown.

Observation helicopters

OH-58 Class E mishap

A series - Aircraft was being ground run. When throttle was advanced, transmission oil pressure light came on. Caused by failure of transmission oil switch.

Fixed wing

C-12 Class E mishap

C series - During flight, No. 2 engine fuel pressure warning light came on and engine quit. No. 2 engine fuel control shaft appeared to have sheared.

OV-1 Class E mishap

D series - No. 1 generator, No. 3 inverter, and master caution lights came on in flight. Caused by failure of No. 1 starter generator.

U-21 Class E mishap

A series - During flight, passenger told pilot of possible fuel leak near right engine nacelle filler cap. Caused by sealant separation between right fuel cover access and fuel adapter assembly.

Maintenance

UH-1 Class C mishap

H series - Compressor stall occurred during test flight for same problem.

(continued on back page)

Mishap briefs

More than $10,000 damage to 90-degree gearbox and tail rotor hub resulted. Caused by impeller rubbing against compressor housing.

OH-58 Class E mishaps

A series - Postflight inspection showed hydraulic fluid was pooling on roof of aircraft. Crew had felt no unusual feedback during flight. Leak in hydraulic return line was caused by line chafing against retaining clamp.

A series - Ammeter showed high output of 70 amps during flight. When battery was switched off, indication dropped to 20 amps. During shutdown, passenger told pilot smoke was coming from bottom of aircraft. Vent tube was clogged by proseal, causing battery to overheat.

C series - After start, N1 gauge indicated 68 percent. Pilot's collective throttle was improperly rigged.

C series - Upon takeoff to hover, N2 dropped to 98 percent and didn't recover. Droop compensator and linear actuator were improperly rigged.

C-12 Class E mishap

C series - During IFR flight, communication was lost on all transmitters. Caused by broken wire on audio PC assembly.

OV-1 Class E mishaps

D series - During climbout to cruise altitude, pilot noticed right drop tank transfer light had come on with 900 pounds of fuel remaining. Right drop tank was misaligned, causing fuel not to transfer.

D series - During cruise flight in light icing conditions, pilot noticed No. 2 engine anti-ice light coming on intermittently. Visual check showed engine top ring cowl wasn't dissipating ice accumulation. Cannon plug to upper ring cowl was disconnected.

U-21 Class E mishaps

A series - During battery start, No. 2 engine started, but generator couldn't be brought on line. Caused by corrosion on fuse block holder.

A series - During flight, No. 1 and 2 VORs wouldn't display course guidance. VOR antenna lead had vibrated loose from diplexer mounted on cockpit firewall.

A series - After reaching about 600 feet agl during climbout, crew noticed airspeed indicators, altimeters, and VSIs were inoperative. Static line was crimped behind copilot's instrument panel. Copilot's altimeter had recently been replaced.

Safety messages

• Safety-of-flight technical message regarding inspection and replacement of vertical stabilizer bolts on AH-64A Apache helicopters (AH-64-86-16, 070400Z Oct 86). Summary: A failure of a machine bolt occurred on an AH-64A aircraft while parked at Fort Rucker on 3 Oct 86. This bolt is used to attach the vertical stabilizer spar box assembly to the tail boom. A Category 1 EIR 16H60187 has been written and a reply is in works. This message directs an inspection, replacement, and revised torque procedure for vertical stabilizer bolts. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning AH-64A series hydraulic system contamination as result of using chlorinated/fluorinated solvent to clean hydraulic components before assembly (MIM-AH-64-86-MEM-04, 291400Z Sep 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

U.S. ARMY SAFETY CENTER

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Flightfax®
Report of Army Aircraft Mishaps

Will the accused please rise

Sometimes when accident investigators arrive on the scene they are looked upon as both judge and jury. That is totally erroneous. The purpose of an accident investigation is not to judge guilt or innocence. Rather, it is to find out what caused an accident so that actions can be taken to prevent the same thing from happening again.

Some analysts estimate that as much as 80 percent of Army aviation accidents can be attributed to some kind of human error. Pilot, mechanic, commander, supervisor, air traffic controller; the list is as long as there are human beings involved.

This was that kind of accident. It wasn't a case of cowboying or trying to make an aircraft do something it wasn't designed to do. It was people who pushed themselves beyond the established limits and accepted noncritical missions when they should have said, "No." Then there were deficiencies in the unit: no procedures for approving a change of mission, stretching guidelines on NVG training hours and crew endurance, failure to provide that extra fine edge of training for the enlisted crew so that they could pull their share of the load as aircrewmembers. Finally, there were individual errors: a PIC who was so motivated to assist someone else, and so sure of his own and his crew's abilities that he sacrificed good judgment. And, a crew chief and door gunner who failed to properly use the restraint systems that were provided for their own protection. Even further away from the actual scene of the accident were those people who should have been doing more to provide units like this one with the higher wattage infrared (IR) bulbs they needed and checking maintenance of NVG to ensure they met serviceability criteria.

The four-man crew of the UH-60 was on a night vision goggles training mission. Their aircraft and one other left for the training area at 1830. They planned to work on night approaches and NOE navigation for about 3 hours. After an hour of training, the second aircraft developed maintenance problems and returned to the airfield where the flight was terminated. The amount of natural light available and the 150-watt IR bulb on the aircraft weren't sufficient for further training and the PIC of the mishap aircraft also decided to return to the airfield and continue training in the traffic pattern.

After about an hour of traffic pattern work, the tower operator called the UH-60 and requested assistance in locating a downed CH-47 which had struck a wire. The PIC called the unit staff duty NCO and told him they were going to assist in a downed aircraft search and to log the information. The UH-60A was equipped with Doppler navigation equipment, and the crew was able to easily locate the CH-47 and lead a medevac aircraft into the area. Then the crew of the UH-60 returned to the airfield to refuel and resume training.

About half an hour after the first call for assistance, the tower again asked for help in transporting military police guards and a 1/4-ton truck to the downed CH-47. The UH-60 PIC turned the request down because his aircraft wasn't equipped to perform the mission. A CH-47 crew agreed to accept the mission but they didn't have the proper maps in their aircraft, so the PIC of the UH-60 agreed to lead the

CH-47 out to the downed aircraft. He landed at his operations and had the crew chief pick up his map of the area then led the CH-47, with the guards on board, out to the crash site. Both aircraft landed and once the PIC of the UH-60 was assured he was no longer needed, he again departed for the airfield.

Before he reached the airfield, the tower operator once again called for assistance and asked that he contact the CH-47 he had led to the crash site and tell the crew to bring the remaining passengers of the downed aircraft back to the airfield. The UH-60 PIC tried to contact the CH-47 by radio but he was unsuccessful. He decided to go back to the crash site and try again to contact them from the air. At this time, the copilot, who had been flying the aircraft, said he was tired and didn't want to fly any more. The PIC took the controls and flew back to the downed aircraft site.

Arriving over the aircraft on the ground, he tried to make radio contact from about 2,000 feet msl. He still was unsuccessful and he decided to circle

(continued on next page)

down and land at the site. He descended to approximately 300 feet agl, with both the landing and IR lights on. He began flying up a valley at 10 to 20 knots and almost immediately saw a wire strand through his right windshield. He pulled collective pitch to try to avoid the wires, but it was too late. The aircraft actually flew up into several more strands of the high-tension power lines. The wires shredded the main rotor blades, and the UH-60 fell about 224 feet, hit a dead tree, and came to rest in a small creek. The aircraft was destroyed. Most of the damage was to the aircraft's left side.

The UH-60 came to rest in a level attitude with both engines running. The PIC shut the engines down and got out the pilot's door on the right side. The crew chief had climbed out the door gunner's window on the left side. They helped the copilot, who had major injuries, out of the aircraft, but the door gunner had been killed in the crash.

The PIC was highly motivated

This PIC had an excellent professional reputation among his peers and subordinates and had been selected as unit trainer for NOE flight techniques. Although the copilot had been having difficulty with aircraft control, particularly under NVG flight conditions, he was considered a professional and competent aviator. Both aviators had arrived in the unit NVG-qualified in the UH-1.

The PIC's response to the control tower's original request to assist in locating a downed CH-47, although an unplanned mission, was appropriate. This was a reasonable emergency mission because conditions at the accident site were unknown. However, once he had completed this first mission, conditions of the downed aircraft and personnel were known, and the medevac helicopter was on site, he should not have accepted missions back into the area. He complied with further requests from the control tower because he was excessively motivated to comply with the requests for assistance.

His motivation outweighed his judgment

When the PIC accepted missions back into the mishap area, he did so without command approval and without a mission update briefing. Thus, he was in violation not only of the unit mission briefing directive but also of the requirements of DA message 281527Z Jan 1985 regarding aircrew mission briefing, briefback, and debriefing. On the last mission, when he was attempting to contact the rescue CH-47 by radio, he descended below the wire hazard height of 400 feet agl in an area that he well-knew was hazardous. During the mission briefing earlier that evening for the NVG training mission, the NOE route on which the downed aircraft was located had been discussed as a possible training route. Use of the route was not approved because of the hazards of flying in that area with low ambient light and a low-wattage IR light.

The UH-60 aircrew had already violated the unit's night vision goggles SOP. After a full duty day, they had flown for 4.3 hours under NVGs, well beyond the maximum allowed by the unit SOP or recommended by AR 95-1. The copilot, who had twice flown into the mishap area, frankly admitted his fatigue and turned over the controls to the PIC when he found out they were once again going into the area.

The unit was also at fault

There were no established procedures in the unit for pilots to receive command approval and mission rebrief in the event of a mission change. When the PIC notified the unit that he was going to comply with the control tower's request to try to locate the downed aircraft, only the staff duty NCO was on duty. He had no authority to approve or disapprove a change in mission. He did the only thing he could do; he logged the information as the PIC told him to do.

The spirit and intent of the DA message on mission briefings is twofold: to provide pilots a channel for command approval when mission changes are requested and to prevent pilots from striking off on their own without command knowledge and without the proper mission planning. The requirements of the message are in accord with good risk management. The Army's accident experience has shown that, in many instances, the individual aviator has decided what level of risk he will accept rather than the command establishing operational parameters. When there is a lack of good risk management at unit level, highly-motivated aviators may accept high-risk missions they should never have accepted.

The unit was not following its own NVG Qualification and Continuation Training SOP in conducting NVG training. The SOP states that training periods will not exceed 1.5 hours, yet the training flight scheduled for this crew was for 3 hours. These crewmembers had reported for duty at 0800, worked the entire duty day, then begun the NVG training mission at 1830. The unit SOP stated that work periods would not exceed 8 continuous hours in a 24-hour period. It also states: "Individuals should not be scheduled for duty 8 hours before, to 8 hours after completion of, NVG training missions."

The unit crew endurance policy did not follow the battalion crew endurance policy (which follows AR 95-1 guidance), nor did it follow the Aviation Group crew rest policy. The NVG environmental factor applied in this unit was 2.0 while AR 95-1 recommends 2.3. The reduced NVG environmental factor was used so that the unit could perform scheduled missions that require a greater mission time than the environmental factor in the AR would allow. The two unauthorized missions to the accident site extended the crew's flight time even beyond the unit's crew endurance policy.

Failure to use restraints properly contributed to severity of injuries

The crew chief, who was seriously injured, and the door gunner, who was

(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 in flight at 2,000 feet msl when crew smelled strong odor of burning and noticed egt was at zero. When aircraft landed, cowling was glowing from excessive heat but there was no fire. Suspect exhaust clamp broke, allowing hot exhaust gas to enter rear cowled area, melting egt harness. Damage estimated at more than $48,000.

UH-1 Class E mishaps

H series - During rappelling demonstration, left rear rappeller's rope hooked on aft ground handling wheel mounting lug. As helicopter moved away from drop area, the rope became entangled on rappeller's D-ring. Rappeller was knocked down and dragged about 75 feet before crew realized he was still attached to the aircraft.

H series - Pilot began takeoff from confined area with 75-foot trees at departure end. After going through effective translational lift, he realized it was doubtful whether he would clear the trees, and he terminated takeoff at a 50-foot hover. Pilot started right pedal turn to take off in other direction. Aircraft started to descend and left pedal was at the stop. Aircraft turned another 45 degrees before complete control was regained at stabilized 8-foot hover. Pilot failed to ensure pre-mission planning for available torque was made.

H series - Master caution light came on in flight. Caused by short in transmission chip detector system.

H series - Master caution and transmission oil pressure lights came on in flight. Transmission pressure was 20 psi. Gasket on filter cracked during test flight.

H series - Transmission oil hot light came on in flight while aircraft was descending. Caused by faulty thermostatic switch.

H series - As aircraft leveled off from maximum performance takeoff, crew heard series of loud rumbles and felt mild but rapid yaw excursions. Caused by compressor stall.

H series - During flight, transmission internal oil filter gasket failed due to overpressurization by transmission oil pump.

H series - N2 tachometer became erratic and dropped to zero during flight. Caused by failure of tachometer generator.

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

UH-60 Class D mishaps

A series -During return to base after completing slingload operation, copilot had to change course to avoid flight of two Air Force A10s conducting JAAT at 150 feet agl, which is below 300-foot established minimum altitude. A10s appeared to be making gun runs on UH-60. After copilot changed course twice more to avoid A10s, pilot told copilot to leave the area at 50 feet agl, 50 KIAS. Both pilots continued visual contact with A10s, then pilot saw single strand of wire in flightpath. Wires struck UH-60 at center of windshield, bending both wipers and landing light hinge and scratching pilot's window.

A series - Crew was conducting night hoist qualification training using concrete-filled bucket weighing about 250 pounds. As load was lifted the third time, it began to oscillate. Training crew

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	1-5 Nov	0	0
	December	1	1			
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	3	4

chief's ICS cord came unplugged as he attempted to stabilize the load, and he was unable to tell pilot to stop raising the load. As load came near aircraft, crew chief gained some control by using his foot on the cable, but when the cable slipped, the load struck the aircraft's underside causing about $2,000 damage.

UH-60 Class E mishaps

A series - Stabilator failed twice during takeoff and again on short final. Caused by defective No. 2 stabilator actuator.

A series - Crew felt heavy vibration during takeoff. Postflight inspection showed one anti-flap assembly had broken off, damaging leading edge of blade. Suspect dusty environment caused anti-flap to stick, causing damage to anti-flap assemblies.

Attack helicopters

AH-1 Class E mishaps

F series - During hover/taxi, pilot's engine tachometer went to zero. Caused by failure of dual tachometer.

F series - During hover, transmission oil pressure fluctuated from full-up to full-down several times, then stopped at zero. Caused by failure of transmission oil pressure gauge.

F series - Dc generator caution light came on during flight. Pilot began followup emergency procedures but couldn't get generator on line. The crew returned to the field site and landed with no further problems. Maintenance couldn't get starter to engage and found shaft had sheared on generator. Starter generator was replaced and aircraft was flown to airfield for installation of MILES/AGES. After landing, crew heard noise from engine compartment but couldn't determine cause. After special oil sample was taken, engine was condemned. When engine was removed, damage was found to variable inlet guide vanes and first several stages of compressor. Suspect cause of damage was compressor stall.

G series - Loose aft section of drive shaft cover was found when aircraft landed. PIC failed to make walkaround inspection.

P series - Copilot was flying aircraft from front seat. During short final, pilot heard loud whine from aft of pilot's station. Instrument indications were normal. Copilot confirmed whine and as pilot took controls, master caution light came on, stability and control augmentation system (SCAS) went off line, and main inverter caution light came on. Circuit breakers were confirmed closed. Pilot put inverter switch to standby, reengaged SCAS, and landed. Caused by failure of inverter.

S series - During flight, transmission bypass light came on. Caused by failure of bypass switch.

AH-64 Class E mishaps

A series - On downwind, No. 2 engine oil psi caution light came on. No. 2 power lever was brought to idle and roll-on landing made. Maintenance couldn't duplicate.

A series - Crew felt aircraft shudder while on downwind and rated student pilot reported some feedback in cyclic. IP took control and during landing three milder shudders were felt. Maintenance couldn't duplicate problem.

A series - During OGE hover, No. 1 engine nose gearbox chip light came on. Single-engine roll-on landing was made. Normal fuzz was found on No. 1 engine nose gearbox chip plug.

Cargo helicopters

CH-47 Class E mishaps

A series - During approach, pilot noticed aft speed trim wouldn't retract. Speed trim still didn't retract when selector was placed in manual position. Caused by malfunction of actuator.

A series - No. 2 engine N1 gauge dropped to zero during takeoff. Caused by failure of No. 2 engine N1 indicator.

B series - During cruise flight, I-bolt attached to practice load broke and load fell 500 feet into unpopulated area. Over several years, moisture had accumulated in depression where I-bolt attached to load, resulting in corrosion. Bolt wasn't strong enough to support load.

B series - No. 2 engine wouldn't start during runup. Caused by defective quadrant assembly.

C series - No. 1 engine beep went to high side during hover. Caused by moisture in No. 1 engine N1 actuator cannon plugs.

C series - No. 2 engine emergency power light came on and emergency power flag tripped, starting timer with No. 2 engine PTIT indicating 500° C. Caused by faulty temperature indicator.

C series - While waiting for 2-minute cool down, No. 2 engine temperature went up to about 1,000 degrees. ECL was placed in stop position and engine was motored until it was cool. Caused by bad check valve.

Observation helicopters

OH-6 Class D mishap

A series - At engine start, N1 hung at 35 percent and TOT was 350° C. After 35 seconds, throttle was rolled off and at the same time the starter switch was released. TOT stayed at 350° C. for a few seconds. Pilot checked to see if key was on. Before pilot or copilot saw what was happening, TOT went to 1,200° C. and fire was found in engine. Aircraft had sat outside overnight in 42-degree temperature and foggy conditions. Damage amounted to over $9,000.

OH-58 Class C mishap

A series - While aircraft was at 3-foot hover, nonrated passenger inadvertently pulled back on cyclic control. Tail skid dug into ground and bent aft portion of tail boom down, separating drive shaft from tail rotor gearbox. Aircraft began right spin and pilot reduced throttle to flight idle. Aircraft hit the ground three times before coming to rest upright. Nearly $15,000 damage resulted to crosstubes, drive shaft assembly, skid tube assemblies, pylon mount assembly, tail boom, and tail skid.

OH-58 Class E mishaps

A series - Engine oil temperature rose to 110° C. during flight. Pressure reducer oil filter was clogged, preventing oil from circulating through cooling system.

Mishap briefs

A series - N1 gauge showed zero while engine was operating at idle during engine start. Caused by failure of N1 tachometer generator.

C series - During cruise flight under NVGs, N2 tachometer failed. Vibration caused wire to come loose from cannon plug to N2 tachometer generator, resulting in failure of tachometer.

Fixed wing

C-12 Class E mishap

C series - No. 2 engine igniter failed during runup after condition lever was placed in idle position.

OV-1 Class E mishaps

D series - During short final, master caution and No. 1 engine chip lights came on and stayed on until engine was shut down. Metal particles were found on plug. After ground run with no lights showing, aircraft was released for flight. During flight, chip light flickered intermittently and aircraft was grounded pending results of oil sample.

D series - Pilot and technical observer began feeling effects of hypoxia during flight at 16,000 feet. Oxygen regulators were replaced.

T-42 Class E mishaps

A series - Right engine ran rough during flight. Caused by faulty right magneto on No. 2 engine.

A series - Flaps wouldn't extend during landing. Caused by faulty flap actuating motor.

U-21 Class E mishaps

A series - During takeoff, flaps remained in full-down position. During abort, electrical fumes filled aircraft and flap motor circuit breaker popped. Flap motor burned out.

C series - During rollout, tower personnel told crew they could see smoke from left main landing gear. Left main outboard tire was blown out.

Maintenance

AH-1 Class E mishap

S series - During flight, pitch channel of stability control augmentation system (SCAS) started motoring fore and aft, then roll channel started motoring. SCAS cards were out of balance.

CH-47 Class E mishaps

C series - During approach to pinnacle, pilot noticed No. 2 engine N1 winding down. Pilot increased airspeed and confirmed that No. 2 engine was operating normally by observing torque, rotor speed and PTIT. After landing, inspection showed back of N1 gauge had been struck sharply by a blunt object or had been damaged in shipment to the extent that the lock washer had been pushed beyond internal lip of the gauge stud connection. This caused bonding of the threaded stud to body of the gauge to fail and separate, pulling out and disconnecting internal wiring.

C series - No. 2 engine had excessive oil leak during runup. Caused by chafed line.

OV-1 Class E mishaps

D series - During aircraft runup, pilot noted No. 2 engine propeller rpm during pull-down check was 1110. Propeller was out of adjustment.

D series - As landing gear was extended before landing, left main gear indicator showed gear was up, although visual check indicated it was down. Left main gear up-lock switch was stuck in up position.

D series - During flight, technical observer noticed cowl latch was ajar. Wrong latch had been installed and latch looked like it was secured when actually it wasn't seated.

U-21 Class E mishap

A series - Landing gear wouldn't retract after takeoff. Caused by loose wire on landing gear.

Safety messages

• Safety-of-flight technical message concerning one-time inspection of OH-58A and OH-58C series aircraft for proper fuel filler cap retention cable (OH-58-86-09, 141500Z Oct 86). Summary: October 1982 issue of *PS Magazine* described a field repair to the wire rope assembly which retains the fuel filler cap. This field repair had been approved by TSARCOM. The repair consisted of shortening the wire rope and attaching it between the outside of the cap and the filler neck flange. Subsequent experience has shown the repair removes the crashworthy feature of the fuel filler cap, thereby reducing survivability features of the system. Purpose of this message is to direct a one-time inspection of all OH-58A and OH-58C series aircraft for the shortened, relocated wire rope assemblies. Filler caps with short wire rope assemblies must be restored to the original manufactured configuration. Contact: Leo Smith, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message regarding UH-1/EH-1 and AH-1G series aircraft (UH-1-86-10 and AH-1-86-06, 201530Z Oct 86). Summary: TB 55-2840-229-20-1 regarding one-time inspection of the T53-L-13B series turbine engines on all UH-1/EH-1 and AH-1G series helicopters, dtd 1 Apr 86, was dated to be ineffective as of 1 Oct 86. This message is to reinstate the technical bulletin until further guidance is available to the field. Contact: CPT W. Knight, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message regarding contractor inspection of transmission oil cooler fan splines and tail rotor drive shaft on UH-60A aircraft (UH-60A-86-17, 212000Z Oct 86). Summary: In 1981, a Class A accident occurred due to loss of the tail rotor drive. Loss was attributed to failure of internal splines in the transmission oil cooler fan. Spline failure occurred following field replacement of the fan assembly. Subsequently, the maintenance manuals were revised to clarify the installation procedure. Recently, a Class A accident occurred that appears to be similar to the earlier accident. Purpose of this message is to provide information and documentation for contractor teams to visit UH-60A locations for the purpose of conducting an on-aircraft inspection of the oil cooler fan and tail rotor drive system and to obtain engineering data. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

(continued on back page)

Will the accused please rise

killed in the crash, were only wearing seatbelts. Had they been using the restraint systems properly, the effects of the crash would almost certainly have been less severe. The PIC failed in his supervisory responsibilities when he did not ensure that both crewmembers were properly using their restraint systems.

Numerous changes have been made in this aviation unit to ensure that circumstances and deficiencies that contributed to this accident have been corrected.

• Procedures have been incorporated into the SOP regarding command approval of mission changes. Either the company commander, operations officer, or flight platoon leader is on duty when unit aircraft are flying.

• SOPs have been revised and personnel must adhere to NVG flight time and crew endurance limitations.

• Crew chiefs and door gunners are receiving training to ensure they are fully qualified and able to function as participating aircrewmembers, particularly in areas with numerous environmental hazards.

• All crewmembers have been briefed on the importance of using properly adjusted restraint systems.

In addition, tests and quality control checks have been instituted in the aviation group to which this unit belongs to ensure NVG meet serviceability criteria. All aircraft now have 250-watt IR light bulbs installed and the appropriate agencies have been notified of the problem of procuring sufficient quantities of the higher-wattage bulbs.

As stated in the beginning, accident investigations aren't conducted to accuse and condemn, but to correct. Actions taken in response to recommendations on this accident may save another crew and their aircraft from a similar fate. That's what safety is all about. ■

Mishap briefs

• Safety-of-flight operational message regarding immediate restriction of rappelling operations involving all H-60A series aircraft (UH-60-86-18, 231130Z Oct 86). Summary: A recent fatality occurred when the rappelling rope connector failed, allowing the rappeller to fall. Immediately cease and desist rappelling operations using the cabin ceiling rappelling rope connectors. Contact: Dick Mooy, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message regarding inspection of transmission pressure switches on YCH-47D and CH-47D helicopters (CH-47-86-09, 211920Z Oct 86). Summary: There have been two recent occurrences of failure of a transmission oil pressure switch, which resulted in loss of oil from the aft transmission. The failure occurred at the weld closest to the base of the switch. Purpose of this message is to require a visual inspection of the forward, aft, combining, and engine transmissions and aft rotor drive shaft oil system pressure switches. This inspection shall be repeated prior to first flight of each day. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning loose insert in main rotor pitch link in OH-58 aircraft (MIM-OH-58-86-MEM-06, 201300Z Oct 86).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

U.S. ARMY SAFETY CENTER

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12 November 1986

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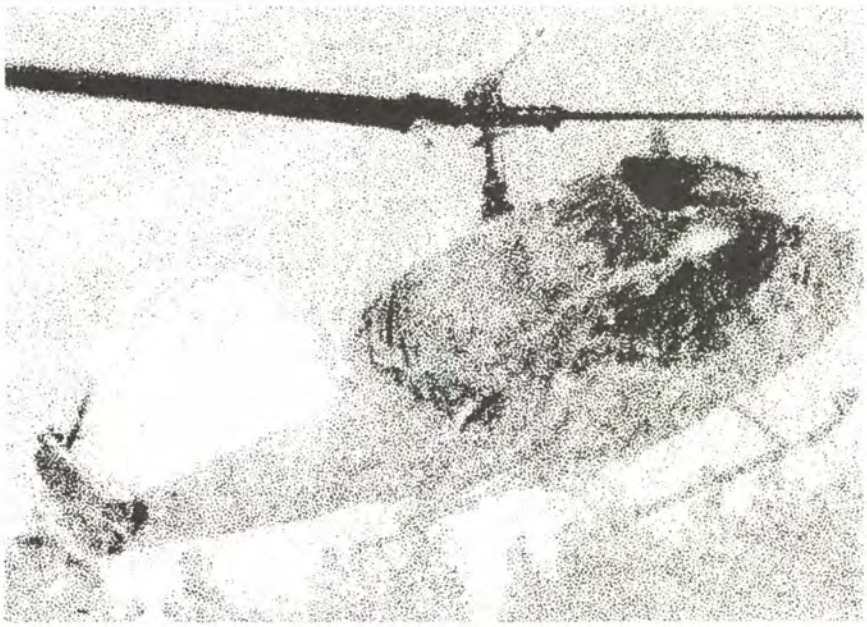
Report of Army Aircraft Mishaps

Snow + helicopters - caution = trouble

Your summer tan has scarcely faded, and here we are talking about snow. You bet. In some parts of the world Army aviators are already flying in snow. If you aren't, it may be just around the corner; so it's time to get ready.

Inexperience or lack of training is the biggest contributor to snow-related accidents. But even if you have lots of winter flying experience, remember the summer hiatus degrades your winter flying ability. Units who haven't already begun refresher training in cold weather flying should do it now. Once an aircrew is involved in whiteout or vertigo from flying over a snow-covered landscape, it's too late to talk about training.

Aviators who are experienced in cold weather flying can still make a mistake when operating in snow. Overconfidence can lead to an accident, just as lack of experience can.



Blowing snow

The PIC in the following winter flying accident was confident in his abilities, and he had reason to be. He had more than 5,500 hours of military flying with a total of 4,450 hours in the UH-1 aircraft. Where his unit was located it had already been winter for 3 or 4 months, and in the 90 days preceding the mishap, he had flown nearly 60 hours in the UH-1 in cold weather conditions. About 10 of those flights were in snow. The copilot had almost 4,200 military flying hours with more than 2,400 hours in the UH-1. He had flown 26 hours in the UH-1 in the 90 days preceding the mishap.

The copilot was at the controls when the Huey approached the designated landing area. There was a 400-foot ceiling, partial obscuration, snow, fog, and estimated winds of 210 degrees at 8 to 10 knots. The approach was terminated at a high hover which was maintained for 1 to 2 minutes in order to blow away newly-fallen snow on top of the 1 1/2 to 2 feet of crusted-over snow which already covered the landing site. The copilot was using the correct snow operation techniques found in FM 1-202.

When the copilot landed on the crusted snow, the rear of the skids broke through, putting the aircraft in a nose-high, tail-low attitude. After the crew chief told the pilots the Huey's tail was 2 to 3 feet above the snow, the pilots decided to reposition to another spot to level the aircraft. The PIC told the pilot that he had good visual reference on a grassy spot outside his right window, and the pilot and copilot transferred the controls.

The PIC picked the aircraft up to a 3-foot hover to reposition to the spot he was using as a reference. After lifting the helicopter to a 3-foot hover in blowing snow, he lost his visual reference. The aircraft began drifting left toward trees protruding into the landing area. The PIC acknowledged a warning from the copilot about the trees, but the aircraft continued to drift left, and the tail rotor struck the trees. As the PIC attempted to set the aircraft down, it struck the snow-covered ground with the left forward skid and rolled over onto its left side.

FM 1-202 specifies procedures for taxiing or repositioning in loose snow. Pilots are told to either ground taxi or maintain a high hover at 5 to 8 feet and then air taxi at a faster than normal taxi speed to the reposition area. The faster speed at a high hover allows the aircraft to move in front of and above the cloud

Snow + helicopters - caution = trouble

of snow created by its own rotors. The PIC failed to follow these procedures because he was confident he could maintain visual reference despite the blowing snow and whiteout conditions created by the helicopter's rotorwash during a 3-foot hover.

Snow-covered landing areas

If there's any lingering doubt about the hazards of flying in a snow environment, the UH-60 pilot in the following accident could tell you just how quickly an accident can happen.

It was winter, and the two flights of five UH-60 helicopters were involved in a troop insertion mission in unimproved landing areas following false insertion landings en route. The mishap aircraft piloted by the unit operations officer was No. 3 in a flight of five. The pilot's flying time had been sharply curtailed because of his duties in the unit. He had flown only 17 hours in the past 4 months, and he hadn't been able to attend mandatory snow operations training conducted within 60 days before the accident, nor did he attend remedial classes or engage in hands-on snow landing operations. In these classes, correct snow landing techniques and the procedures in FM 1-202 were reviewed.

The flight proceeded normally with 7 miles visibility and 1,000-foot ceilings outside scattered snowshowers; then the flights separated and began a series of false insertions. The flight lead for the mishap aircraft found the next landing zone unsuitable and selected an alternate site. The aircraft were in a snowshower with about 1-mile visibility as approach was begun to a large, open snow-covered field with an apparent upslope in the direction of landing. The crew of No. 3 aircraft could see a large amount of snow circulating through the rotor systems of the first two aircraft.

The pilot of No. 3 aircraft selected a touchdown point downslope and to the left rear of the lead aircraft. During approach, the copilot told the pilot to move a little to the left for aircraft spacing and 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 reference, 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.

Several factors contributed to the difficulty of attempting a landing at this site.

- The flight was landing downwind to an upslope
- The aircraft were landing during a snowshower to very loose, dry snow
- They were landing to a left sloping hill
- They had limited stationary visual cues

Individually, these factors would not be taxing, but collectively, their effect would be demanding even for the most experienced crew. The pilot had to monitor two slopes and his position simultaneously, which is a difficult task, especially for a pilot with limited recent snow experience. The rate of descent was excessive, 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.

Other hazards from snow

While rotary wing pilots have to be particularly cautious in snow because of whiteout created by the aircraft's rotors, that doesn't mean fixed wing aircraft don't have their own problems when operating in snow. For example, a C-12 was making a routine approach to landing; only a few seconds later, it was involved in a Class B mishap.

The aircraft was on short final approach in landing configuration at about 90 knots, then the main landing gear struck a 2-foot, crusted-over snowbank that had been plowed onto the approach end of the runway. The impact with the snowbank forced the right main landing gear rearward, shearing the drag link attaching structure from the main wing spar and causing the down-lock mechanism to rotate out of the locked position. As a result, when the aircraft touched down the right main landing gear folded, and the aircraft rolled off the runway and over a ditch. It came to rest in an upright position, but there was major damage to the fuselage, both main landing gears, and the right propeller.

Winter has been following summer for hundreds of years. There's nothing we can do about that, even if we wanted to. That very predictability of the seasons can be in our favor, however. It gives us time to plan our training so that we're ready and have a mindset for the different kind of flying problems each season can bring. If you haven't already done it, get your refresher training, review FM 1-202, and be cautious out there in that winter wonderland. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - Aircraft had compressor stall while in forward hovering flight during maintenance test flight. MTP initiated improper hovering autorotation, resulting in hard landing. Skids and crosstubes were destroyed and sheet metal on underside of aircraft was damaged. Estimated cost of damage was $4,500.

M series - After start had been initiated, pilot and fire guard saw tiedown straps on main rotor. Tiedown straps hit FM antenna, vertical fin, and tail rotor blades, causing $1,850 damage.

UH-1 Class E mishaps

H series - Master caution and chip detector lights came on during flight. Metal was found on chip detector. Same aircraft had experienced overspeed in early August and 28 engine hours later had a chip detector light come on. Engine was changed at that time because of high metal content in oil sample.

H series - During approach to confined area, rotorwash caused panel marker to blow up and come back down into rotor system, resulting in small hole in rotor blade. Panel marker hadn't been properly secured. In another instance, a panel marker, which had been secured with rocks, blew up into another UH-1's rotor system, also damaging the main rotor blade. Another unsecured panel marker hit the main rotor system of a V series UH-1 during takeoff, but caused no damage.

H series - During cruise flight, pilot noticed engine oil temperature was 100° C., while OAT was below 15° C. Engine oil pressure was 100 psi. Caused by clogged engine external oil filter.

H series - When pilot started reducing power to descend, crew heard loud rumbling from engine area. N2 decreased from 6600 to 6200 rpm and aircraft yawed to left. IP took controls and further reduced power to enter autorotation; then compressor stall ceased, engine stabilized, and rpm returned to 6600.

H series - During landing, rpm warning light and audio came on and rotor tachometer went to zero. Caused by broken shaft in tachometer generator.

V series - During flight, flap on A22 slingload became unsecured. Load was improperly packed, allowing contents to shift. Aircraft landed and load was resecured.

UH-60 Class E mishaps

A series - During flight, No. 1 engine oil pressure dropped to 30 psi. Caused by failure of crew chief to properly seat oil cap.

A series - Stabilator failed twice during takeoff at 5 knots. Another aircraft's stabilator auto control failed at 130 KIAS when aircraft was placed in decelerative attitude. Autocontrol was reset and stabilator failed again. Stabilator on a third aircraft failed in straight and level flight, at 120 KIAS, in light to moderate turbulence. Pilot reset stabilator and it failed again. Stabilator on a fourth aircraft failed at 55 KIAS, during climbout from NVG NOE training route. Auto reset indicated "on" but stabilator wouldn't continue proper programming. About 30 seconds later, stabilator auto mode failed again. Stabilator manual slew switch would only allow maximum upward travel to 5 degrees trailing edge down. No. 2 stabilator actuator was defective.

A series - Crew felt feedback in controls when stability augmentation systems (SAS) 1 and 2 were turned off. When flightpath stabilization was turned off, caution light failed to come

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	1-12 Nov	1	0
	December	1	1			
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	4	4

on. When SAS was off, caution light was on and there was increased resistance in longitudinal axis. Aircraft had been washed during morning hours that same day.

Attack helicopters

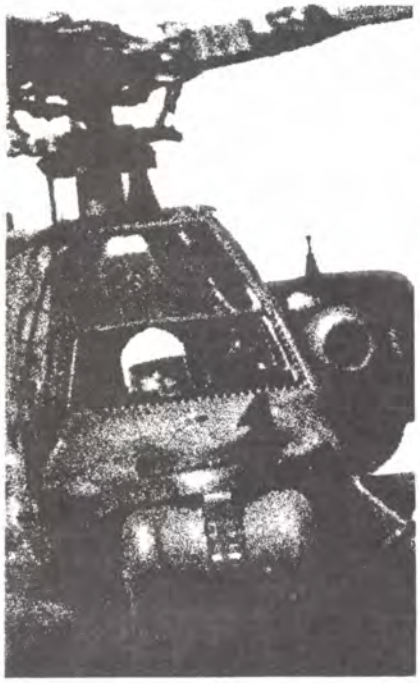
AH-1 Class E mishaps

S series - Dc generator caution light came on in flight. Light wouldn't go out when switch was recycled. Broken wire caused generator failure.

S series - Crew was involved in MILES training, making numerous attacks on ground team. Crew was attempting to engage ground team, using in-flight unmasking when pilot, who was on controls from rear seat, saw two trees in his flightpath. The trees were about 15 feet higher than the surrounding trees. Pilot tried to avoid the trees, but sun reflecting off the aircraft's canopy caused him to misjudge his clearance and the aircraft clipped the top of one tree, resulting in a 12-inch crease in skin on underside of main rotor blade.

AH-64 Class E mishaps

A series - Fuel began leaking from CCR port after refueling. As aircraft was taxied away from the spilled fuel,



utility hydraulic psi caution light came on and pressure dropped to zero. Caused by failure of CCR poppet valve and hydraulic pressure line.

A series - During OGE hover, No. 1 nose gearbox (NGB) temperature caution light came on. Aircraft was accelerated to single engine airspeed. Fault detection/location system indicated No. 1 NGB temperature was 127° C., and cooling. Problem couldn't be duplicated during test flight.

A series - Aircraft was at 200 feet agl, 80 KIAS, during maximum performance takeoff. No. 1 nose gearbox chip light came on. Power was reduced, No. 1 engine power lever was brought to idle, and roll-on landing was made. Normal fuzz was found on chip plug.

A series - During runup, No. 2 engine showed a -17° HIT check. Maximum allowable was -6°. HIT check was within allowable limits after aircraft engines were washed and MOC was completed.

A series - During engine runup, engine overspeed check (circuits A and B check), No. 1 engine NP dropped to about 68 percent for 3 to 4 seconds before slowly increasing back to 100 percent. Tgt remained within limits. Problem couldn't be duplicated during MOC.

A series - During runup, engine overspeed check (circuits A and B check), reignition didn't occur. No. 2 engine NP dropped to 40 percent and tgt rose to 910° C. Problem couldn't be duplicated during MOC.

A series - During OGE hover while performing gunnery training, intermediate gearbox temperature light came on. Light came on again during test flight. Top forward and bottom temperature sensors were replaced.

A series - No. 2 nose gearbox oil psi caution light came on during hover. Caused by faulty pressure switch.

A series - During taxi, crew smelled smoke in cockpit and target acquisition designation system/pilot night vision sensor (TADS/PNVS) caution light came on. TADS/PNVS power supply burned up due to a TADS interface wiring problem. Awaiting manufacturer fix.

Cargo helicopters

CH-47 Class E mishaps

C series - Gun crew readied external load (howitzer) for pickup and FE directed pilot in positioning aircraft over load. At about 30 feet agl, aircraft was centered and FE told pilot to bring aircraft straight up. Pilot was scanning outside to ensure a vertical ascent and watching his radar altimeter to judge when the slings would be coming tight. FE told the pilot when the slings started to get tight, then hesitated and told the pilot to put the aircraft down; the howitzer had turned over. The pilot descended and the crew released the sling. Slings were not completely taped, allowing slack during pickup.

C series - No. 1 engine transmission oil hot caution light came on during flight. Light went out when engine condition lever on No. 1 engine was reduced to one-half, but came back on and stayed on about 30 seconds later. Engine was shut down and aircraft landed. Cause unknown.

C series - During landing, aircraft's rotorwash blew sunroof off automobile parked in unauthorized area.

D series - During landing, pilot detected simultaneous dual high beep failure. Pilot increased thrust and rotor rpm peaked at about 108 percent for 2 seconds before returning to normal. Problem couldn't be duplicated.

D series - During runup, No. 2 engine wouldn't respond to normal engine beep trim. Caused by failure of No. 2 engine N2 control box.

Mishap briefs

Observation helicopters

OH-58 Class C mishaps

A series - Pilot was making a running landing as part of aircraft qualification. After aircraft touched down at about 10 knots, left skid caught on center line light, breaking skid off. Aircraft came to rest on left crosstubes. Estimated damage $27,000.

A series - Pilot was to pick up passenger who would then give him information on area to be reconned. Location given was a firing point 10 nmi from the airfield. Pilot had completed a similar mission at same location just 2 days prior to this incident. As pilot approached firing point at 400 feet agl, he conducted a high recon of the landing area and made a circling approach. He did not notice newly strung commo wire that crossed the landing site. As the pilot slowed the aircraft below etl and settled below barriers, he saw the wires directly in front of the aircraft. He applied power to clear the wire obstacle and the low rotor rpm light and audio came on. The pilot's attention was focused on the wires and he didn't notice how high the TOT or torque had gone until he cleared the wire and landed. The low rpm audio didn't go out until the collective was lowered. There were no poles or other visible markings to warn pilots of the commo wire across the landing area. Similar incidents of wire being strung across landing areas had resulted in a letter directing units not to suspend commo wire in any open area. Damage from engine overtemp and overtorque of transmission amounted to $25,000.

OH-58 Class D mishap

A series - IP was conducting simulated engine failure from hover altitude for his own proficiency. Maneuver was begun at 3-foot hover. Smooth touchdown was made in level attitude with skids aligned with movement. When collective was lowered to full-down position, skids dug into soft ground, causing aircraft to stop abruptly. Forward momentum caused aircraft to rotate on the toes of the skids, causing nose-low attitude. Lower wire cutter

assembly struck ground, causing breakaway tip to partially shear.

OH-58 Class E mishaps

A series - On seventh approach to marked LZ, aircraft struck a suspended commo wire. Wire was pulled tight and broke, doing no damage to aircraft. Supported unit had put wire back up that they had been told to remove the day before because it was a hazard to flight.

A series - Aircraft had landed on uneven surface. When passenger got off, aircraft's center of gravity shifted, causing aircraft to rock back onto the tail stinger. Pilot thought the fore and aft lateral vibration was mast bumping and he shut the aircraft down.

A series - During flight, master caution light flickered then came on along with hydraulic system light. Crew felt feedback in controls. Caused by hydraulic fluid leaking from collective servo pressure line.

D series - During hover/taxi, pilot noted high-frequency vibrations in anti-torque pedals. Maintenance realigned No. 3 tail rotor drive shaft bearing.

Fixed wing

C-12 Class C mishap

C series - When takeoff power was applied, crew noticed No. 1 engine was running about 30 to 40 degrees hotter than normal tgt. Caused by FOD damage to two blades of first stage of engine compressor. Engine was replaced at cost of about $13,800.

C-12 Class E mishap

C series - During flight, No. 1 engine was shut down to check autofeather. When engine was restarted, propeller wouldn't unfeather. Caused by malfunction of pilot valve in primary governor.

OV-1 Class E mishaps

D series - When gear and flaps were lowered for landing, wheel lights flashed when power was reduced. Gear appeared to be down. Caused by failure of microswitch inside control pedestal.

D series - During level off at 10,000 feet MSL, aircraft yawed right and vibration increased. No. 2 engine torque was fluctuating rapidly between 20 and 40 percent. N1, egt, and propeller rpm also fluctuated, but remained within limits. No. 2 engine stabilized when pilot reduced power on engine. Suspect fuel control failure.

SD-3-30 Class E mishap

Crew noticed thumping sound during taxi. Dzus fastener of unknown origin had penetrated nose gear tire.

U-21 Class D mishaps

A series - During takeoff, fuel was seen siphoning from left main fuel cap. Refueller had improperly seated the fuel cap.

F series - Aircraft was on takeoff roll at 65 knots groundspeed. Pilot caught a glimpse of a deer in flash of strobe light and felt a thump in the airframe. Deer had been struck by the No. 1 prop. One blade on No. 1 prop showed a small nick and left inboard main landing gear door was torn at leading edge. Visibility was reduced by haze.

Maintenance

UH-1 Class E mishap

H series - Crew smelled fuel fumes during engine start. O-ring at fuel filter was pinched during installation.

UH-60 Class E mishap

A series - At about 110 KIAS, first stage tail rotor servo caution light came on followed by backup pump and second stage tail rotor advisory lights. Tail rotor servo pressure sensor switch cannon plug was corroded and dirty.

C-12 Class E mishaps

C series - Left fire light blinked for 2 minutes after aircraft took off. Rear of front cowling was open about 1 inch,

Mishap briefs

indicating latches were not secure. After landing, cowling locks were found in locked position, but internal hook wasn't secure.

C series - Gear failed to retract on takeoff. Caused by broken wire to microswitch on right gear.

U-21 Class E mishaps

H series - During in-flight flat turn to left, a spark, followed by white smoke, was seen coming from upper port of control pedestal. Circuit breaker on control pedestal lights tripped and lights to control pedestal went out. Smoke dissipated and all other indications were normal. Short was caused when buss ISO switch vibrated loose and grounded to airframe.

A series - Gear handle was placed in up position after takeoff. Gear indicator lights went out, but gear handle in transit lights remained on. When gear handle was placed in down position, all three gear indicator lights came on. Caused by slipped clutch.

Safety messages

• Safety-of-flight maintenance mandatory message concerning repetitive inspection of eyebolt on UH-60 aircraft (UH-60-86-19, 301500Z Oct 86). Summary: AVSCOM message 312330Z Jan 86, concerning safety-of-use message on airframe eyebolt (SOU-UH-60A-86-01) provided change out of eyebolts on aircraft S/N 83-23908 and subsequent. However, field reports have indicated four recent failures of these replacement bolts. The purpose of this message is to restrict the use of these bolts until they are replaced with serviceable bolts (P/N 70209-02136-104) provided by Sikorsky aircraft. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Accident accountability

We need your help in keeping the Army Management Information System (ASMIS) UIC master file current. The Army is undergoing some major reorganization and, to be certain accidents are charged to the correct command, we have to ensure these reorganizations are included in the ASMIS master UIC file. Information used for publications distribution is not accurate and timely enough for use in accident accountability.

Commanders at all levels are urged to notify USASC when they become aware that one of their units is being reassigned. This is important so that any future accidents in that unit will not continue to be charged to their command.

Forward information to Commander, U.S. Army Safety Center, ATTN: PESC-DA (UIC), Fort Rucker, AL 36362-5363. ■

U.S. ARMY SAFETY CENTER

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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 mishaps

H series - During cruise flight at 850 feet msl, slingload consisting of an A-22 bag carrying sand bags and steel stakes was dropped into heavily wooded area. Manual release cable was out of adjustment.

H series - Large bird struck nose door assembly during terrain flight, destroying nose door assembly.

V series - During preflight, IP noticed navigation lights had stopped flashing. Lights began flashing when circuit breaker was pushed but then failed again. Aft electrical compartment, flasher unit, and components were checked; and again when circuit breaker was pushed in, components and lights appeared to function normally. When lights were switched from flash to steady in preparation for takeoff, crew smelled smoke and fumes from electrical wire burning. Caused by shorting of electrical wiring in upper console.

UH-60 Class A mishap

A series - Aircraft crashed into salt water. 8705

UH-60 Class D mishaps

A series - Small hole was found in left cargo door near lower aft roller mount. Suspect damage occurred while crew was attempting NVG slingload operations with reduced peripheral vision and visual cues.

A series - During postflight inspection, crew found left APU door had separated from aircraft during flight. Door had been properly secured during preflight. Suspect metal fatigue caused hinges to fail.

UH-60 Class E mishap

A series - During runup, PBA/EPS caution lights and gyro light in fault advisory panel came on. After resetting, lights came on again during liftoff and couldn't be reset. Pilot's gyroscope displacement unit was out of tolerance.

Attack helicopters

AH-1 Class E mishaps

F series - Aircraft was descending out of 3,000 feet agl. When collective was added to stop descent, crew noted increase in N2 rpm, decrease in torque, and excessive amount of upward collective was required. Collective servo rod end outer bearing housing had failed, leaving collective servo free to disconnect from collective yoke. If crew had attempted a minimum collective pitch setting descent, the collective servo would have disconnected in flight.

P series - Master caution light flickered during flight, then transmission oil pressure light came on. Transmission oil pressure gauge was near zero. Caused by failure of internal transmission oil filter seal.

P series - Master caution and aircraft fuel boost pump lights came on during flight. Caused by failure of aft fuel boost pump.

S series - During NOE flight, pilot

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	1–19 Nov	1	0
	December	1	1			
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	4	4

Mishap briefs

noticed roll SCAS had lateral feedback. IP in front seat took controls and verified feedback. Roll SCAS was disengaged and feedback stopped. Caused by faulty pylon SCAS transducer and roll SCAS transducer.

S series - While at NOE hover, aircraft had uncommanded pitch cyclic inputs. Caused by failure of SCAS amplifier.

S series - Transmission oil bypass caution light came on during final approach. By the time aircraft was shut down, transmission oil temperature had risen to 90° C. Transmission oil bypass valve failed, causing oil to partially bypass cooler.

Cargo helicopters

CH-47 Class D mishap

C series - Crew was engaged in tactical hot refueling at night, under NVG, with minimum lighting. Cargomaster brought chocks inside aircraft to raise the ramp. He was holding onto the chock rope and he didn't check to ensure the ramp was clear before closing. When CE raised the ramp, he heard a loud crushing/grinding noise and when he looked to see what had caused the noise, he found a chock wedged between the ramp and airframe. Damage amounted to nearly $1,000.

Observation helicopters

MH-6 Class B mishap

E series - Engine failed during approach to airfield. Aircraft made 300-degree turn and landed on an 18-degree downslope. Main rotor blades flexed down, severing tail boom and damaging upper boom fairing. Left front landing gear was damaged during hard landing. Total damage cost was $125,000. Float in main fuel cell was rubbing on main fuel pump causing erroneous indications on main fuel indicator. Secondary low fuel warning system wasn't activated, therefore, there was no indication of a problem. 8706

OH-58 Class E mishaps

A series - During cruise flight at 850 feet agl, pilot heard a series of loud reports that sounded like machinegun fire from engine area. While landing in open field, pilot heard two more series of reports, each of which lasted 1 to 2 seconds. Suspect compressor stall.

A series - During cruise flight, aircraft suddenly rolled left and pitched down. Bonding failure allowed blade tip cap to separate from main rotor blade.

D series - Contractor personnel suspect malfunction in computer software caused hot start indication on vertical scale indicator and digital readout. Software is being modified on subsequent production aircraft to prevent similar erroneous indications and retrofit of existing aircraft will follow.

Fixed wing

U-21 Class C mishap

H series - Left main gear only partially retracted after takeoff. After several attempts at recycling, including manual gear extension, left gear was still in unsafe condition. With props feathered and engines shut down, aircraft touched down on right main gear first, then nose gear, and finally left main gear. Brakes were immediately applied in attempt to lock left main gear, but without success. Left main gear collapsed. As aileron control was lost, aircraft's left wing tip touched down and aircraft skidded left, coming to rest in grass next to runway, resulting in $12,400 damage. Caused by failure of left main landing gear actuator.

U-21 Class E mishap

A series - During flight, IP initiated emergency procedures for engine failure by using condition lever to completely shut down No. 2 engine. Pilot made two unsuccessful attempts to restart engine during flight. When master avionics switch was reengaged, No. 1 generator light came on, followed by loss of electrical power. IP landed aircraft safely. Caused by failure of left engine starter generator.

Maintenance

UH-1 Class E mishap

H series - Crew heard loud thumping sound from engine area during hover. Noise stopped when pilot reduced power. Bleed bands were set at low side of scale.

UH-60 Class E mishaps

A series - As aircraft leveled off to cruise flight, crew chief saw tail rotor warning circuit breaker had popped out. Aircraft had same problem before and ground MOC had been done before takeoff. Caused by defective wire from cannon plug at gearbox to cannon plug on tail rotor warning.

A series - Stabilator failed in flight at 120 KIAS. Pilot decreased speed to below 70 knots and reset stabilator, but when speed reached 120 KIAS, it failed again. Heavy rains and ineffective waterproofing caused water to get in cannon plugs on SAS/EPS computer. No. 2 collective position sensor was replaced.

AH-1 Class E mishaps

E series - No. 2 hydraulic caution light came on during flight. No. 2 hydraulic system was contaminated with water. Maintenance purged hydraulic system and repaired broken wire on hydraulic pressure switch.

F series - When radios were turned on during runup, crew saw sparks and smoke coming from copilot's instrument panel. Improper installation allowed rheostat to ground against airframe.

F series - Low transmission oil pressure light came on and gauge went to zero during flight. Pinched O-ring on internal transmission oil filter allowed transmission oil to be pumped overboard.

F series - Master caution and warning light for 42-degree gearbox came on during low level flight. Wire had separated from gearbox chip detector plug.

S series - Shortly after turning crosswind at 1,500 feet agl and 100 KIAS, pilot and copilot heard unusual noise from behind pilot's seat, followed by master caution and No. 2 hydraulic lights. Maintenance personnel had failed to properly tighten fitting on hydraulic return line from left wing.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Stacom

Standardization Communication

1986 UPDATE TM 55-1520-210-10

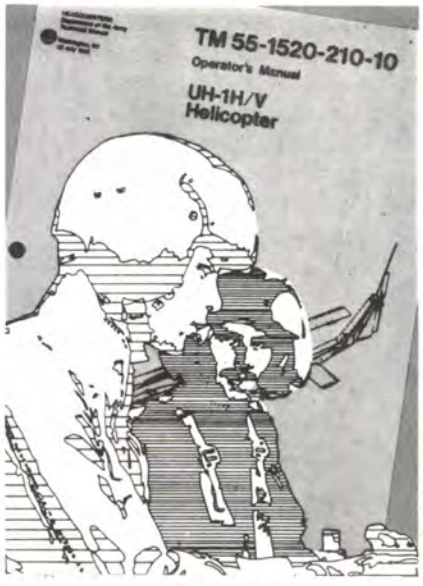
Where *is* the 1986 version of UPDATE TM 55-1520-210-10? Good question. Wherever Directorate of Evaluation and Standardization representatives have visited, this subject comes up. This STACOM is to let you know the current status of the UPDATE and give you some information on changes that have been made to the manual and checklist.

Since the UH-1H/V operators manual and checklist users review on 18-22 November 1985 at Fort Rucker, AL, there have been numerous hurdles encountered between Army Aviation Systems Command (AVSCOM) and the contractor in getting the final copy printed and out to the field.

The draft third edition of the new UPDATE manual originally was printed with a 15 May 1986 date, but upon review it was sent back to the contractor for further editing and changes. Subsequent review of the manual and checklist was conducted by The Adjutant General's Office (TAGO) on 14-15 October 1986. Shipment to the field was expected within 6 weeks of this review. The new date of the manual will be 1 December 1986 and it will be published with the checklist inserted.

Operators will notice several minor changes in the manual in addition to two major changes incorporated into this edition. Results from testing in the field indicated the majority of pilots felt the changes in the checklist were a great step forward. These changes will probably cause much discussion in the aviation community, therefore, we will discuss them in some detail in this STACOM.

As is true with any new manual or concept, users should take a few minutes to look at the changed portions for errors or omissions. Any recommended change for improving the manual should be submitted on DA Form 2028, through the unit commander, to U.S. Army Aviation Systems



Command, ATTN: AMSAV-MPSD, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798.

When you send in proposed changes, please keep the following in mind. Do not send in comments on DA Form 2028 that—

- ask a question instead of giving an answer.
- are based on minor differences of opinion or wording.
- point out obvious editorial errors, misspellings, or errors in publication, unless the errors actually change the intended meaning.

Once the UPDATE manual and checklist have been in the field for 4 to 6 months, another user review will be scheduled at Fort Rucker to consider proposed changes and consolidate DA Forms 2028 for the next printing in 1987.

During the user review in November 1985, many DA Forms 2028 were reviewed and a consolidated change was drafted by representatives from the field and submitted to AVSCOM. These changes have been incorporated into the new manual, except for those pending further action by AVSCOM engineering personnel.

Minor changes

Some minor changes have been made in the manual:

- Bold lines above and below all WARNINGS, CAUTIONS, and NOTES have been deleted.
- Double underscoring in chapter 9 has been replaced with single bold underscoring.
- All italics used in chapter 9 have been changed to Roman.

Major changes

Now, let's take a look at the two major changes which will be coming out in this publication. The first change is a new one-page folding cardstock checklist.

- **Checklists.** Inception of the new type of checklist goes back quite some time. STACOM 107, 21 November 1984 issue of *Flightfax*, gives a very good historical background and future direction being taken in the area of checklists to make them more responsive to needs and to eliminate unnecessary items. The checklist is designed to be a "mind jogger" to assist crewmembers in checking the aircraft in proper sequence before flight. It is supposed

STACOM 120 19 November 1986

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JOHN C. SHAW, JR.
Colonel, Aviation
Director, DES

Stacom

to include all necessary checks so that safety isn't compromised, without listing every single "widget" that an aircrew is supposed to check.

The folding cardstock checklist was tested for a month, from 15 September to 15 October 1985. The purpose of the test was to determine desirability of replacing the current plasticized checklists with the folding cardstock checklist. Test sites included Fort Indiantown Gap, PA; Fort Carson, CO; Fort Bragg, NC; and Fort Rucker, AL. Results of this test indicated the majority of users considered the new checklist equal to or better than the existing checklist. The results of the test, and the tremendous cost savings that would result, led AVSCOM and TAGO to approve the change from the bulky plasticized checklist book to the one-page folding cardstock checklist.

The new checklist is designed so that one side contains the exterior and interior checks. It also has a separate through-flight checklist (which can double as a responsive checklist for combat/tactical operators when authorized by the commander). The other side of the checklist contains all of the emergency procedures, including a matrix of warning panel lights.

• **Performance charts.** The other major change concerns relocation of the tabular performance charts to appendix C of the operators manual. Change 1 to TM 55-1520-210-CL, dated 29 May 1985, contained the tabular performance charts which were added by AVSCOM in response to recommendations on issues presented at the 1983 Army Aviation Policy Committee meeting. The charts were developed to assist in performance planning in the cockpit, 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.

STACOM 113, 20 November 1985 issue of *Flightfax*, should be reviewed for an example of how the charts may be used. The placement of the tabular data in the operators manual allows the operator to use the data as he deems appropriate and the data does not become an integral part of the checklist. For example, the section that pertains to the pressure altitudes and temperatures common to the local flying area could be reproduced and carried in the operator's pocket, on the flight knee board, or even attached to the cardstock checklist to be used as a ready reference for the pilot in his pre-mission performance planning, when in-flight changes are encountered, or at any other times it is needed.

The minor and major changes that have been outlined have been made for several reasons: responsiveness to combat needs, flight crew MOPP requirements, fuel conservation, and for the cost savings to be realized by converting from plasticized checklists to the cardstock checklist. As mentioned earlier, these changes were not made without testing in the field and evaluating the impact on safety. The concept has proven to be viable and if the new checklists are used as they are intended, anticipated improvements in efficiency will be realized. ■

U.S. ARMY SAFETY CENTER

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Flightfax®
Report of Army Aircraft Mishaps

Twelve receive Broken Wing awards

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.

• **SGT Jonathan S. Gyuran and SP4 Russell H. Crocker, B Company, 159th Aviation Battalion (MH), 101st Airborne Division (AASLT), Fort Campbell.** SGT Gyuran, flight engineer, and SP4 Crocker, crew chief, were on board a CH-47D aircraft redeploying to the continental United States from Puerto Rico. The aircraft was about 50 miles from the nearest land when it began leaking oil from the aft transmission. At the rate the transmission was losing oil, the crew knew all oil would be exhausted before they could reach land. Using onboard oil stock, the enlisted crewmembers managed to service the transmission with oil in flight at just about the same rate it was losing oil. Despite being constantly sprayed with hot oil as it was pumped from the transmission, they stuck with it and narrowly averted having to ditch the CH-47 in the ocean. The efforts of SGT Gyuran and SP4 Crocker saved the aircraft and possibly the lives of the five people on board. Further details about this incident may be found in the 25 June 1986 issue of *Flightfax*.

• **CW3 William M. Hasenauer, D Company, 24th Combat Aviation Battalion, Hunter Army Airfield.** The copilot was flying the UH-1H from the left seat during a VFR service mission. Suddenly, the aircraft yawed left, the master caution and low rpm lights came on, and the low rpm audio sounded. CW3 Hasenauer took the controls and prepared to land in a grass-covered pasture. When he saw that the engine N1 had decreased to below 40 percent, he told the copilot to tell the crew of the lead aircraft he had an engine failure. As he crossed over a line of trees and began decelerating to make the landing site, he saw drainage ditches parallel to a service road bordering the pasture. There was still another ditch crossing the pasture. CW3 Hasenauer reevaluated his situation, increased deceleration, turned about 30 degrees left, and lined up with furrows of a plowed field located between his position and the service road. He held the aircraft's nose up until the Huey settled into the soft ground. After a shortened ground run of about 5 feet, the undamaged aircraft came to a halt about 15 feet short of the service road and drainage ditches. The emergency resulted from failure of Nos. 3 and 4 bearing packs.

• **CW4 Robert B. Murphy, Command Aviation Company (Helicopter), U.S. Army Davison Aviation Command, Military District of Washington, Fort Belvoir.** CW4 Murphy was IP of a UH-1H on a training mission to familiarize assigned fixed wing aviators with the helicopter unit's mission. After about half an hour of hover work, the aircraft had just made a normal takeoff when suddenly on downwind, the torque, N1, N2, and EGT began fluctuating violently, accompanied by severe airframe vibrations. CW4 Murphy took the controls, lowered the collective to full-down position and looked for the best place to make a forced landing. There wasn't one; the helicopter was over densely populated residential and industrial areas as well as a heavily traveled highway. Since the abnormal instrument indications and vibrations had ceased when the collective was lowered, CW4 Murphy decided against the risk of damage or injury to civilians by a forced landing and elected to attempt to return to the airfield. By now, the aircraft was only 500 feet agl. CW4 Murphy increased collective and at 19 psi torque all indications were normal so he was able to maintain altitude by reducing airspeed. He maintained this power setting for a few seconds and had started a turn to final when, without warning, the fluctuations and vibration began again. CW4 Murphy had to make an immediate decision: should he hold power and attempt an approach and landing, risking catastrophic failure of the transmission or tail boom attaching points, or try an autorotation? Without hesitating, CW4 Murphy declared an emergency, closed the throttle and autorotated to the end of the runway, landing with no damage to the aircraft. The emergency had been caused by internal failure of the fuel control unit and overspeed governor.

• **CW4 Willard L. Swank and CW2 Kenneth M. Barnwell, B Company, 159th Aviation Battalion, 101st Airborne Division (AASLT), Fort Campbell.** CW4 Swank was PIC and CW2 Barnwell was copilot of a CH-47D on an NVG AAPART evaluation. CW2 Barnwell was on the controls demonstrating low-level flight NVG navigation. He made a shallow left 180-degree turn and as he rolled out to a straight and level attitude, he felt a binding in the flight controls. He told CW4 Swank

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Broken Wing awards

and started an approach to land. CW4 Swank responded with the emergency procedure and attempted to isolate the problem by turning first No. 1 AFCS, then No. 2 AFCS, to the on position. There was no improvement in the flight control binding. CW2 Barnwell told him that the flight controls were frozen; he was unable to move them in any quadrant. CW4 Swank turned both power transfer units (PTUs) on and got on the flight controls to help with the landing. Even with both PTUs on and both pilots on the controls, they couldn't move the flight controls. When the flight controls first began binding, CW2 Barnwell had put the aircraft in a decelerating landing attitude, and the aircraft touched down in a corn field on its aft landing gear. Forward groundspeed at touchdown was about 20 knots and as soon as the forward landing gear was on the ground, CW4 Swank pulled both engine condition levers to the stop position while CW2 Barnwell applied the brakes to stop the aircraft. The aircraft's ground run was through 5-foot-high cornstalks, but CW2 Barnwell's reaction in putting the aircraft in a landing attitude and his and CW4 Swank's correct actions throughout the emergency allowed them to land the aircraft without damage.

• **WO1 William H. Neckels, A Company, 123d Command Aviation Battalion, 101st Airborne Division (AASLT), Fort Campbell.** WO1 Neckels was PIC of a UH-1H on a service mission. The aircraft, with the copilot on the controls, was about 200 feet agl, on approach to landing, when it experienced severe engine stall, followed in quick succession by several engine compressor stalls. As the copilot began emergency procedures, WO1 Neckels took over the controls and continued under reduced power while looking for a suitable area to land. When the aircraft was about 50 feet agl, 60 knots forward airspeed, the engine lost even more power, making continued power flight impossible. WO1 Neckels began autorotation to the only available landing site, a confined area covered by 50- to 75-foot trees. Despite a strong crosswind, he managed to avoid the hazards and land the aircraft without damage. During engine teardown, fuel was found in the air sensing port for the fuel control, indicating that the P1 bellows had ruptured, allowing fuel to come into the engine intake.

• **CW2 John R. Cole, Attack Helicopter Troop, 278th ACR, Tennessee Army National Guard, Smyrna, TN.** The OH-6A was in level flight at 90 KIAS, during a VFR training mission. The crew heard a noise from the engine compartment, then the engine stopped and CW2 Cole saw No. 1 tachometer needle rapidly decaying. He also noticed smoke in the rear compartment and began autorotation to a wet corn field. He cut the throttle off, turned off the battery, and told the observer to cut off the fuel valve and lock his shoulder harness. After a safe landing in the field he had selected, CW2 Cole extinguished the fire in the engine compartment. The only damage to the aircraft was caused by the in-flight explosion of the engine. Examination of the engine revealed the No. 1 power turbine wheel had disintegrated and cut the engine into two pieces. Probable cause was failure of helical cluster gear.

• **CW2 Kevin J. Kelly, 7th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CW2 Kelly, IP of an OH-58A, was conducting IERW flight training. When the student pilot became disoriented during low-level flight, CW2 Kelly slowed the aircraft to 60 knots and began orbiting to the left to allow the student pilot to reorient himself. After 3 orbits, CW2 Kelly began a climb from 60 to 100 feet agl. During the climb, engine torque surged from 43 to 52 psi and returned, and N1 surged from 62 to 85 percent. This surging was accompanied by a right yaw and corresponding decreases and increases in engine noise. CW2 Kelly decided to terminate training and make a precautionary landing to a cleared field 1,200 meters away. He climbed to 200 feet agl with 60 KIAS then, while the aircraft was still 900 meters from the landing area, the engine failed. CW2 Kelly adjusted collective and began a 180-degree turn toward a small, partially-cleared area dotted with small trees. About halfway through the turn, the engine momentarily started, the aircraft made a rapid yaw to the right, then the engine failed again. The low rotor rpm and audio came on. By now, the aircraft was about 125 feet agl. The right yaw had placed the aircraft in a left-side-slip situation which was corrected with left pedal. CW2 Kelly retarded throttle, closed the fuel valve handle, and began autorotation. He maneuvered the aircraft into the 50- x 75-foot semicleared area, avoiding several trees on the approach end. At 25 feet agl, he saw a 2-foot-high earthern berm crossing the clearing was the only suitable spot to land. If the OH-58 hit the berm, or slid off it into nearby 20-foot trees, there would be significant damage to the aircraft. CW2 Kelly began deceleration to place the aircraft in zero airspeed touchdown configuration directly above the berm. He applied cushioning collective pitch at about 3 feet and attempted to land in a nose-high attitude, with the aircraft pointing upslope. When he applied final cushion to effect touchdown, the tailboom oscillated, receiving Class D damage. CW2 Kelly's assessment of the situation and his subsequent actions prevented major damage to the aircraft and injury to the crew.

• **WO1 Alan J. Massman, Troop D, 1/194th Cavalry, Iowa National Guard, Waterloo, IA.** WO1 Massman was PIC of an OH-58A on the final leg of a service mission flight. The aircraft took off into the wind and was at about 250 feet agl when the nose suddenly yawed left twice and power began to decrease. WO1 Massman saw N2 rpm pass through 88 percent and took control of the aircraft. Airspeed was going down through 50 knots, N2 was below 88 percent with corresponding low rotor rpm, and the aircraft was settling toward power lines, trees, and buildings in its direct flightpath. WO1 Massman checked the throttle at full open while reducing collective to begin

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

M series - During cruise flight at 2,000 feet MSL, 90 KIAS, crew felt vibrations, heard loud noise, and noted loss of tail rotor thrust. Aircraft began uncommanded right spin. Reduction of throttle, cyclic input, and reduced collective failed to stop spin and crew entered autorotation. Aircraft touched down with zero groundspeed with no further damage to the aircraft. Caused by failure of 42-degree gearbox.

UH-1 Class D mishaps

H series - Three out of four approaches into tactical area were aborted because of blowing dust and dirt. Aircraft landed on fourth attempt, then returned to training area. After landing, discussion of amount of power used led to suspicion of overtorque. TI found $7,900 damage to transmission resulted when pilot pulled excessive power during brownout landing.

H series - During airspeed over altitude takeoff, aircraft encountered downdraft and settled into tree, cracking both chin bubbles. Pilot was slow to respond with corrective action when downdraft was encountered in vicinity of pinnacle.

UH-1 Class E mishaps

H series - During procedure turn, student pilot was correcting for altitude by increasing power from 25 psi to 30-35 psi, and aircraft experienced compressor stall. Caused by fault in fuel control.

H series - Main inverter failed during approach to landing.

H series - During flight, low rpm light and audio came on as rotor rpm dropped to zero. Caused by tachometer generator failure.

H series - Approach to ground had been terminated and as aircraft was being lifted to hover, it yawed left, rpm light and audio came on, and crew heard loud reports. N1 binding resulted in compressor stall.

H series - During approach, pilot reduced collective to avoid birds, then began increasing collective to regain approach angle. Loud report was heard from engine area and tgt rose. Compressor stall resulted in engine replacement.

H series - As aircraft was brought to 3-foot hover, low rpm audio and light came on. Sand and dirt on pilot's throttle linkage caused binding, restricting throttle operation to full-open position.

V series - Right boost pump failed during short final.

UH-60 Class D mishap

A series - During slingload hookup, crew chief told pilots tail wheel had touched load. Hover height was increased and load was hooked up. No damage was noted during postflight inspection, but on following day, a 7- x 5-inch hole was found punched in transition section, outboard of left fuel sump door, and lower anticollision light assembly had been sheared off. Aircraft was being operated under NVGs with reduced peripheral vision and visual cues.

UH-60 Class E mishaps

A series - After being run up 15 minutes, aircraft was ground taxied to POL point. Transmission fluid could be seen flowing down right side of aircraft. By the time aircraft was shut down, a large puddle of fluid had accumulated and fluid level on dipstick had gone down 3/8 of an inch. Caused by failure of No. 2 module input seal.

A series - During shutdown, fire guard told pilot APU was on fire. Fire light was not on. CE mistook stack fire on APU for APU fire.

A series - During flight, chip main module sump light came on. After circuit breaker was pulled and reset, caution light remained on. Same problem had occurred four times on same aircraft. Maintenance personnel found chips and will replace main module.

E series - Three aircraft had stabilator failures. First aircraft was Chalk 2 in flight of UH-60s. Stabilator failed during takeoff, was reset, and immediately failed again. Second aircraft was in straight and level flight at 110 KIAS when stabilator failed. Aircraft decelerated to 70 KIAS and stabilator reset but failed again when aircraft accelerated to 110 KIAS. Third aircraft was about 300 feet agl at 80 KIAS when stabilator audio and visual warnings came on. When pilot performed emergency procedure, stabilator reset to auto mode but malfunctioned again when airspeed reached 120 knots.

Attack helicopters

AH-1 Class D mishap

F series - During engagement of target, copilot began hovering left turn while pilot was verifying target position on map. Pilot felt a bump and looking over his shoulder saw the upper portion of a tree was missing. Tree strike caused $8,800 damage to bottom of both tail rotor blades.

AH-1 Class E mishaps

F series - Aircraft had total electrical failure during flight. Aircraft released after main power cable cannon plug was cleaned.

F series - Engine oil pressure dropped to 70 psi during hover/taxi. Caused by failure of oil pressure transducer.

F series - During runup, copilot's altimeter registered 65 feet higher than pilot's. Altimeter was replaced.

F series - Alternator light came on during hover/taxi. Alternator replaced.

F series - Pedals became stiff during flight. Caused by failure of servo assembly.

F series - During flight, fuel gauges on two aircraft stuck at around 1,200 pounds. Fuel quantity gauges were replaced.

F series - During hover firing of MILES, crew heard loud pop and aircraft's nose yawed left slightly. Suspect compressor stall.

S series - While picking up to hover, master caution and transmission oil hot segment lights came on. Caused by failure of transmission thermostatic switch.

S series - All three SCAS lights blinked on and off during hover/taxi and several attempts to reengage SCAS were unsucccessful. Caused by failure of sensor unit.

S series - While aircraft was downwind for landing at 900 feet, nose pitched violently up then down several times. Caused by faulty SCAS card.

AH-64 Class E mishaps

A series - Utility hydraulic caution lights came on during runup. Pressure gauge showed normal but, after about 15 seconds, dropped to zero. Crew found fluid running down aircraft's right side from transmission area to tailboom. Caused by failure of utility hydraulic pressure line.

A series - APU failed to start during initial runup. Utility hydraulic pressure hose to hydraulic accumulator had failed. After pressure hose was replaced, this hose also failed. Further troubleshooting is underway.

A series - Primary hydraulic pump failed during runup.

A series - During hover, hydraulic psi low and hydraulic caution lights came on as hydraulic gauge dropped to zero. Failure of primary hydraulic line caused pressure loss.

A series - During startup, and again during taxi, pilot's helmet display unit went blank. Caused by faulty display electronics unit.

A series - During final approach, crew smelled fumes in cockpit followed by shaft-driven compressor light. Caused by failure of shaft-driven compressor.

A series - No. 2 engine failed to start during runup. No. 2 engine starter was replaced.

A series - Oil psi accessory pump light came on during taxi for departure. Caused by failure of accessory pump pressure switch.

A series - During runup, No. 2 engine oil pressure was 15 psi with power lever in fly position. Caused by failure of engine oil pressure transmitter.

A series - No. 2 nose gearbox light flickered on and off four times during takeoff. Caused by failure of NGB pressure transducer.

A series - Master caution light flickered during 100-foot OGE hover. No segment light came on, but No. 2 engine oil pressure fluctuated about 18 psi. When aircraft was accelerated to single engine airspeed, oil pressure returned to 50 psi but fluctuated again before aircraft could land. Problem couldn't be duplicated.

A series - During power check, predicted torque was about 9 percent lower than indicated torque. Caused by failure of engine turbine speed control unit.

A series - APU fire segment and APU fire pull handle lights came on during runup. Lights stayed on after pilot pulled APU fire handle and activated both fire bottles. Bottle discharge lights did not illuminate. Postflight showed no signs of APU fire and fire bottles didn't discharge. Caused by open connection on wire harness 119. Category 1 QDR was submitted and one-time inspection of all school AH-64s is in progress.

A series - During hover power check, aircraft yawed left and right, 20 to 30 degrees, several times. Uncommanded yaw inputs stopped when digital automatic stabilization equipment (DASE) was taken off line. DASE computer was replaced.

A series - Main transmission chip light came on during flight. Normal fuzz was found on chip detector plug.

A series - Aircraft was performing dry firing gunnery training at 150-foot OGE hover. Master caution and main transmission chip lights came on. Both chip detector plugs were replaced.

A series - Master caution light came on in flight without segment light. During short final, master caution and main transmission chip lights came on. Normal fuzz was found on chip detector.

A series - During taxi, No. 2 engine oil pressure light came on and oil pressure indicator showed less than 28 psi. Maintenance could not locate or duplicate problem.

Cargo helicopters

CH-47 Class D mishap

C series - During climbout, FE heard loud banging from left rear of aircraft and saw work platform was open. Damage to exhaust cone and work platform amounted to nearly $8,000.

CH-47 Class E mishaps

C series - During flight, No. 2 engine oil pressure fluctuated 10 to 15 psi at constant power setting. Caused by defective engine oil pressure transmitter.

C series - During low-level flight, crew heard loud whine. CE checked flight control closet and found excessive amount of hydraulic fluid leaking from a No. 2 SAS line. During approach, the SAS emergency release switch was released and No. 2 hydraulic boost light came on.

C series - Crew had completed first of two airmobile insertions and shut down aircraft. During postflight, crew noticed excessive amount of fluid leaking from No. 2 engine transmission. Leak between engine and engine transmission was allowing loss of fluid at about 2 quarts per hour.

CH-54 Class E mishaps

A series - After aircraft picked up 13,000-pound external load, it developed moderate vertical bounce during hover. Torque was increased to 65 percent and aircraft began rapid, uncommanded right turn. Aircraft recovered, nose low, after load was jettisoned. Load was slightly bent but could be quickly repaired and used.

A series - Aircraft developed mild cyclic feedback and progressively-worse lateral vibration at hover. AFCS servo was disabled and vibration

Mishap briefs

stopped. Suspect cyclic movement was pilot-induced.

Observation helicopters

OH-58 Class D mishap

A series - Fall colors of trees made wires difficult to see and pilot saw high-tension power lines too late to avoid hitting them. Wire broke left windscreen before being cut by aircraft's upper wire strike protection system. Damage to windscreen, main rotor blade, and wire cutter assembly amounted to nearly $10,000.

OH-58 Class E mishaps

A series - During approach, pilot noticed change in rotor noise and noise increased during hover. After landing and shutdown, one main rotor blade tip cap was found bent 1 to I 1/2 inches. Blade was damaged by blowing debris during search and rescue mission along creek bank.

C series - During runup, throttle was increased to 100 percent and governor switch was placed in decrease position to maintain N2 rpm at 100 percent, but there was no reduction in N2 rpm. Circuit breaker had popped and after being reset, it popped again. Broken wire caused failure of linear actuator.

D series - During runup on the ground, with NR 100 percent and flat pitch, aircraft yawed 60 degrees nose left. Pilot had to overcome aircraft-induced left pedal to stop rotation. Maintenance reshimmed tail rotor servo actuator.

Fixed wing

OV-1 Class E mishaps

D series - During takeoff, left main gear did not indicate up and locked. Caused by failure of main gear sensing switch.

D series - Fuel pressure high light came on during flight. Caused by malfunction of fuel control.

D series - As pilot completed before-landing check, left main landing gear showed unsafe indication. Caused by failure of downlock switch.

D series - Rudder pedals stuck during takeoff roll. Rudder control follower arm spring had broken, allowing follower arm to jam rudder control cable.

U-21 Class E mishap

H series - During engine runup, flaps were placed in approach position and couldn't be repositioned. Caused by flap motor failure.

Maintenance

UH-1 Class E mishap

H series - During hover checks, anti-torque pedals motored excessively when slightest pressure was applied. Hydraulic tail rotor servo was out of adjustment.

UH-60 Class E mishap

A series - Stabilator failed during takeoff and wouldn't reset. Stabilator amplifiers were out of adjustment.

AH-1 Class E mishap

E series - During stationary hover, master caution and No. 2 hydraulic pressure lights came on and pitch and roll SCAS went off line. Caused by burst hydraulic line. Hydraulic line from No. 2 pump to No. 2 hydraulic module had chafed on metal ID tag attached to line over its plastic coating

AH-64 Class E mishap

A series - During taxi/hover, crew noticed high-frequency vibration in tail rotor pedals. Tail rotor assembly had not been properly balanced.

BE-65 Class E mishap

During maintenance test flight, clutch on landing gear failed to engage properly. Clutch cable overextended and gear wouldn't align properly.

C-12 Class E mishap

D series - No. 2 NAC low caution light came on with approximately 800 pounds of fuel indicated in right main tank. Suspect cause was corroded fuel sensor connections.

U-21 Class E mishap

A series - During flight, crew noted unsafe gear indication for nose gear. Landing gear switch was out of adjustment.

For more information on selected aircraft mishap briefs, call AUTOVON 558-4198/3901.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	1-26 Nov	1	0
	December	1	1			
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	4	4

Broken Wing awards

autorotation descent. Immediate autorotation would almost certainly have meant crash landing into trees, wires, and buildings. WO1 Massman noticed that when he lowered the collective, N2 increased to about 94 percent, which indicated a partial power loss. He attempted to pull enough power to slow the rate of descent and, by a series of collective and airspeed adjustments, he was able to keep the aircraft flying, although in a gradual descent, long enough to clear immediate obstacles. Then power droop became so severe the aircraft would no longer maintain even gradual descent without rotor rpm bleeding off below the point of recovery. WO1 Massman entered autorotation at about 130 feet agl. He now found himself facing a smaller set of wires, ammunition bunkers and a landing on rough unimproved terrain covered with waist-high grass. WO1 Massman managed to maneuver between and around the remaining obstacles and land the aircraft without damage or injury.

• **MAJ Dennis J. Lord and CW2 Michael K. Nelson, Minnesota Army National Guard, St. Paul, MN.** MAJ Lord was the IP and CW2 Nelson the pilot of a T-42A which had just taken off on a service mission. The aircraft was accelerating from 145 knots to cruise speed after entering level flight over river bluffs and hilly terrain. Just before cruise speed was reached, the control column began back-and-forth movement of about 4 inches. When the pilots looked back at the tail section, they could see violent vibration of the left elevator. They reduced power to try to stop the buffeting, which was similar to the buffet felt just before a stall. The aircraft's nose pitched down abruptly to about 60 to 80 degrees below the horizon. Both pilots were on the controls. They lowered the landing gear and then lowered the flaps about 10 degrees, trying to stabilize the aircraft. With considerable force, the pilots pulled the yoke back and the nose of the aircraft came up to about 20 degrees below the horizon. Pitch attitude oscillated between 20 and 50 degrees, and the yoke seemed to have the most back-and-forth movement at this time. At the same time, the aircraft was experiencing pitch gyrations, it took considerable rudder pedal pressure to stop it from yawing. The crew was given radar vectors to the nearest airport which was 22 nm from the aircraft's position when the emergency started. About halfway through descent from 5,800 feet agl, oscillations of the control column were still abrupt, going from stop-to-stop. The aircraft was vibrating so severely, ground controllers were unable to understand radio transmissions. With both pilots on the controls, movements were dampened to about 4 to 6 inches (2 to 3 inches on each side of neutral position). With some control established, the IP took over control to try to prevent overcontrolling the aircraft. The T-42 had descended about 3,000 feet and was now about 15 miles from the airport. It still took considerable pressure to minimize oscillation and the horizontal stabilizer seemed to flex as much as 1 foot above and below the normal position. The crew could also see a piece of metal separating from the elevator. Fifteen to 20 minutes after the emergency began, the aircraft reached the airfield. MAJ Lord timed power reduction to correspond to the low point of pitch oscillation and landed to the runway. The only apparent damage was to the aircraft's left elevator. ■

U.S. ARMY SAFETY CENTER

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A. E. Hervey, Jr.
Colonel, Aviation
Commander, Army Safety Center

DEPARTMENT OF THE ARMY
United States
Army Safety Center
Fort Rucker, Alabama 36362-5363

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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 - Crew heard noise from transmission area during flight. Controls became stiff and master caution and hydraulic lights came on. Caused by failure of collective servo irreversible valve.

H series - During flight, crew heard loud noise and engine sound changed. During landing, aircraft became very erratic with noise, vibration, and changes in engine sound. Suspect compressor stall.

H series - Pilot noticed oil pressure was lower than normal during flight and engine oil temperature was 150° C. Caused by failure of thermal bypass valve.

H series - During preparation for takeoff, engine oil pressure rose from 90 to 100 psi, then returned to 90 psi. Sequence repeated several times, with pressure remaining at 100 psi for longer and longer periods. Caused by failure of pressure transmitter.

H series - Left fuel boost pump light came on during flight. Caused by failure of left fuel boost pump.

H series - During takeoff from field site, crew heard loud popping sound and smelled rubber burning. Caused by failure of windshield wiper motor.

UH-60 Class D mishaps

A series - During landing, no one noticed that allied soldier had pulled window jettison instead of door latch. Later, cargo door window assembly fell out during flight.

A series - Copilot cleared aircraft for landing, as pilot landed aircraft from right seat. As aircraft's main gear was being lowered to ground, CE called to pilot to bring aircraft up immediately. Two rotor blades were cracked at trim tab and all four tip caps were damaged from contact with tree.

A series - During slingload of jeep, jeep's hood blew open, damaging the vehicle's steering column.

A series - Slingload of two 500-gallon blivets of fuel was released on sloping ground. Blivets rolled down the slope and one broke open, spilling fuel.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	1-3 Dec	0	0
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	4	4

Mishap briefs

UH-60 Class E mishaps

A series - Central display unit failed during flight. Digits and lights on PDUs would illuminate in test position only.

A series - Collective capsule and stabilator caution lights came on during hover. Caused by defective No. 2 stabilator actuator.

A series - Pilot noticed vibration after takeoff from pinnacle. Anti-flap cam stuck during flight.

A series - Crew chief noticed exhaust fire from No. 1 engine during start. During second start attempt, fire again was seen and egt rose to 750° C. Caused by starter failure.

A series - APU failed during shutdown, with engine power control levers in idle position. APU failed again during start. Worn generator bearings caused drag on APU.

Attack helicopters

AH-1 Class E mishaps

F series - Forward and aft fuel boost pump caution lights came on briefly during short final to FARP. About 10 feet from refueling pad, both fuel boost caution lights and low fuel warning light came on. N1 decreased from 95 to 75 rpm and aircraft yawed left. Erroneous reading on fuel gauge caused pilot to believe he had more fuel than he actually had and low fuel light was late coming on.

P series - Aircraft experienced compressor stall twice during flight at 20 knots, 10 feet agl.

S series - Master caution and transmission oil bypass lights came on during flight. Caused by failure of transmission oil bypass switch.

AH-64 Class E mishaps

The following problems involving AH-64 aircraft could not be duplicated during maintenance operational checks.

A series - No. 2 nose gearbox oil psi light came on during final approach.

A series - Target acquisition and designation system (TADS) electronic unit (TEU) failed during hover. Fault location detection system indicated TEU had not failed.

A series - During taxi, vibration gearbox caution light came on.

A series - Oil leak at No. 2 nose gearbox output seal was noticed during runup.

A series - During flight at 900 feet msl and 100 KIAS, No. 2 engine oil pressure began fluctuating and No. 2 engine oil psi light flickered on and off. CPG's digital display indicated oil pressure would drop as low as 15 psi for 2 to 3 seconds.

Cargo helicopters

CH-47 Class D mishaps

C series - After takeoff with 6,000-pound training slingload, pilot told copilot to safety the hook. Copilot moved cargo hook master switch from arm to off position. Cargo hook open caution light came on briefly. FE told the pilots he heard the precharge blow and the slingload had been dropped. Copilot stated that he had not touched the cargo hook emergency release switch. Precharge showed 2,100 psi on preflight and 1,700 psi during postflight.

D series - Minor damage to aft rotor blades was found during postflight inspection. Aircraft had returned from NVG flight involving numerous cargo transport operations into confined areas. Reduced illumination affected FE's and crew chief's ability to properly judge clearance between aft rotor blades and trees in landing zone.

CH-47 Class E mishaps

A series - APU would only achieve 40 percent rpm instead of the 98 to 106 percent rpm required for start. Crew had flown about 1.3 hours, requiring 10 APU starts during the day. Caused by internal breakdown of APU oil assembly.

C series- During No. 2 engine start, N1 stabilized at 45 percent and hydraulic oil could be seen dumping out of drain tube. Seal between engine starter and engine had been perforated, allowing fluid to leak out, causing loss of engine starter fluid pressure.

Observation helicopters

EH-6 Class C mishap

E series - Seventy-five percent of forward-looking infrared radar sensor (FLIR) turret was destroyed during hard landing. Damage amounted to more than $56,000.

OH-58 Class E mishaps

A series - Transmission chip detector light came on during flight at 4,500 feet. Segment lights were scratched and unreadable, causing momentary delay in identifying emergency. Condition of lights had been reported about 3 weeks before. After landing, excessive metal slivers were found on chip detector. Main transmission, mast bearing, and freewheeling unit were sent to CCAD for teardown analysis.

A series - When pilot attempted to start aircraft after refueling, N1 rose to

15 rpm, but no ignition followed. Crew did not hear normal popping noise of igniters. Ignition wire had broken at the pivot point of pilot's collective.

D series - IP noted high-frequency vibrations in antitorque pedals during power-off maneuvers, with rotor rpm at 70 to 80 percent.

Maintenance

UH-60 Class E mishap

A series - When power control levers (PCL) were advanced from idle to fly position during runup, No. 2 engine torque rose from 2 percent, then dropped. NG and tgt remained low as rpm slowly increased to 100 percent. No. 1 engine indications were normal. When PCLs were brought back to idle and advanced again, the same thing happened. Engine load demand cable was improperly rigged.

AH-1 Class E mishap

F series - During flight, pilot noticed transmission oil pressure gauge fluctuated between 45 and 68 psi and transmission oil temperature increased by 20 degrees. Transmission internal oil filter O-ring was pinched, causing oil leak.

AH-64 Class E mishap

A series - Master caution light flickered during flight and intermediate gearbox temperature light came on. Wire on temperature probe had shorted out.

OH-58 Class E mishaps

A series - Transmission chip detector light came on when battery switch was turned on during preflight. Same aircraft had two incidents of transmission chip detector lights in previous two weeks and in each case fuzz was found on chip detectors. Oil samples were normal. Caused by frayed wire leading to one of the chip detector sending units.

C series - Although N1 climbed to 25 rpm and start fuel was introduced into compressor chamber, there was no rise in TOT during engine start. Cannon plug on right side of engine firewall was found loose.

C series - As aircraft was picked up to hover, pilot felt binding in both left and right lateral quadrants of cyclic. Cyclic rigging was out of tolerance and proper shims were not in place.

Safety messages

• Safety-of-flight maintenance mandatory/operational message concerning field inspection on first three tail rotor drive shaft spline couplings and removal of material from under crew seats on UH-60A/EH-60A helicopters (UH-60A-86-20, 070030Z Nov 86). Summary: Background is same as safety-of-flight maintenance mandatory message UH-60A-86-17, 212000Z Oct 86, concerning UH-60A contractor inspection of transmission oil cooler fan splines and tail rotor drive shaft. In addition, post-accident investigation revealed that the crew injuries would have been less severe if ballast weights had not been stored under front crew seats. These crashworthy seats were only allowed to stroke partially during impact. Purpose of this message is to require a unit-level inspection on the first three tail rotor drive shaft spline couplings to determine if Sikorsky contractor team support is necessary for other aircraft identified and reworked in accordance with UH-60A-86-17 message, and to direct removal of any material under crew seats. Contact: Dick Mooy, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of and restrictions on weight on landing gear of OH-58A/C series aircraft (OH-58-86-10, 132330Z Nov 86). Summary: There have been recent instances of aft cross tube cracks at the fuselage attachment point, and in some instances of aft cross tubes being broken at the fuselage attach point on the OH-58 standard landing gear. Initial instances were on aircraft with MILES/AGES installed. Further engineering investigation results show excessive weight added to the standard skid gear causes vibratory stresses which can crack the cross tube. If not corrected, the cross tube will eventually break. The purpose of this message is to require a one-time inspection of aircraft which have had excessive weight on the landing gear and to restrict weight which can be mounted on the landing gear. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• AVSCOM message, 071815Z Nov 86, references 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 and OH-6A-85-03, 261920Z Dec 85) and reiterates subsequent messages that, to prevent both supply and readiness impact, it is imperative all unserviceable case and vane halves and/or compressor assemblies on hand be returned to Corpus Christi Army Depot. Message includes list of document numbers against which case and vane assemblies were shipped but no corresponding returns have been tracked. Contact: Cindy Stevens, AUTOVON 693-3727, commercial 314-263-3727.

• AVSCOM message, 131800Z Nov 86, concerning addition of blind fastener, installation tool kit, NSN 5180-01-201-4979, to aviation maintenance shop sets. Contact: Jack Kost, AUTOVON 693-1107, commercial 314-263-1107 or Jerry Smith, AUTOVON 693-9090, commercial 314-263-9090.

(continued on back page)

Stacom

Standardization Communication

New change to AR 95-1

Be on the lookout for Change 6 to AR 95-1: Army Aviation General Provisions and Flight Regulations. An UPDATE printing of the new change should be fielded in December 1986, with an effective date of 1 January 1987. Change 6 includes the following:

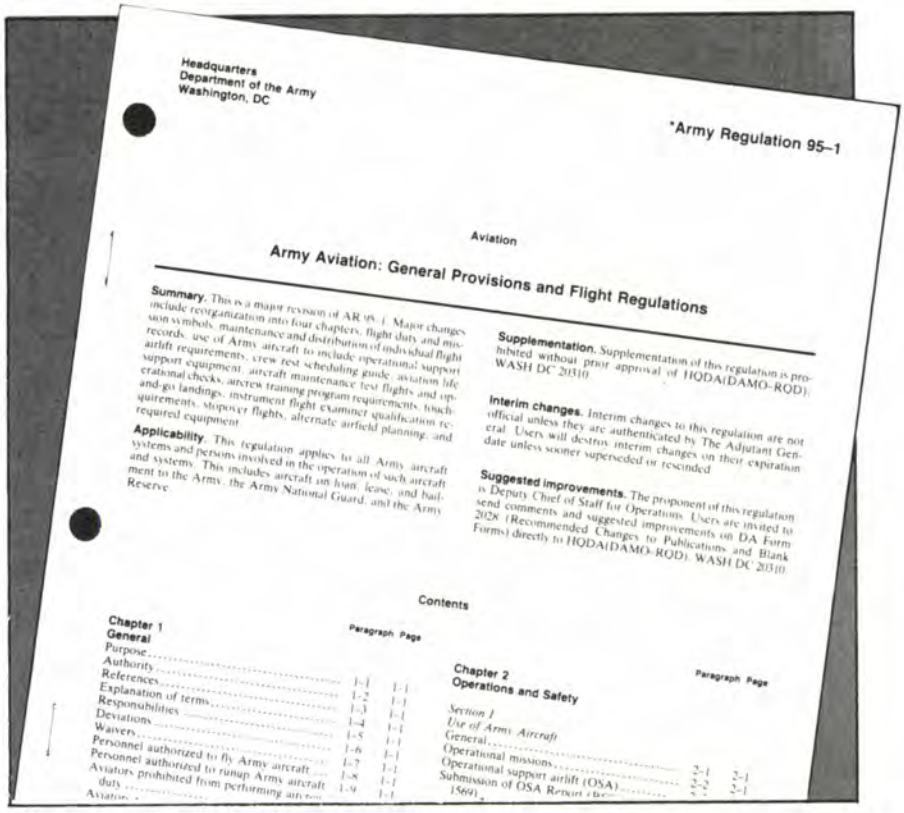
1. **Paragraph 1-8a(2).** Specific qualification, training, evaluation, and currency requirements for civilian employees who fly Army aircraft, which have not been previously addressed, have been added to this paragraph. This ensures the same standards for civilians as now required for the Army aviators.

2. **Paragraph 1-8a(8).** This change is required to authorize graduates of the USAAVNC Aeroscout Observer Course to continue training required by the Aeroscout Observer Aircrew Training Manual Supplement.

3. **Paragraph 1-11.** Aviators who have not been trained and evaluated in instrument flight procedures, per the ATM, during the previous 12 months, will not fly as copilot in instrument meteorological conditions. This change restricts specific officers and limits the flights on which they may perform flight duties.

4. **Paragraph 1-14.** The Army is not exempted from provisions of FAR Part 91, paragraph 91.87(d)(1), which requires a turbine-powered airplane to fly at an altitude at least 1,500 feet above the surface while in a traffic pattern. The standard for all Army airplanes is now 1,500 feet.

5. **Paragraph 1-16.** Title of paragraph is revised to change "IFR" to "Instrument" in order to align definition with AR 95-50. VHIRP is now required only for installations with units that have tactical terrain flight training missions.



Headquarters
Department of the Army
Washington, DC

*Army Regulation 95–1

Aviation

Army Aviation: General Provisions and Flight Regulations

Summary. This is a major revision of AR 95-1. Major changes include reorganization into four chapters, flight duty and mission symbols, maintenance and distribution of individual flight records, use of Army aircraft to include operational support airlift requirements, crew rest scheduling guide, aviation life support equipment, aircraft maintenance test flights, and operational checks, aircrew training program requirements, touch-and-go landings, instrument flight examiner qualification requirements, stopover flights, alternate airfield planning, and required equipment.

Applicability. This regulation applies to all Army aircraft systems and persons involved in the operation of such aircraft and systems. This includes aircraft on loan, lease, and bailment to the Army, the Army National Guard, and the Army Reserve.

Supplementation. Supplementation of this regulation is prohibited without prior approval of HQDA(DAMO-ROD), WASH DC 20310.

Interim changes. Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration date unless sooner superseded or rescinded.

Suggested improvements. The proponent of this regulation is Deputy Chief of Staff for Operations. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA(DAMO-ROD), WASH DC 20310.

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6. **Paragraph 1-18.** TM 38-750 has been changed to DA PAM 738-751.

7. **Paragraph 1-19.** This paragraph and others throughout this regulation are changed to reflect the new symbology to be used with the revised flight records.

8. **Paragraph 1-21.** This entire paragraph is changed to implement the new flight records system.

9. **Paragraph 1-21f.** "Five working days" is changed to "14 working days" because aviators have 14 days after reporting for duty to be integrated into the unit's ATP. Provisions are also made for aerial observers' flight records.

10. **Paragraphs 2-1 and 2-7.** Changed per HQDA Msg (DAMO-ZB), subject: Change to AR 95-1: Domicile to Duty Travel.

11. **Paragraph 2-3.** Operational Support Airlift (OSA) requirements apply to local flying areas as well as all other geographical areas; therefore, all references to local flying areas have been deleted from this paragraph. Other authorized missions have been excluded from OSA.

12. **Paragraph 2-6h(3)(b)** AR 95-19 is replaced by AR 215-2 as a reference for use of Army aircraft for sport parachuting.

13. **Paragraph 2-7c.** Using Army aircraft for the purpose of obtaining or renewing FAA ratings is prohibited and is highlighted by deleting the second sentence of this paragraph. FAA now

requires an applicant who intends to use an Army aircraft for an evaluation to present a letter from the commander indicating that the use of the Army aircraft is for the **sole** purpose of the FAA evaluation.

14. **Paragraph 2-8.1.** A system for internal control of OSA is added per AR 11-2.

15. **Paragraph 2-10c.** Consumption of alcoholic beverages is prohibited on Army aircraft, thus, the additional sentence in this paragraph.

16. **Paragraph 2-10d(1).** This change implements the new Army policy for no smoking in aircraft.

17. **Paragraph 2-22d.** Provisions for nonaviator personnel operating aircraft APUs have been added.

18. **Paragraph 3-3b.** This change makes the aircrew training program applicable to aeroscout observers. DAC aviators' training requirements are addressed in this change.

19. **Paragraph 3-3c.** Aviators who have been excused from all ATP requirements are now prohibited from flying Army aircraft. If they are not trained and evaluated, they do not fly.

20. **Paragraph 3-6.** The revised *ATM Commanders Guide* provides specifics on annual evaluations. Those who must be evaluated are included in this paragraph.

21. **Paragraph 3-7.** Currency requirements are changed as a result of the 1985 Army Aviation Policy Committee work group's review of Issue No. 15. The previous 700 hours in the aircraft category, 90 and 45 days, and one takeoff/one landing could not be supported with sound rationale. This change makes the commander responsible for determining the maneuvers necessary to attain currency.

22. **Paragraph 3-8.** Changes are made to add C-12L, RC-12G, and CH-54A and B to the appropriate series.

23. **Paragraph 3-9a(2).** DAC aviators who fail to meet training requirements are addressed in this addition.

24. **Paragraph 3-9b.** This paragraph is added because of the recently implemented aeroscout observer program.

25. **Paragraph 3-12b.** This change is made as a result of continuation of the moratorium on helicopter touchdown emergency procedures training.

26. **Paragraphs 3-16, 3-17, 3-18, and 3-19.** These paragraphs reflect the revision of the entire Army Aviation Standardization Program organization.

27. **Paragraphs 3-21 through 3-26.** The provisions of Vice Chief of Staff of the Army messages regarding crew qualification, selection, and utilization have been incorporated in these paragraphs.

28. **Paragraph 3-23c.** The term "current instrument qualification" is no longer applicable to the ATP and has been deleted from this paragraph.

29. **Paragraphs 3-28 and 3-28.1.** Revisions are made to better define qualification and designation requirements for MPs and MEs.

30. **Paragraph 3-28.2.** Experimental test pilot (XP) is addressed in this paragraph as a result of implementing the new flight records system.

31. **Paragraph 3-32.** Changes in this paragraph reflect decisions made by the 1985 Army Aviation Policy Committee to ensure that the AAWE is administered annually to all aviators in operational aviation positions.

32. **Paragraph 4-1.** FAR Part 91, subparts A and B, are the only parts of the FAA flight regulation that apply to the Army. This fact is now stated in this paragraph.

33. **Paragraph 4-2c(2).** This change is made in an attempt to clarify the intent of providing for flights into forecast severe turbulence. If an operators manual prohibits flights into severe turbulence, the aircraft **shall not** be flown into severe turbulence. The problem arises when forecasts for a very large geographical area; e.g., South Korea, indicate that severe turbulence may be encountered. Experience has shown that severe turbulence does not occur to large portions of area described in the forecast. In such cases, MACOMs may establish procedures for clearing flights into those areas where it is highly unlikely that severe turbulence will be encountered.

34. **Table 4-1.** NOTE d is deleted because a control zone is not a part of uncontrolled airspace and is therefore not relevant to the provisions of this table.

35. **Paragraph 4-2e(3).** The provision for flight plan activation is deleted because FAA does not activate a flight plan as previously stated.

36. **Paragraph 4-4f.** Army aircraft are not authorized to fly over National Security areas below 2,000 feet AGL. This restriction is included in this paragraph.

37. **Paragraph 4-5a.** Change is made to reduce restrictions on holding.

38. **Paragraph 4-5c.** This change is made to reduce confusion regarding filing and flying to another airfield after missed approach at destination.

39. **Figure 2-1.** This form is added to use in the internal control system required in paragraph 2-8.1.

40. **Appendix A.** References are changed to reflect changes to required and referenced publications, and to paragraphs within this regulation.

41. **Glossary.** Changes made to this area resulted from the need to correct errors and reflect the changes to symbols used on flight records. ■

STACOM 121 3 December 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.
Colonel, Aviation
Director, DES

Hazard alert

Field surveys conducted in 1984 revealed that items were being stored under the pilot and copilot seats of the UH-60 Black Hawk. An article published in the 18 July 1984 issue of *Flightfax* warned that this practice defeats a primary crashworthy feature (stroking) designed to protect occupants during a crash sequence. Stroking seats absorb impact loads that otherwise would be absorbed by crewmembers.

This problem has surfaced again. Following is a 201500Z Oct 86 message from the Commander, USASC, on the hazards of not allowing energy-absorbing crew seats to function as they were designed.

"A recent UH-60 accident resulted in severe back injuries to the pilot and copilot. The severity of the back injuries is attributed to the limitation of the vertical stroking of the energy-absorbing seats by objects stored in the well underneath each seat. In this case, the vertical stroking was limited by the stored objects by approximately one-half the distance normally available.

"The U.S. Army Safety Center (USASC) recommends that units and aircrews review procedures for storing objects/materiel onboard aircraft. Additionally, positively ensure that crashworthy design features of the crew and troop seats in an aircraft are not compromised by what may be a common practice. We must assure that the critical, vertical energy-absorbing stroke of the seat is not blocked.

"USASC POC is Mr. Milan Buchan or LTC McCammon, AUTOVON 558-4198/3901."

POC in NGB-AVN-S is CPT West, AUTOVON 584-4727. ■

Mishap briefs

• HQDA message, 131824Z Nov 86, concerning delayed implementation of paragraph 2-9B, AR 95-17: The Army Aviation Life Support System Program. Requirement that each aircraft crewmember be equipped with a survival radio was delayed until 15 Nov 86. This message authorizes further delay until 15 May 87. In the interim, PICs will continue to ensure that not less than one fully operational radio is on board the aircraft during each flight. Contact: MAJ Hinds, AUTOVON 227-0487.

• Maintenance information message concerning leakage criteria change for actuator assembly on UH-60/EH-60 series aircraft (MIM-UH-60-86-MEM-15, 191800Z Nov 86.)

• Maintenance information message concerning loss of power steering control on CH-47D helicopters (MIM-CH-47-86-MEM-04, 212030Z Nov 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

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - Aircraft was in NOE flight over plowed field adjacent to tree line. Pilot misjudged clearance during left banking turn and allowed main rotor blade to strike a tree.

UH-1 Class E mishaps

H series - During hover, crew noticed moderate to severe main rotor vibration. Caused by crack around trim tab on main rotor.

H series - Smoke and odor of electrical fire came from area above pilot's head during flight. Caused by malfunctioning of windshield wiper.

H series - Master caution and auxiliary fuel lights came on during flight. Caused by failure of master caution control panel.

UH-60 Class D mishap

A series - During NVG approach, aircraft was cleared by pilots and crew chief at 50 feet and again at 10 feet. As aircraft landed, crew chief heard a thump. A small pine tree which had been concealed by the stabilator had popped up from a blown-down position, striking the tail rotor. Damage amounted to nearly $4,700.

UH-60 Class E mishaps

A series - Crew felt vibration during takeoff. After landing, cracked spindle was found. Leading edge of busning slid aft, causing anti-flap cam to lock in static position, cracking anti-flap bracket assembly and main rotor blade spindle.

A series - During takeoff, crew chief noticed clevis locking bolt retaining nut on slingload was missing. Suspect rigging personnel didn't thoroughly inspect hardware attachments.

A series - Stabilator wouldn't slew more than 20 percent down while in auto mode during climbout. Stabilator actuator was out of tolerance.

A series - Main transmission module chip light came on during flight. Excessive metal chips were found on plug.

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	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	7	7

Attack helicopters

AH-1 Class A mishap

F series - Aircraft landed and pilot got out of front seat to check rockets. As he walked around the rear of the aircraft, he was struck by the tail rotor and killed. 8707

AH-1 Class D mishaps

F series - Dent in leading edge of tail rotor blade was found during postflight inspection. Aircraft had hovered over unimproved ground for more than an hour.

F series - During postflight, dent was found in tail rotor blade. Suspect damage was caused by stud assembly turnlock which broke off during flight.

F series - Damage to main rotor was discovered during postflight inspection. Suspect damage was caused by loose debris.

AH-1 Class E mishaps

F series - During hovering MILES engagement, anti-tank weapons effects simulator system (ATWESS) cartridge

Mishap briefs

detonated with more than usual force, causing aircraft to shudder.

F series - When collective was reduced to full-down position after landing, pilot's torquemeter remained at 65 percent. Caused by failure of torquemeter.

F series - Master caution, alternator, and rectifier lights came on during flight. Alternator failed and aircraft yawed as SCAS dropped off line.

P series - During flight, master caution light came on, with no segment light. Caused by faulty aft fuel boost pump.

S series - During hover for takeoff, engine oil temperature rose to 130° C. within 1 minute. Caused by engine oil cooler malfunction.

AH-64 Class E mishaps

A series - With both engines shut down and APU running, hydraulic fluid could be seen venting overboard. Caused by failure of utility hydraulic restrictor valve.

A series - While conducting night gunnery training, aircraft was at OGE hover, 150 feet agl. Primary hydraulic psi and hydraulic oil low caution lights came on. Caused by failure of hydraulic line.

A series - Hot battery caution light came on during flight. Caused by battery failure.

Cargo helicopters

CH-47 Class D mishap

C series - Aircraft landed in blowing dust in unimproved landing area. Hard stem in center of sagebrush plant punched hole in ramp.

CH-47 Class E mishaps

C series - During shutdown, FE saw hydraulic fluid leaking from hydraulic cooling fan. Caused by failure of fan assembly.

C series - During flight at constant power setting, No. 2 engine oil pressure fluctuated 10 to 15 psi. Caused by defective No. 2 engine oil transmitter.

Observation helicopters

OH-58 Class A mishaps

A series - Aircraft crashed as it returned to airfield from training area. Both pilots were killed. 8708

D series - While Army pilots were flying aircraft, they experienced severe violent buffeting. They landed the aircraft and, after inspection, manufacturer's pilots flew the aircraft. They felt the same violent buffeting and when the engine quit, attempted to land. Aircraft nosed over during landing and the tail boom was chopped off. 8709

OH-58 Class E mishap

A series - Master caution and engine oil bypass lights came on during flight. Caused by cracked hose assembly.

Fixed wing

C-12 Class E mishaps

C series - When gear switch was placed in down position for landing, unsafe indication showed on left main gear. Caused by burned-out bulb in gear down-and-locked indicator light.

D series - When landing gear handle was placed in up position during climb-out, gear retracted partially and stopped. Caused by failure of main gear box clutch assembly.

U-8 Class E mishap

F series - Smoke and flames were seen coming from side of aircraft as it prepared to taxi into position for takeoff. Fuel regulator on heater was pumping too much fuel.

U-21 Class E mishaps

A series - During flight, torque began fluctuating between 500 and 1,000 psi, and rpm couldn't be controlled by moving power levers. ITT, N1, and fuel flow also fluctuated. Caused by malfunctioning fuel control.

A series - Pilots smelled unusual odor after landing and discovered flap wouldn't come up during after-landing check. Caused by flap motor failure.

H series - During flight, right fuel gauge began fluctuating from 400 pounds to zero. Caused by failure of fuel gauge.

UV-18 Class E mishap

A series - During taxi for takeoff, pilot noticed battery overtemp light was on. Caused by faulty wiring in battery for overtemp sensor.

Maintenance

AH-1 Class E mishaps

F series - During MOC for replacement of transmission oil return line, oil could be seen squirting from both fittings. Line hadn't been properly tightened.

F series - Master caution and dc generator lights came on during runup. Voltage regulator was out of adjustment.

F series - During approach for landing, engine oil pressure began fluctuating, then went to zero. Caused by loose wire to oil pressure transducer.

OH-58 Class E mishaps

C series - During pickup to hover, flight control check showed cyclic was binding in aft quadrants. N2 drooped to 94 percent then recovered to only 99 percent. Bell crank bolt wasn't properly tightened.

C series - While at OGE hover, pilot noticed N2 and rotor increasing then stabilizing at 108 percent. Pilot decreased governor and increased collective, with no effect on rpm. Torque on the coupling nut from the fuel control to the accumulator wasn't checked following installation of overspeed governor assembly, and coupling nut vibrated loose during flight.

C-12 Class D mishap

D series - Slow acceleration during takeoff roll, followed by rapid acceleration after liftoff, caused crew to suspect that one or both main wheel brakes hadn't fully released. Subsequent landing was normal, but after rollout, excessive power was required for taxi. The forward sleeve on the parking brake handle had backed off, causing the parking brake not to release fully, resulting in $1,500 damage.

Safety messages

• Safety-of-flight technical message concerning one-time inspection of crew seats for longitudinal movement of lock pin adjustment in UH-60A Black Hawk aircraft (UH-60-86-21, 012100Z Dec 86). Summary: In a recent mishap involving a UH-60A Black Hawk, the

(continued on page 6)

ALSS-GRAM

Recap of ALSE messages

Following is a list of ALSE messages prepared by the Office of the Deputy for Aviation Life Support Equipment (APCPM-ALSE-L) since 1 January 1986.

ALSE 86-01, 091400Z Jan 86 concerning new retest date, NSN 6850-00-985-7166, water purification tablets, iodine, mfd by Van Brode Industries, DLA 120-83-C-4135, all lots with dates of manufacture during 1983.

ALSE 86-02, 271600Z Mar 86 concerning alert notice on helmet, flyer's, SPH-4, NSN 8425-00-144-1981 and 4985, contract DLA 100-83-C-4207, SAFETECH, Inc.

ALSE 86-03, 171700Z Apr 86 concerning addition of new survival components to individual survival kits.

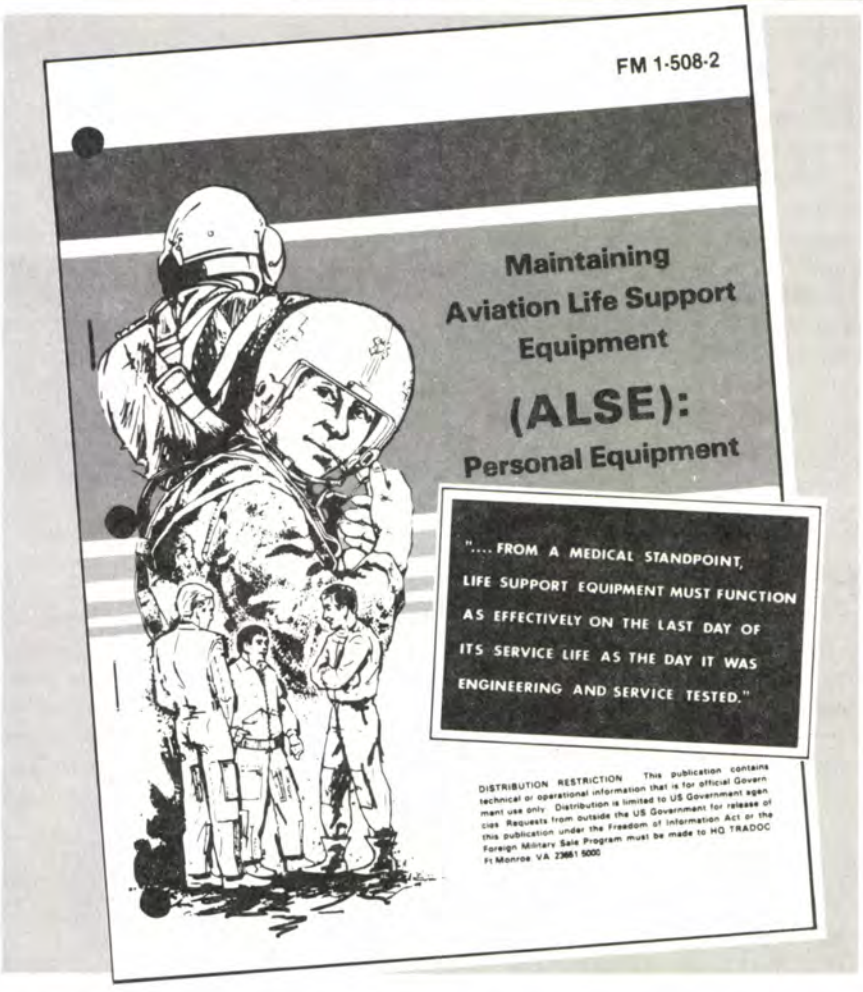
ALSE 86-04, 061430Z May 86 concerning new issue cold climate survival kit.

ALSE 86-05, 061030Z May 86 concerning new retest date, NSN 6850-00-985-7166, water purification tablets, iodine, mfd by Wisconsin Pharmaceutical.

ALSE 86-07, 101020Z Jul 86 concerning guidance for maximum shelf/service life for food packet, survival, general purpose, NSN 8970-00-082-5665.

ALSE 86-08, 171400Z Jul 86 concerning nonsuitable material, NSN 6850-00-985-7166, water purification tablets, mfd by Van Brode Milling Company, all lots manufactured during 1974.

ALSE 86-09, 062000Z Aug 86 concerning extension in dating of NSN 6850-00-985-7166, water purification tablets, iodine, mfd by Van Brode Industries, or Van Ben, contracts DLA 120-83-C 0567 and DLA 120-84-C-0020, all lots with dates mfd during 1984 and inspect test dates in 1986.



ALSE Symposium

The ALSE Symposium held in St. Louis, MO, 18-22 Aug 86, identified a number of problems needing review/action. When minutes have been compiled, copies will be furnished to attendees.

ALSS questions and answers

Q. Can you tell the ALSE user community what the latest ALSE FM 1-508 series publications are?

A. Following is a list of FM 1-508 series publications dealing with ALSE.

FM 1-508-1: Maintaining Aviation Life Support Equipment (ALSE): Maintenance Program, dated 24 May 85. This

is the first of six planned field manuals. It contains basic information for establishing the ALSE maintenance program.

FM 1-508-2: Personal Equipment, dated 24 Jun 86.

The remaining manuals in the ALSE FM 1-508 series are in a hold status. They include:

FM 1-508-3: Flotation Equipment
FM 1-508-4: Survival Equipment
FM 1-508-5: Medical Equipment
FM 1-508-6: Oxygen Systems and Related Equipment

NOTE: The FM 1-508 series field manuals are written for a peacetime operating environment and are applicable to commanders, AVUM, AVIM, depot and operations, and ALSE personnel. Field or Air-Land Battle operations will be addressed in future publications of the FM 1-508 series.

The goal of the FM 1-508 series of manuals is to establish a standardized ALSE maintenance program, support the establishment of ALSE MOS, and support the need for adequate maintenance shops.

Users of these publications are encouraged to recommend changes and submit comments for improvements. Please key your comments to a specific page and paragraph of the FM 1-508 series in which the change is recommended. Provide a reason for each change or comment so that it can be completely understood and evaluated. Submit your recommendations on DA Form 2028 and forward to Commandant, U.S. Army Aviation Logistics School, ATTN: ATSQ-TDL, Fort Eustis, VA 23604-5422.

Q. Can we still send in recommendations on what we feel could be beneficial in updating AR 95-17: The Army Aviation Life Support System Program?

A. Absolutely, we want to be sure that this regulation will be one that will benefit the Army and the user because of the critical ALSE need. Send in your DA Forms 2028. (You can even send in recommended changes on a blank sheet of paper if you have problems obtaining forms.) Send the information to AMC Product Manager, Aviation Life Support System, ATTN: AMCPM-ALSE-L, 5300 Goodfellow Boulevard, St. Louis, MO 63120-1798. Names of contacts and telephone numbers are listed below for your convenience.

Q. Recent inspections in the field have identified damage to Survival Radio AN/PRC-90 antennas due to storage and inspection of the radio. Do you have any recommendation for a "fix?"

A. Get the longer pocket, NSN 8415-00-442-3616, PN 7347316.

ALSS-GRAM 2 10 December 1986

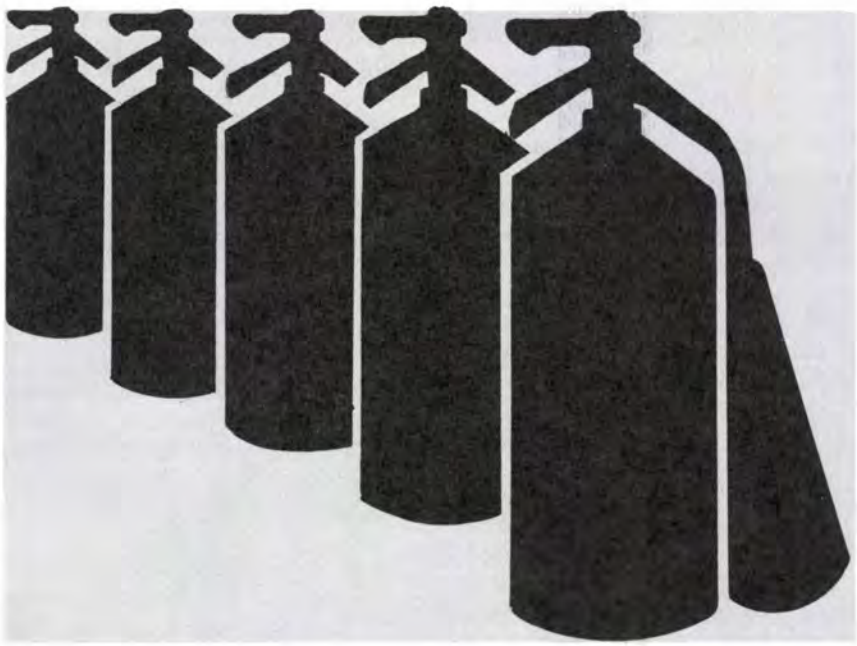
Prepared by the Deputy AMC Product Management Office, Aviation Life Support Equipment, 4300 Goodfellow Blvd, St. Louis, MO 63120-1798, AUTOVON 693-3215, commercial 314-263-3215. Information published generally precedes normal staffing and distribution of Army official policy and is intended as advance information to enhance the critical area of ALSE.

A.B.C. Davis, Jr.
Deputy AMC Product Manager
Aviation Life Support Equipment

Deputy for Aviation Life Support Equipment
AUTOVON 693-3215, Commercial 314-263-3215

Title	Name	Area of Responsibility
AMC Product Manager	Karl R. Griffin, LTC	AMCPM-ALSE
Deputy AMC Product Manager	A.B.C. Davis, Jr.	Chief, Logistics/ Readiness
Logistics/Readiness	Harlyn Hubbs	Senior Logistics/ Readiness
Logistics/Readiness	Jim Dittmer	Mission/ Environmental/ Equip
Logistics/Readiness	Boone Hopkins	Egress/Survival/ Rescue Equipment
ALSE Maint Specialist/ Technican	SFC Edward Bruck	ALSE Maint/Tng/ Admin

Aircraft portable fire extinguishers



During a recent inspection at an airfield, a unit was written up for not having performed hydrostatic tests on their aircraft portable fire extinguishers. The reference given was OSHA General Industry Standard 1910.157, paragraph F. The inspector who wrote this up made two mistakes.

First, the General Industry Standards do not apply to aircraft. Army regulations, Federal Aviation regulations, and National Fire Protection Association codes govern aircraft and airfield operations involving fire protection.

Hydrostatic testing is required on many of the extinguishers we use in the Army. Hydrostatic testing is required to ensure that a reusable pressure container is safe for reuse. Extinguishers containing Halon 1211 or Halon 1301 require hydrostatic testing every 12 years. This brings us to the inspector's second mistake.

The cylinders used on Army aircraft portable fire extinguishers (except for the C-12) cannot be used again once they have been discharged. These cylinders are filled and sealed at the factory. When you squeeze the handle of the extinguisher, a probe punctures the seal, and the cylinder is not reusable.

Since hydrostatic testing is only done on reusable cylinders and the cylinders used on aircraft portable fire extinguishers aren't reusable, hydrostatic testing isn't required for these extinguishers.

A question often asked about the portable fire extinguishers used in cabins or cockpit areas of the UH-1, AH-1, and other Army aircraft is, "What do they contain?"

Except for the C-12 and some off-the-shelf aircraft, which use Halon 1211, all Army aircraft cabins and cockpits are equipped with portable fire extinguishers containing Halon 1301 Bromotrifluoromethane (generally referred to as CF3Br or BrCF3). Halon 1301 is also used on all Army aircraft engine fire protection systems like those in the C-12, UH-60, AH-64, and CH-47.

Because Halon 1301 is stored as a liquid, and expels as a gas, it is known as a liquified gas. (Propane or butane are other examples of liquified gases.) Currently, Halon 1301 is the least toxic fire-extinguishing agent available, and it leaves no residue after it is expelled. Many people, including some instructors, believe and incorrectly teach that it expels as a powder or a foam, requiring extensive cleanup or component replacement, which is not correct. Halon 1301 is considered a clean agent. In fact, it is used in all SFTS buildings as a total flooding system.

Halon 1301 differs significantly from carbon dioxide which displaces oxygen. Halon 1301 and all other Halon agents work by inhibiting the chemical reaction which takes place within the fire itself. These agents are extremely useful in a variety of applications required by the Army today.

What's an SD-3-30?

Because we have had a number of calls from the field asking about the fixed wing SD-3-30, we thought you might like to see what it looks like. This is the commercial version of the Shorts 330, a widebody commuter/regional airliner.

The Short brothers and their aircraft are hardly newcomers to aviation. In 1910, three Short brothers joined two other brothers named Wright and were awarded a contract to produce six biplanes. They've been around ever since. ■

Mishap briefs

copilot's seat disengaged from the tracks. Cause of disengagement was improper adjustment of the front-to-rear movement lock pins. Checks of additional UH-60 crew seats revealed that this problem was not an isolated case. Neither the maintenance nor parts manual addresses this adjustment for the "ARA" manufactured seat. This message requires adjustment of the "ARA" seat lock pins for proper pin engagement. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Message from Cdr, TRADOC, 020525Z Dec 86, reference safety-of-flight technical message UH-60-86-21, 012100Z Dec 86, which was transmitted for information only. This message directs all TRADOC units to take action required to comply with the safety-of-flight message. Contact: MSG Lehnhardt, AUTOVON 680-3246.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Ringology 101

On any given day if you were able to look closely under those sweaty, greasy gloves being worn around Army aircraft, you most likely would find a large number of fingers with rings on them—all types of rings: wedding, university, some plain, others set with stones. These bands of gold, platinum, or whatever, are symbols used in our society to show the world we have either graduated from a school or been precipitated into the blissful state of matrimony. Or they may just show that we had some extra money to invest in precious stones.

These rings are a source of pride. They can also be a source of immense pain and permanent disfigurement. If you happen to catch that little circle of achievement or wedding bliss on a part of an aeromachine while your feet are in transit to terra firma, then your ring, and your ring holder, are fixing to depart from your body proper. When your feet do hit the ground, the following will occur in short order: world class pain, followed by a loud scream, accompanied by significant watering of the eyes. Your "HIGH FIVE" has now become a "HIGH FOUR."

My point is—rings and aircraft don't mix. If they do, the ring and the ring holder are going to lose, and the open space where your finger used to be will serve as a permanent reminder for other ring-wearing nonbelievers. ■

—Adapted from an article by MAJ Roger M. Cude, ATC Project Officer, Safety Directorate, HQ, Air Training Command, Randolph AFB, TX.

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.

A. E. Hervey, Jr.
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THE SIXTH SENSE OF SAFETY
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Flightfax®
Report of Army Aircraft Mishaps

Lest we forget

Among the joy and warmth of the Christmas season, there is a somber reminder at the Army's Safety Center of the seriousness of the safety business.

A 10-foot living fir tree bears 674 small clear lights. Each light represents an Army loss in FY 86. Two hundred and forty-eight of these lights represent soldiers killed in the air crash in Newfoundland just before Christmas last year. Appropriately, the tree also holds white doves, traditionally associated with peace, and these 101st Airborne Division soldiers, returning from duty with the Multinational Force in the Sinai, were peacekeepers.

Although FY 86 was the safest year ever for Army aviation, 27 lights represent people killed in aviation mishaps throughout the Army. One hundred and fourteen other lights represent soldiers and civilians killed in on-duty accidents.

Perhaps the most sobering of all are the 285 lights representing soldiers who died in off-duty accidents, most of them in their own personal vehicles.

This tree is not only a memorial, it is a reminder to people who work with safety every day of the tragic results of accidents. Every one of those 674 people was someone's son or daughter, someone's husband or wife, someone's mother or father. Safety **is** a serious business. ■

Last Flightfax this year

This is the last issue of *Flightfax* you will receive this year. The next issue will be dated 14 January 1987. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

H series - Aircraft was flying support for an armored cavalry squadron when it appeared to fly into the ground. 8710

UH-1 Class D mishaps

H series - During hover taxi for departure, master caution and engine oil pressure lights came on. Caused by short circuit of cannon plug.

V series - Pilot shut down aircraft and opened door while main rotor blades were coasting down. Unforecast 30- to 45-knot winds from right rear quadrant blew door open, damaging upper and lower door hinges.

UH-1 Class E mishaps

H series - Airspeed indicator became erratic and appeared to stick during flight. Obstruction was found and removed from pitot static line.

H series - During flight, crew saw smoke in cockpit. Windshield wiper motor failed and overheated. Overheated wires caused circuit breaker to fail.

H series - During flight at 4,000 feet msl, pilot noticed both needles of dual tachometer were decreasing. IP performed low-side governor failure emergency procedure but neither rotor nor N2 needle would increase. Caused by failure of rotor tachometer generator.

H series - During NOE flight under NVG, crew heard high-frequency noise and engine oil pressure gauge indicated 100 psi. Caused by failure of engine oil pressure gauge.

H series - During hover, egt rose to between 585 and 610° C. Deicing system was stuck in open position. Caused by malfunctioning solenoid valve.

H series - During landing, main transmission oil temperature steadily decreased. Caused by failure of temperature transmitter.

H series - N2 generator failed during flight. Caused by failure of tachometer generator shaft.

UH-60 Class D mishap

A series - During second postflight of the day, left APU door was discovered missing. Cause couldn't be determined. APU door hadn't been opened since preflight.

UH-60 Class E mishaps

A series - During cruise flight at 5,000 feet msl, No. 2 engine fire light came on. During descent, No. 1 engine fire light came on and moderate icing was indicated. When aircraft reached 1,700 feet msl, Nos. 1 and 2 engine fire lights went out. Caused by malfunction of fire detection control.

A series - Stabilator failed in auto mode during flight at 140 KIAS, 1,400 feet msl. Aircraft's nose dipped down 5 degrees and stabilator was reset, but 5 minutes later it failed again and couldn't be reset. Caused by malfunctioning of No. 2 stabilator amplifier.

A series - Stabilator failed during climbout from takeoff and after being reset failed again. Caused by failure of stabilator amplifier.

Attack helicopters

AH-1 Class D mishaps

F series - During inspection on day following night flight, residue from pine tree was found on aircraft's vertical fin and both tail rotor blades. Tail rotors showed small dents. Crew was unaware a strike had occurred. Damage amounted to nearly $5,600.

F series - Main rotor blade tiedown was still attached when aircraft was run up for MOC. Pilot felt vibration in airframe and shut aircraft down. Tiedown had struck vertical fin before wrapping around tail rotor drive shaft cover. $1,000 damage was limited to vertical fin.

AH-1 Class E mishaps

E series - IP initiated simulated engine failure at 1,500 feet agl and 100 KIAS. In a few seconds, engine and rotor speed were at 83 percent with collective pitch full down. IP suspected sprag clutch failure and landed aircraft.

F series - Master caution light and rpm audio came on during hover with rpm at 100 percent. Caused by malfunctioning of rpm warning box.

P series - Fuel quantity needle began circling gauge during flight. Caused by broken wire on fuel probe compensator.

S series - Same aircraft had engine chip detector come on during four flights. Engine was removed for analysis.

S series - Flight crew heard unusual whining noise as IP hovered aircraft at 3 feet agl. Master caution and No. 2 hydraulic caution lights came on and, after landing, crew found large quantity of hydraulic fluid under hydraulic drain line. Caused by failure of aluminum hydraulic fitting on line from hydraulic pump to No. 2 hydraulic module.

AH-64 Class E mishaps

A series - Rotor rpm went below 94 percent during high-low G maneuvers. Rotor rpm low light and audio came on when power was applied. Caused by failure of NR sensor.

A series - During flight, pilot's night vision sensor image fluctuated from far to near focus. Caused by failure of display adjustment panel.

A series - Shaft-driven compressor caution light came on during flight. Caused by failure of centrifugal shaft-driven compressor.

A series - While performing dry-fire operations at 70-foot hover, tail rotor

gearbox temperature light came on. Caused by failure of temperature sensor.

Cargo helicopters

CH-47 Class B mishap

D series - Aircraft made forced landing after drive shaft failure on No. 2 engine. Drive shaft did some damage to sheet metal of surrounding cowlings and pieces of metal went into forward rotor system. 8711

CH-47 Class D mishaps

D series - Driver did not follow directions given by FE during loading of M220 TOW jeep. Vehicle struck and damaged a three-man troop seat.

D series - During loading of M220 TOW jeep, FE noticed fire in engine compartment of jeep. FE and crew chief alerted pilots and began pushing vehicle off the aircraft. After FE extinguished fire, damage caused when jeep struck three-man seat on aircraft was found. Fire was caused when dried brush, which had lodged under jeep, caught fire from engine heat.

CH-47 Class E mishaps

A series - During flight, crew chief saw smoke in utility cooling fan area and informed pilots. Smoke increased and began filling cargo compartment, but there was no fire. Utility hydraulic cooling fan disintegrated, causing fan shaft to rotate and heat bearings.

C series - During flight, crew chief told pilots he could see daylight shining into interior aft pylon due to separation of work platform. After landing, work platform was secured with safety wire so that it couldn't separate from aircraft, and mission was completed. Mount brackets for right work platform latch had broken because of loose-fitting latch and aircraft vibrations.

C series - Transmission pressure gauge indicator showed maximum reading during flight. Caused by failure of oil pressure rotary switch.

C series - As normal beep trim was increased for APU shutdown during engine start procedure, No. 1 engine began high-side beep failure. As shutdown was completed, utility hydraulic pressure read 3,600 psi. Minimum beep resistor had shorted out, causing high-side beep failure. High gauge reading was caused by internal failure of utility hydraulic pressure transmitter.

D series - During hover before takeoff, crew felt a bump they described as similar to the aircraft hitting something, but there were no obstructions in the vicinity. After hover check with no further problems, aircraft took off. While on downwind, the aircraft began to bump regularly and as crew began approach, bumping grew progressively worse. Aircraft was landed and shut down. With each bump, cruise guide indicator had spiked. Subsequent test flight showed No. 2 generator was failing. As generator began cycling rapidly, control system received uneven electrical inputs, causing it to cycle and create the bumping sensation.

CH-54 Class E mishaps

A series - During hover, crew noticed oil had begun spraying on rear of aircraft. Caused by cracked elbow/tube.

A series - After landing, FE told pilots hydraulic fluid was leaking from right strut. Possible cause was seal failure.

Observation helicopters

OH-58 Class C mishaps

A series - During flight, IP noticed N2 fluctuating between 98 and 103 percent. He had begun a shallow approach to land at a training strip when rpm audio and light came on. After entering autorotation, he saw N1 passing through 50 percent. As aircraft touched down, vertical stabilizer hit a small tree, aircraft's nose pitched forward, and main rotor blade severed tailboom just aft of horizontal stabilizer. Damage amounted to more than $40,000. N2 governor had failed.

A series - Aircraft was in shallow approach for running landing. As it touched down on approved sod area, aircraft nosed over forward and pivoted on bottom wire strike protection system. Hard landing resulted in $20,000 damage to aircraft. Aircraft touched down at effective translational lift and was at about 5 knots ground speed

(continued on back page)

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	1-17 Dec	4	3
2nd Qtr	January	3	4			
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	8	7

Seven receive Broken Wing Awards

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.

• **CPT Nickolas F. Giampa, 9th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CPT Giampa was IP of a UH-1H which had recovered three crewmembers from another aircraft that had made a precautionary landing. The student pilot made a terrain flight takeoff and the Huey was about 40 feet agl when it yawed violently to the right accompanied by rapidly building rpm. When CPT Giampa took over the controls, rpm had reached 6900. He attempted to control the overspeed by increasing collective and reducing throttle, with no effect. Then he told the student pilot to put the governor switch in the emergency position and CPT Giampa unsuccessfully attempted to maintain flight with manual throttle. By now, the master caution and transmission segment lights had come on, and CPT Giampa selected the only suitable forced landing area and made a power-off landing with no damage to the aircraft. The only available landing area was a sloping field covered with 6-foot stalks of corn and surrounded by 60-foot trees. CPT Giampa landed the aircraft with no ground run and without the tail rotor contacting the stalks of corn.

• **CPT Thomas J. O'Brian, 4th Brigade (Aviation), 3d Infantry Division, APO New York 09182.** CPT O'Brian was PIC of an OH-58A flying a logistical support mission over foothills interspersed with small cultivated areas and ponds. The flight had been routine, then the aircraft began to oscillate. A quick check of his instruments told the pilot it wasn't just a thermal; the N1, N2, and torque gauges were fluctuating wildly as the aircraft yawed left. Within 3 seconds from the onset of the emergency, the engine-out light and audio came on and engine noise decreased. The aircraft was at 800 feet agl when CPT O'Brian began autorotation. He turned the aircraft into the wind and, avoiding 100-foot power lines in his path of descent, headed toward some small fields just north of a forested area. Most of the fields were on slopes and he selected the only one that appeared to be suitable. CPT O'Brian adjusted his airspeed to make a zero ground run, avoiding a major highway directly in front of the aircraft, and landed the helicopter only 50 yards from the highway.

• **Mr. Jamie F. McKenzie, Pan Am Support Services, Inc., U. S. Army Aviation Center, Fort Rucker.** While instructing an initial entry rotary wing student on instruments, the UH-1H, on which Mr. McKenzie was IP, had a complete loss of tail rotor control. Several times during the flight, the IP asked the student to trim the aircraft, and each time trim was corrected. After a power reduction, the IP again asked the student to trim the aircraft. This time, the student indicated that he had full right trim applied. Mr. McKenzie took the controls and moved the pedals back and forth with no response. Realizing he had no tail rotor control, he began a slow climb toward the airfield. During the 20 minutes required to reach the airfield, Mr. McKenzie continued instructing the students, explaining why slow and small power applications were required. To reduce tension during the flight to the airfield, he talked about the approaching landing. About 5 minutes out, he called for a before-landing check and told the students what he wanted them to do if the aircraft began a spin on short final. Intercepting a shallow approach angle, he reduced power to establish rate of descent, and began slow deceleration with cyclic to keep use of collective at a minimum. With the aircraft's skids about 1 foot off the ground, at 20 to 25 KIAS, the aircraft's nose began turning left. Mr. McKenzie reduced throttle to keep the nose aligned and allowed the aircraft to touch down. He continued to reduce throttle to maintain alignment and reduced collective to slow the ground run. As the aircraft slowed, the nose slid slightly right of centerline with collective full down and engine throttle at idle. He applied cyclic, bringing the aircraft to a stop on centerline 20 degrees right of runway heading, with no damage to the aircraft. Loss of tail rotor control was caused by failure of the tail rotor pitch change control nut assembly.

• **CW3 Charles L. Murphy, Eastern ARNG Aviation Training Site, Pennsylvania Army National Guard, Annville, PA.** CW3 Murphy was IP of a UH-1H on a NVG training flight when, during short final approach, the Huey had a total hydraulic failure. The rated student pilot on the controls was decelerating below effective translational lift at 50 feet agl when the IP heard a loud grinding noise from the rear of the aircraft. The master caution and hydraulic segment lights came on and the student pilot reported stiffness in the aircraft controls. CW3 Murphy took the controls and began a side-step maneuver of 100 feet to an adjacent runway. CW3 Murphy told the student pilot to place the hydraulic control switch in the off position as he maneuvered the aircraft for a run-on landing. The IP then noticed increased stiffness in the collective pitch lever and asked the student pilot to help him lower the

collective. After a successful run-on landing, inspection revealed that the hydraulic sight gauge was empty and there was a large amount of hydraulic fluid on the runway. The metal tube assembly had broken due to fatigue, causing the loss of hydraulic fluid.

• **CW3 William C. Radford, A Company, 159th Aviation Battalion (MH), 101st Airborne Division (AASLT), Fort Campbell.** The CH-47D, on which CW3 Radford was IP, took off from a parking lot with 30 passengers on board. The pilot on the controls noticed the aircraft required an abnormal amount of forward cyclic and told CW3 Radford he was experiencing a DASH malfunction. The IP, who was in the left seat, attempted to halt the runaway condition of the DASH by turning off the advanced flight control system (AFCS). The aircraft continued to accelerate to 90 knots with abnormal forward cyclic required. Airspeed ultimately increased to 100 knots, requiring 4 inches of forward cyclic to maintain airspeed. At this point, CW3 Radford took the controls and declared a precautionary for a run-on landing. Because of the abnormal amount of forward cyclic required. Four inches of forward cyclic was required to increase and maintain airspeed at 100 knots. At this point, CW3 Radford took the controls and continued flight to an Army airfield where he could make a run-on landing. Because of the abnormal amount of forward cyclic required, he decided to maintain airspeed at 90 knots until touchdown was imminent. When power was reduced slightly, the aircraft's nose pitched up, requiring full forward cyclic control to maintain control of the aircraft. The emergency was compounded by having to make a running landing to a snow and ice-covered runway with the AFCS off. After landing, inspection confirmed the DASH had programmed to its full-extended range.

• **CW2 Karl H. Maier, 1st Squadron (Air), 17th Cavalry, Fort Bragg.** CW2 Maier, unit trainer, was pilot of an OH-58C engaged in live aerial gunnery training. The aircraft, with the copilot on the controls, had returned from gunnery training and was downwind for landing at 80 feet agl and 45 KIAS, when the engine failed. After the copilot began emergency procedures, CW2 Maier took the controls and confirmed engine failure. The N2 reading went to zero, rotor rpm and engine-out lights came on, and the low rpm audio went off. CW2 Maier turned the aircraft toward the nearest available landing area. Because the slightly sloping ground was soft and sandy, he landed with zero groundspeed to avoid sinking or sliding in the sand which could have caused dynamic rollover or blade-tailboom contact. The undamaged aircraft came to rest in a skid-down, nose-low attitude.

• **CW2 Jeffrey E. Richeson, Attack Helicopter Troop, 107th Air Cavalry, Army Aviation Support Facility No. 2, Ohio Army National Guard, Worthington, OH.** CW2 Richeson was PIC of a UH-1H engaged in slingload operations during a fire control mission in support of range operations. Weather in the exercise area had been unusually dry and, on the previous day, several crews had to be brought in for direct fire fighting. The UH-1 was carrying a "Bambi Bucket," a canvas water bucket used in sling operations. This device automatically fills and closes and has an electrical solenoid for dumping. The weather was clear and unrestricted with winds out of the southwest at 15 knots. OAT was 35° C., producing a density altitude of 3,000 feet. Operating weight of the aircraft with the slingload was about 7,600 pounds. After a normal departure, the aircraft made a wide swing to the northwest to avoid a populated area, leveled off at 500 feet agl, and turned northeast. The UH-1 had been airborne for around 8 minutes and was 3 nm due north of the airfield when the crew felt high-frequency vibration throughout the airframe and the master caution and engine chip lights came on. CW2 Richeson put the aircraft in a right turn, back into the wind, and chose a landing area. During the turn, another high-frequency vibration was felt, immediately followed by catastrophic engine failure. CW2 Richeson slowed the aircraft to about 60 KIAS as he turned toward a baseball diamond about one-half mile away. He delayed jettisoning the Bambi Bucket while he was over a populated area. The UH-1 was 200 to 300 feet agl by the time he reached a stand of pine trees on state property where he could safely jettison the load. He then autorotated onto the baseball field, landing with no further damage to the aircraft. ■

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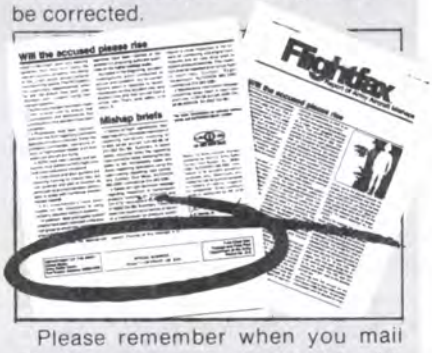

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Mishap briefs

when it nosed over. Sod area surface was very uneven with numerous potholes.

OH-58 Class E mishaps

A series - While flying in downdrafts over a mountain draw, No. 2 engine drooped to 97 rpm then recovered. Third time engine drooped, N2 stayed at 95 rpm until aircraft landed. Power required in unforecast turbulence on leeward side of mountains exceeded aircraft's capabilities.

C series - Aircraft began vibrating during descent for landing. Caused by bonding separation of main rotor blade tip cap.

Fixed wing

U-8 Class B mishap

F series - Aircraft was on training mission. Crew noted unsafe indications with gear down and tried without success to correct problem by troubleshooting systems. After flying several traffic patterns, aircraft landed. All three gears collapsed and both engines experienced sudden stoppage.

C-12 Class E mishaps

D series - Aircraft was in cruise flight in 5-degree nose-up attitude. Auxiliary tanks were empty but each main tank indicated 900 pounds of fuel each. When left engine nacelle low light came on, the nose was lowered, but light remained on. After about 8 minutes, as aircraft descended to return to base, light went out. This had been a recurring problem in this particular aircraft. As entire system was being checked out, compressed air was blown through vent line from heated fuel vent-to-vent manifold and three pieces of hardened epoxy resin were dislodged from the line. Suspect the epoxy had been in the system since manufacture.

D series - When gear handle was placed in down position for landing, nose gear light wouldn't give safe indication. Caused by worn gear down lock switch.

F series - During climbout, airspeed began dropping and pilot reset autopilot to maintain 140 KIAS. As aircraft passed through 16,000 feet, elevator control became stiff. Pilot pushed control forward 2 or 3 inches before it broke loose. Binding was caused by wet snow freezing on leading edge of elevator.

Maintenance

UH-1 Class E mishap

H series - Dc generator light came on during hover. Main generator voltage regulator was set too low.

AH-1 Class E mishap

S series - Engine oil bypass light came on during compass swing. Engine oil pressure remained normal but N2 dropped and tgt rose. N2 continued to decrease when throttle was reduced to flight idle. Then copilot reported fire and crewmembers got out and emptied extinguisher into left side of engine cowling. No actual fire was seen, but oil could be seen running out of engine oil drain and the aircraft was engulfed in smoke. During assembly, the quick disconnect for engine gear box vent line to oil tank had not been properly seated. Pressure buildup in engine resulted in oil blowing past internal bearing seals which caused smoke seen by crewmembers. Problem has been reported to contractor who has been asked for actions to be taken to prevent recurrence.

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

THE SIXTH SENSE OF SAFETY
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IN TRAINING AND LIVING

1987 goals for Army aviation standardization

The following article is based on a letter from MG Ellis D. Parker as Chief of the Aviation Branch to commanders and aviation personnel at all levels throughout the Army.

The goal of the Department of the Army Aviation Standardization Program is to ensure that combat-ready aviators are in our cockpits when the next battle comes. To achieve this goal, we must continue to pursue demanding and realistic, but safe, training. As Chief of the Aviation Branch, I charge each and every member of our aviation community to dedicate themselves to attaining and maintaining the kind of high standards we must have if our aviation forces are to prove equal to the rigors and demands we will face in any future conflict.

During 1987, we must see to it that this goal becomes reality. Our success in aviation standardization will rely equally upon the training assistance and evaluation processes. We at the Army Aviation Center will support aviation training and evaluation by continuing to provide aviation standardization and training seminars, branch training teams, and instructor pilot/standardization instructor pilot seminars. But the key factor in achieving this goal remains the commander.

Command involvement in developing and supervising the Aircrew Training Program (ATP) improved significantly during this past year. We now need to increase our emphasis on implementing all aspects of the ATP to support a "train as we fight" philosophy. Inherent in applying this philosophy is the commander's responsibility to assess his unit's mission and select special or additional tasks for training and evaluation.

Commanders select areas of their aviation programs to be enhanced, and we provide the training standardization and safety teams to give them the assistance they require. These teams also collect data on the aviation product being sent to the field from Fort Rucker. Analysis of this data is used to evaluate and improve that product. Department of the Army evaluations will continue to be used in evaluating aviation unit standardization and training programs. These assistance teams, evaluations, and seminars will not succeed, however, unless there is continuing command involvement.

The ATP, through the use of the Commander's Guide, FC 1-210, and the appropriate Aircrew Training Manual, provides a training program and evaluation system to ensure Army aviators have the basic skills, confidence, and knowledge needed to respond safely to any task or mission they may be called upon to perform.

In a letter sent to the field in September 1986, I emphasized the necessity of training our aircrews in Aircraft Survivability Equipment operations, specifically Identification Friend or Foe Mode 4 transponder operation, and the AN/APR-39 radar warning set. I also outlined some of the training that should be included in unit tactical scenarios and simulated combat missions, and the areas of special interest that will be covered in FY 87 Department of the Army evaluations.

Another area that continues to be of paramount interest is safety. We saw a significant decline in serious aviation accidents during FY 86. In fact, the 1.98 Class A mishap rate for FY 86 is the best ever recorded for Army aviation. Especially noteworthy is the reduction in mishaps involving the OH-58 and UH-60 aircraft. There is no question that command involvement played a significant role in this decline, and we must continue to seek new ways to improve the effectiveness, efficiency, and safety of all our missions. One tool available to assist us is called SafeArmy 1990.

SafeArmy 1990, a 5-year plan tailored to prevent accidents while leading to a highly professional and combat-ready force, offers a challenge to every member of the aviation team. Its challenge of an annual reduction of 5 percent for aircraft accidents and 3 percent each for ground accidents and lost-time civilian injury claims can be met and exceeded, but it will take dedication and hard work by everyone concerned to do it. One area we must continue to emphasize is elimination of human-error accidents, especially those that involve willful acts of omission or commission.

The equipment we use, our organizations, doctrine, and realistic training make aviation one of the hardest-hitting and most versatile combat arms branches in the Army. What we are doing today will impact far into the future. To ensure that impact is positive, commanders at all levels must be personally involved. I challenge each one of you to review what was done in FY 86 and come up with ways to achieve in 1987 even higher standards in safety while still training to produce cohesive, effective, combat-ready units. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - During landing to sod, right skid began sinking into soft ground, causing aircraft to settle to the rear. When pilot applied collective and aft cyclic to level aircraft, toe of right skid stuck momentarily, then released abruptly, causing tail stinger to hit the ground. Aircraft rocked forward and main rotor flexed, hitting top of wire cutter, causing $50,000 damage to both blades and wire cutter.

UH-1 Class E mishaps

H series - During descent, MTP noticed engine oil pressure rapidly decreasing. Pressure relief valve was clogged with dirt.

H series - While conducting NOE operations, pilot misjudged distance and allowed main rotor blades to strike tree limbs.

H series - Master caution and right fuel boost pump lights came on during descent to confined area. Caused by failure of right fuel boost pump.

H series - Fluid was seen leaking from cargo hook area as aircraft was being run up. Caused by leak in left lateral servo cylinder.

H series - During NVG training along NOE route, master caution light came on with no segmented warning light. Caused by 90-degree gearbox chip detector.

H series - Crew smelled fuel fumes and, after aircraft landed, crew chief saw tail boom was saturated with fuel. Caused by cracked nut on main fuel hose assembly at fuel control.

H series - Chip detector light for 90-degree gearbox came on during runup but, after normal fuzz was found, aircraft was released. Chip light came on again during flight. Caused by internal failure of 90-degree gearbox.

UH-60 Class A mishap

A series - Two UH-60 aircraft on NVG flight under VFR conditions collided in mid-air over training area. 8713

UH-60 Class D mishaps

A series - Aircraft had departed from refueling site and was in traffic pattern. IP told student he was above traffic pattern altitude and to descend, but didn't specify the altitude. IP diverted his attention to other aircraft and failed to notice how low the aircraft was. The SP, who was relying on IP's judgment, was also having trouble with glare in the cockpit. When he saw a tree ahead, he increased collective, but both pilots heard a thump as aircraft struck a tree. Damage to anticollision light and tail wheel lockpin actuator amounted to about $1,000.

A series - During attempted hookup of a jeep and trailer, pilot allowed aircraft to descend and hit the jeep's antenna mount.

A series - Aircraft was trail in flight of two. During takeoff, PIC felt bumping movement in controls. During landing, loud pop was heard and crew chief saw a spark in rotor disk. Anti-flap assembly broke free from mount, causing gouge in leading edge of one rotor blade.

UH-60 Class E mishaps

A series - Main module chip caution light came on after takeoff. Caused by internal failure of main module.

A series - Stabilator failed during runup and wouldn't reset. Caused by failure of airspeed transducer.

A series - Stabilator failed at 20 degrees during stabilator check. Caused by failure of No. 2 stabilator actuator.

A series - While aircraft was on refueling pad, crew chief saw fuel leaking from No. 1 engine. Caused by leak in No. 1 engine fuel manifold.

A series - During ground operation, IP simulated hydraulic malfunction by turning SAS, trim, FPS, and boost off. After pilot flew traffic pattern and landed, No. 2 hydraulic pump caution light came on when IP reengaged SAS, trim, FPS, and boost. No. 2 hydraulic pump had seized.

A series - While attempting sling hookup of M102 howitzer, pilot and crew chief misjudged distance between gun tube and bottom of aircraft. Gun tube struck Doppler antenna. Blowing dust caused pilot to misjudge hover height.

Attack helicopters

AH-1 Class C mishap

F series - During NOE flight, with copilot at the controls, aircraft's main rotor blades struck a tree the crew had failed to see. Damage to both main rotor blades amounted to about $20,000.

AH-1 Class D mishap

F series - Aircraft was trail in flight of three. As flight reached FARP, lead aircraft stopped at refueling point and the other two aircraft came to hover. No. 3 aircraft was between No. 2 aircraft

and a tree on the left front when No. 2 increased its hover altitude and began drifting backward. Pilot of No. 3 aircraft moved to his left to avoid the other aircraft. The copilot noticed they were getting close to the tree but failed to alert the pilot and the aircraft's rotors struck the tree about 20 feet above the ground.

AH-1 Class E mishaps

F series - Engine oil temperature began rising slowly during flight, reaching 93° C. Caused by failure of bearing in oil cooler turbine fan.

F series - During flight, engine chip light came on for the second time in 4 hours. Tests showed excessive metal in oil sample and engine was replaced.

P series - Transmission oil pressure gauge began fluctuating during flight. Caused by failure of transmission oil pressure transducer.

S series - Aircraft began vertical vibration during flight. When collective pitch was reduced after landing, vibration was again felt. Caused by worn outboard feathering bearings in main rotor hub.

AH-64 Class C mishap

A series - During postflight following NVG NOE training flight, damage was found to all four main rotor blades, stabilator, and ADF sensing antenna. Crewmembers had noticed nothing unusual during flight. Estimated damage is nearly $74,000.

AH-64 Class D mishap

A series - Evidence of bird strike was found following flight in rainy conditions using pilot night vision sensor.

AH-64 Class E mishaps

A series - Utility hydraulic oil bypass caution light came on during gunnery operations. Utility hydraulic pressure filter was replaced.

A series - No. 2 engine chip detector light came on during flight. Caused by failure of chip detector.

A series - During flight, hot battery light came on. Caused by thermal runaway of battery.

A series - Smoke filled cockpit during flight and shaft-driven compressor light came on. Caused by failure of shaft-driven compressor.

A series - No. 2 nose gearbox oil pressure caution light came on in flight. Caused by failure of NGB oil pressure switch.

A series - During flight, IP placed No. 2 engine power lever in idle position. No. 1 engine didn't double torque and No. 2 power lever was put back in fly position. Caused by failure of No. 1 engine electrical control unit.

A series - As No. 2 engine power lever was moved to lockout during runup, smoke began pouring from pilot's missile panel. Caused by short in jettison circuit wiring harness.

Cargo helicopters

CH-47 Class D mishaps

A series - While positioning over external load, pilot allowed aircraft to contact load, resulting in puncture to outer skin.

B series - During postflight inspection, broken drag link on aft landing gear was found. Suspect break occurred during landing or ground taxi operations. Damage estimated at $2,700.

D series - During landing at field site, aircraft crossed tree line and overflew parked UH-60. Unsecured door on UH-60 was damaged when it blew open, and pilot's chin bubble was also damaged. Ground unit had positioned UH-60 directly under approach path of the CH-47.

D series - Pilot allowed aircraft's aft rotor blades to descend into treetops during landing, resulting in about $500 in damage.

D series - During offloading, gun crew allowed gun to drop onto ramp, puncturing floor.

D series - Soldier was backing M880 off ramp in wet conditions. When he was signaled to stop, he applied brakes. Brakes locked and left rear seat was damaged when M880 slid into it.

CH-47 Class E mishaps

C series - Both rotor tachometer indicators dropped to zero during flight with no other abnormal indicators. Caused by failure of rotor tachometer generator.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	5	6
2nd Qtr	January	3	4	1-14 Jan	0	0
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	9	10

Mishap briefs

OH-6A and OH-58A aircraft with T63-A-700 engine, it became apparent that additional engine maintenance instructions are necessary to reduce risk and enhance safety. Contact: Dick Mooy, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message regarding one-time and recurring inspection of input coupling on CH-54A helicopters (CH-54-86-05, 092230Z Dec 86). Summary: An incident recently occurred where an input coupling that connects an engine to the main gearbox failed in flight, causing a mission abort. The coupling had been visually inspected and lubricated 63 hours prior to failure. It had been fluorescent magnetic particle inspected 167 hours prior to failure. Laboratory analysis showed the male coupling half had failed. Failure was through the web that extends between the spline ring and the 4.5-inch diameter shaft section. The web had cracked circumferentially for 360 degrees, thus separating the driving section from the driver. Analysis also showed radial cracks at some of the spline teeth, thereby indicating that cracking may have been initiated by inadequate spline lubrication. AVSCOM safety-of-flight technical message CH-54-86-01, 221500Z Jan 86, imposed visual and fluorescent magnetic particle inspection of the couplings and regreasing at 50-hour intervals. The inspection and greasing were later changed to a visual inspection and regreasing at 100-hour intervals because all couplings were checking satisfactory. Purpose of this message is to again impose a recurring visual and fluorescent magnetic particle inspection and lubrication at intervals of 50 flying hours or 6 months, whichever comes first. Aircraft with couplings which were inspected less than 50 flight hours or 6 months ago require recurring inspections when these intervals occur. Aircraft with couplings inspected more than 50 flight hours or 6 months ago must be inspected prior to next flight. The information on the fluorescent magnetic particle inspection has been expanded and clarified to ensure uniformity of inspections. This inspection applies only to CH-54A models. The couplings on the CH-54B are a different configuration. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message regarding revision to one-time inspection of and restrictions on weight on landing gear for OH-58A/C series aircraft (OH-58-86-11, 051700Z Dec 86). Summary: This message adds the requirements of AVSCOM safety-of-flight technical message OH-58-86-10, 132330Z Nov 86, to inspect/rework the forward cross tube also. In addition, due to difficulty in rivet supply, alternate rivets have been specified. 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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C series - During flight, crew noticed that fuel in forward left auxiliary tank was not being consumed and a mist of fuel could be seen venting from the tank. When airspeed was reduced, misting from vent stopped. Suspect there was a partial failure of fuel boost pump and that flapper valve was defective.

C series - Pilots noticed high-frequency vibration during flight, and rotor tachometers immediately dropped to zero. Caused by failure of rotor tachometer generator shaft.

C series - When PIC attempted to decrease No. 2 engine trim during hover, No. 2 engine went to high side. Caused by internal failure of N2 actuator.

C series - During descent for instrument approach, crew chief detected a leak in aft vertical shaft area. Suspect failure of aft vertical shaft seal.

D series - During flight, pilots noticed fluctuation in transmission oil pressure indicator. Caused by failure of indicator.

D series - Slingload consisting of concrete block weighing 6,000 pounds was dropped during flight and destroyed. Keeper on the clevis had broken off, allowing chain to slip off clevis.

D series - As M102 on tandem hook configuration was picked up, forward sling released from gun mounting point. Crew chief opened aft hook and forward hook, releasing slings from aircraft at about 2 to 3 feet agl. Artillery personnel didn't properly secure chain lock.

Observation helicopters

OH-58 Class D mishap

A series - During flight, pilot noticed humming noise and slight vibration in aircraft. After landing at hot refueling pad, flat-pitch high-frequency vibration increased. Vibration lessened when throttle was placed in flight idle position. As refueling was completed and throttle was increased, copilot's door came off hinges, striking the copilot in the face. Pilot had failed to secure door.

OH-58 Class E mishap

C series - When pilot noticed transmission oil pressure was at 70 psi during flight, he turned back to airfield. When transmission oil pressure increased to 80 psi, aircraft landed in a field. Caused by failure of oil pressure transducer.

Fixed wing

C-12 Class E mishap

D series - Upon reaching cruise altitude at flight level 270, pilot checked oxygen mask. After about 5 seconds, oxygen flow stopped and pressure indicator turned red. OAT was minus 48° C. Aircraft returned to field and landed. During preflight in heated hangar, system had checked out okay. Maintenance suspects faulty O-ring in valve located in unheated area of aircraft allowed moisture to be introduced. When moisture froze, oxygen flow stopped. Oxygen masks should be regularly checked during flight, especially when outside air temperature is low.

OV-1 Class E mishaps

D series - During touchdown, lug bolt assembly broke and lodged in brake assembly, locking wheel brake. Main tire skidded, then went flat.

D series - IP initiated dive to demonstrate loop maneuver. At 9,000 feet msl, 270 KIAS, before applying aft elevator pressure to enter loop, IP heard loud noise followed by violent rush of air. He saw right entrance hatch was wedged in open position and plexiglas was shattered. Cause is being investigated.

SD-3-30 Class E mishap

After takeoff, No. 2 engine fuel pressure light came on and torque, oil temperature, and oil pressure on No. 2 engine showed zero. Internal failure of No. 2 engine starter generator caused No. 2 inverter to drop off line, causing zero indications on the gauges.

U-21 Class E mishaps

A series - During after-takeoff check, fuel could be seen siphoning from left wing fuel cap. Cap was seated improperly after refueling.

H series - Flaps wouldn't retract after landing and crew detected electrical odor. Caused by failure of flap motor.

Maintenance

AH-1 Class E mishaps

P series - As aircraft hovered to fire rockets, crew heard two loud bangs from engine. Aircraft descended about 2 feet before recovering and landing. Variable inlet guide vane was out of adjustment.

S series - During flight, tgt gauge dropped to zero then went to 350 degrees, where it remained. Caused by loose terminal nuts on resistor spool.

CH-47 Class E mishaps

C series - After landing, PIC noticed No. 2 PTIT gauge wasn't working. After shutting down No. 2 engine, pilot noticed engine start circuit breaker was out. When it was reset, it again popped out. Protective coating on two electrical wires had worn through, causing short.

C series - Duing IFR flight, pilot noticed low oil pressure indication on No. 1 engine, but there were no other indications of engine malfunction. Circuit breaker had popped out and couldn't be reset. Caused by loose cannon plug.

OH-58 Class E mishap

A series - During hovering flight, master caution and tail rotor chip detector lights came on. Wire on 90-degree

Mishap briefs

gearbox chip detector was frayed and had shorted against gearbox.

UH-60 Class E mishap

A series - Stabilator failed three times during takeoff. Stabilator amplifier bias was out of adjustment.

Safety messages

• Safety-of-flight maintenance mandatory message concerning night vision goggle operations in UH-1 aircraft (UH-1-86-13, 021530Z Dec 86). Summary: UH-1 aircraft have had a high failure rate of panel light inserts from debonding of the plastic insert from the metal base. Several of these failures have caused near incidents when unfiltered white light flooded the cockpit. The white light causes immediate power down of the night vision goggles, resulting in complete vision loss. AVSCOM is testing replacement parts which when available will be distinguishable from the current defective items. Until qualified replacement parts are available, in 6 to 9 months, all light inserts require temporary repair or aircraft are restricted from NVG missions. Installation of modification kits has been suspended and none will be installed until problems have been corrected and replacement parts are available. Purpose of this message is to require all inserts, whether they have failed or not, to be repaired. Inserts fail randomly, ranging from a few operating hours to several hundred hours. There is no assurance that a part which has not failed will not fail in the immediate future. This message also directs replacement of specified slide drawer filters. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message concerning addition to flight restriction on OH-6A and OH-58A aircraft with T63-A-700 engines (OH-6A-86-12, OH-58A-86-11, 021500Z Dec 86). Summary: Subsequent to release of SOF operational message OH-6A-86-10/OH-58A-86-05, 222300Z Aug 86, regarding flight restrictions on

(continued on back page)

Recap of AVSCOM messages

Following is a list of AIG 8881 addressed messages transmitted by AVSCOM (AMSAV-M) from 1 July through 30 September 1986.

If you missed the other message recaps for FY 86, you will find them in the following issues of *Flightfax:* 1st Quarter, 7 May 1986; 2d Quarter, 2 July 1986; 3d Quarter, 1 October 1986.

UH-1-86-08 Safety-of-flight technical message concerning one-time inspection of swashplate control assembly.

UH-1-86-09 Safety-of-flight technical message concerning removal of AN310-8 nuts from pylon and control installation.

UH-60A-86-12 Safety-of-flight maintenance mandatory message concerning aircraft location and changeout of listed serial-numbered yaw and collective boost servos.

UH-60A-86-13 Safety-of-flight maintenance mandatory message concerning removal of AN310-8 nuts.

UH-60A-86-14 Safety-of-flight technical message concerning revision to previous message concerning lever assembly.

UH-60A-86-15 Safety-of-flight maintenance mandatory message concerning revision of AN310-8 nuts.

AH-1-86-05 Safety-of-flight maintenance mandatory message concerning one-time inspection of M97 series turret spring pins and saddle shaft mounting bolts on TAH-1S/AH-1E (ECAS) and AH-1F (MC) aircraft.

AH-64A-86-13 Safety-of-flight maintenance mandatory message concerning replacement of electrical contacts at four-way fuel valves.

AH-64A-86-14 Safety-of-flight operational message concerning operations of aircraft in high winds.

AH-64A-86-15 Safety-of-flight technical message concerning one-time inspection of AH-64A aircraft drive shaft couplings for proper assembly.

CH-47-86-07 Safety-of-flight maintenance mandatory message concerning inspection of manual release cable to forward hook.

OH-6-86-07 Safety-of-flight technical message concerning requirements for ungrounding OH-6A series aircraft.

OH-6-86-08 Safety-of-flight technical message concerning requirements for ungrounding commercial variants of H-6 series aircraft.

OH-6-86-09 Safety-of-flight technical message concerning tail rotor inspection requirements (commercial variants).

OH-6-86-10 Safety-of-flight operational message concerning OH-6 and OH-58 series aircraft with T63-A-700 engine flight restrictions.

OH-6-86-11 Safety-of-flight technical message concerning one-time inspection of OH-6/H-6 series aircraft tail rotor assembly.

OH-58-86-04 Safety-of-flight maintenance mandatory message concerning clarifications of modifications work orders and publications.

OH-58-86-05 Safety-of-flight operational message concerning flight restrictions on OH-6A and OH-58 series aircraft with T63-A-700 engine.

OH-58-86-06 Safety-of-flight technical message concerning one-time inspection of transmission support fittings.

OH-58-86-07 Safety-of-flight operational message concerning changes to operators manual and crew checklist for NVG operation of OH-58C aircraft only.

OH-58-86-08 Safety-of-flight technical message concerning one-time inspection of OH-58A aircraft which have MWO 55-1520-228-50-26 installed.

OV-1-86-03 Safety-of-flight technical message concerning one-time inspection and replacement of P/N AGE-21-1 and P/N AGE-1A, A-C deice generators on OV-1/RV-1 aircraft.

Addressees requiring copies of messages should contact their higher headquarters. ■

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THE SIXTH SENSE OF SAFETY
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Report of Army Aircraft Mishaps

A fatal decision

The two AH-1 helicopters were returning to their home unit after being used in support of a field training exercise. Both aircraft were being flown single-pilot, although on the mishap aircraft, the copilot/gunner seat was occupied by the crew chief. Normal restrictions were in effect; the aircraft would not fly NOE and would remain VFR. En route weather forecast was for 500-foot ceiling, 7,000-meter visibility, rain showers with light snow, and light to moderate turbulence.

The flight was uneventful until, while crossing a mountain range, the aircraft encountered rain showers, moderate turbulence, and light snow. The mountain tops were obscured by fog and clouds. The AH-1s followed their planned route of flight through a major valley until the pilot of the mishap aircraft, who was flying lead, announced to the other pilot that he was going to deviate and fly a different route across the mountains.

Seeing the lead aircraft turn toward rising terrain, the other pilot suggested that they continue on the planned route of flight. Before the pilot of the lead aircraft could answer, his aircraft had flown through a low saddle in the side of the valley and entered IMC conditions in a valley on the other side.

When he inadvertently entered IMC conditions, the pilot began vertical helicopter instrument recovery procedures (VHIRP) by starting a climb to 4,000 feet and turning to the appropriate VHIRP heading. He radioed the other pilot that he was IMC and, switching his radio to guard, made two calls to a radar facility, telling them he was IMC and climbing to 4,000 feet. The first call was made at 2,000 feet and the second at 3,000 feet.

After receiving the radio call telling him the lead aircraft was IMC, the other AH-1 pilot, who was continuing along the planned route, also switched his radio to guard. He heard the calls to radar from the mishap aircraft, but there was no response. Thinking the other pilot might have switched to GCA when he received no response, he also switched to GCA, but heard nothing. He continued to fly for 15 kilometers and realizing he couldn't get enough altitude to report the IMC aircraft, he decided to land near a small town and report by telephone. He was met by a civilian who told him there had been an aircraft crash and took him to the accident site.

The aircraft had hit a hilltop with a 7-degree upslope. On initial impact, the main rotor blade flexed down, striking the ground on the right front of the aircraft and the tail boom, before the mast snapped. The fuselage bounced into the air and came to rest about 120 feet from the initial point of impact. The pilot and the crew chief had been killed.

There was no apparent reason for the pilot's decision to deviate from his planned route of flight. The weather was VFR, as forecasted, he had sufficient fuel, and there was no urgency about the mission. He apparently felt confident that he could remain VFR, but when he attempted to fly a more direct, unplanned route, he immediately entered IMC. While he was attempting to execute VHIRP, he became disoriented and crashed.

There is no clearly defined guidance for single-pilot versus dual-pilot mission requirements for the AH-1 helicopter. This is particularly critical when operating in an environment with rapidly-changing weather conditions. In the area where this mishap occurred, unforecasted changes from VMC to IMC can happen within minutes. Had there been two rated pilots on board this aircraft the mishap probably would not have happened.

When the pilot entered IMC and initiated VHIRP, he focused his attention on radio communications before establishing positive control of the aircraft. He also probably switched the transponder to the emergency squawk position because a ground control intercept site received a brief unidentified

(continued on back page)

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

EH-1 Class D mishap

H series - During runup in subfreezing temperatures, pilot attempted to lower door window to help defrost windshield. Window split into two pieces. Pilot failed to anticipate brittleness of plexiglass window at subfreezing temperatures.

UH-1 Class E mishaps

H series - During flight at 1,300 feet agl, fire warning light came on. Caused by malfunction of fire warning system.

H series - Aircraft was on final approach when crew smelled and saw smoke coming from vicinity of overhead circuit breaker panel. Binding in windshield wiper motor caused overheating in wiring harness.

H series - During stabilized hover, transmission oil pressure dropped to zero. Master caution and transmission oil pressure low lights came on. Transmission input and output quick disconnects failed and oil lines collapsed, causing pressure to build up and internal filter to blow a gasket.

H series - As aircraft hovered after training flight, master caution and engine chip lights came on. Metal chips were found on chip detector and in oil samples. After engine oil system was drained, flushed, refilled, and ground run for an hour, a second oil sample also showed metal particles and engine was condemned.

M series - Aircraft was on downwind leg of traffic pattern when master caution and left fuel boost caution panel lights came on. Caused by failure of left fuel boost pump.

UH-60 Class B mishap

A series - Maintenance test pilot was performing single-engine runup for drive shaft vibration check following reinstallation of engine No. 1. There was no intent to fly. As MTP moved power lever to flight position, he heard a loud whining noise in No. 1 engine and immediately shut down the aircraft. Inspection of the engine revealed a single first stage compressor blade was bent beyond reasonable limits. Suspect FOD was probable cause, although FOD inspection had been performed prior to engine installation. Cost of damage was $195,000. 8714

UH-60 Class E mishaps

A series - Aircraft had flown through turbulence before stabilator failed, causing warning horn and master caution light to come on. Crew's efforts to regain automatic control were unsuccessful. Stability augmentation system/flightpath stabilization computer displayed a lateral accelerometer failure code. After SAS/FPS computer was reset, problem couldn't be duplicated.

A series - Internal leak in pressurizing overspeed unit resulted in fuel dispensing through the common drain. Pressurizing overspeed unit was replaced.

Attack helicopters

AH-1 Class E mishaps

F series - Aircraft was in low level flight, mounting between battle positions, when it entered a pass and the crew saw an A-10 aircraft on collision course. The copilot, who was on the controls, bottomed collective and lowered the nose and the aircraft began settling with power. Aircraft was 15 feet agl with a high sink rate and 90-percent torque when PIC took controls. PIC increased collective and cyclic and applied pedal to avoid trees and get aircraft's nose into the wind. Torque climbed to 104 percent for 6 seconds before aircraft could be landed.

F series - During runup, go/no-go lights would come on when stability and control augmentation system power was applied. Dc power surge during previous ground run had damaged all three SCAS cards and fuses.

F series - No. 2 hydraulic failed while aircraft was on short final. Hydraulic light came on and pitch and roll stability and control augmentation system came off line. Caused by failure of No. 2 hydraulic switch.

F series - Transmission pressure light came on during IGE hover. During shutdown, transmission oil temperature caution light and transmission oil bypass light came on. Caused by oil cooler fan bearing failure.

S series - Bird strike during flight caused crack in tail rotor 90-degree gearbox fairing.

AH-64 Class E mishaps

A series - During postflight inspection, after routine night mission, pilot noticed lower inboard portion of trailing edge on main rotor blade had separated. A 2-inch by 33-inch strip of outer skin had debonded. There were no indications of damage being caused by outside forces. Aircraft had been subjected to high winds and temperatures fluctuating from 0° F., to plus 46° F. several times in the 2-day period prior to blade separation. Subsequent inspections revealed similar debonding of main rotor blades of other aircraft at same location. Category 1 QDR has been submitted.

A series - During flight, master caution, primary hydraulics, and fluid low primary lights came on. Primary system hydraulic pressure gauges registered zero, but utility system was functioning normally. Primary hydraulic pressure line on left side of transmission had ruptured, causing loss of all fluid and pressure and resulting in failure of No. 1 hydraulic system.

A series - While aircraft was being taxied to rearm pad, hydraulic fluid was

noticed on side of aircraft. Inspection revealed fluid leaking from utility hydraulic area. Caused by failure of utility hydraulic manifold.

A series - Hot battery light came on during taxi. Battery assembly was replaced.

Observation helicopters

OH-58 Class C mishap

A series - Engine failed at 200 feet agl, 80 KIAS, during takeoff from recovery site. Aircraft was autorotated to area covered in sand dunes. Hard landing resulted in sheared drive shaft, torn fairing assembly, and drag pin mounts pulled out of casing.

OH-58 Class D mishap

C series - During flight down range for tactical training, pilot misjudged distance to trees. After shutdown, dents were found in main rotor blades, requiring replacement of one blade.

OH-58 Class E mishaps

C series - During termination of approach, engine-out light and audio came on. Engine was still operating, N2 and rotor tachometer were steady, but N1 was erratic. Caused by malfunctioning of N1 tachometer generator.

C series - N1 went to 130 percent during cruise flight, then dropped to 120 percent with engine at flight idle after landing. When engine was shut down, N1 went to 43 percent. Failure of N1 gauge caused false indications.

D series - During downwind NOE flight, pilot noticed tail rotor pedals had free travel of about 1 1/2 inches in each direction, followed by stiffness beyond that point. Problem couldn't be duplicated.

Fixed wing

OV-1 Class E mishaps

D series - During flight, smoke began coming from air-conditioning vents and outlets when system was turned to heating mode. Smoke abated when system was turned off. Caused by failure of electrical temperature control.

D series - During flight, right main landing gear indicated unsafe condition and gear was lowered manually. Caused by failure of down lock switch.

D series - During landing rollout, left main tire spun on wheel rim, causing inner tube valve stem to shear from tube. Tire deflated, but aircraft was stopped without loss of control or damage.

D series - During taxi for takeoff, No. 1 inverter, instrument power, and master caution lights came on and flight director failure warning flags unmasked. Ac power to flight instruments was restored when pilot placed inverter switch in emergency position. Caused by failure of No. 1 inverter.

U-21 Class A mishap

A series - Civil aircraft closed from below into U-21 at 7,000 feet. Three people in the Army aircraft and three others in the civil aircraft were killed. 8715.

Maintenance

OH-58 Class D mishap

C series - During test flight for vibrex check, tail rotor drive shaft cover came off and struck tail rotor. During preflight, crew failed to notice that drive shaft cover wasn't properly fastened to tail boom.

OH-58 Class E mishaps

A series - Inverter failed to come on line during runup. Crew chief had bridged two terminals with solder while working on cannon plug.

A series - Transmission light came on during flight. Freewheeling unit drain plug hadn't been properly seated and plug came out during flight.

C series - During flight, crew found VHF radio was inoperable. Antenna lead was disconnected.

Safety messages

• Safety-of-flight technical message concerning one-time inspection of forward and aft transmissions on CH-47A, B, and C helicopters (CH-47-86-11, 010200Z Jan 87). Summary: Purpose of this message is to perform a one-time records inspection and transmission inspection of all CH-47A, B, and C helicopters only. Investigation of a recent Boeing Model 234 mishap revealed that the spiral bevel ring gear,

(continued on back page)

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	5	6
2nd Qtr	January	3	4	1-21 Jan	1	3
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	10	13

Mishap briefs

P/N 114D1244-6 in the forward transmission had failed. A similar gear is used in Army CH-47A, B, and C forward and aft transmissions. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning one-time and recurring inspection of certain CH-47D aircraft rotor heads (CH-47-87-01, 121730Z Jan 87). Summary: CH-47D forward rotor heads, P/N 145R2003-1, and aft rotor heads, P/N 145R2004-2, currently require an inspection after 600 flight hours and every 100 hours thereafter per p. 1-312.1, TM 55-1520-240-23-1. A rotor head, P/N 145R2003-1, was recently inspected under the flight safety parts program and a crack was found in the spline root fillet extending to the lower side of the hub. This hub had 417 CH-47D flight hours. In order to ensure safe operation, the initial inspection time for these rotor heads, both forward and aft, is hereby reduced to 300 hours with 100 hours repetitive inspection thereafter. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning inspection of OH-58D aircraft (231400Z Dec 86). Summary: Preliminary report of an aircraft mishap investigation found fuel shutoff valve to be improperly rigged. Fuel shutoff valve was not fully open in the on position. This message provides procedures for inspecting and reporting fuel shutoff levers in OH-58D aircraft. Contact: LTC James Christie, AUTOVON 693-1309, commercial 314-263-1309.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

A fatal decision

emergency squawk from an aircraft in this area.

In the AH-1S aircraft, the UHF radio, transponder, and the NDB navigation radio are located on the right side of the aircraft, along the pilot's rightside console. To change frequency or select switch position requires the pilot to use his right hand and to turn his head to see what he is doing. This is particularly true of the UHF radio and transponder which are located to the lower right and rearward at the pilot's upper leg and hip position.

To make the calls on UHF guard, the pilot had to switch the radio to the emergency position. This action would cause him to transfer the cyclic to his left hand in order to use his right hand on the radio, and to divert his eyes and attention to the radio location. The same is true with the transponder, which is located even farther back on the right side console.

No one will ever know just why this pilot decided to deviate from his planned route of flight. This decision, and diverting his attention from flying and maintaining control of the aircraft to establishing communications and resetting the transponder, cost him his life and the life of his crew chief. His attempts at so many complex cockpit tasks caused him to divide his attention improperly, and he became disoriented and allowed the aircraft to crash. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
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Read and heed

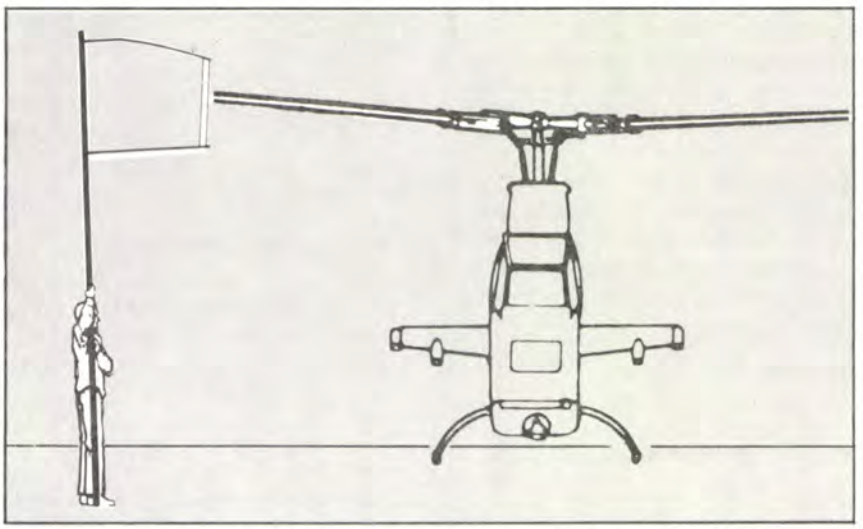
A maintenance test pilot (MTP) and two ground maintenance personnel were attempting to ground track the main rotor system on an AH-1. Ground personnel were using a tracking flag as referenced in TM 55-1520-236-23, p. 5-182. However, the lower guide arm tension cable attaching bolt on the flag had previously failed; therefore, the tape between the upper and lower arms was loose. It was the only flag available in the unit and, although it was unserviceable, it was being used anyway.

When the ground personnel arrived, the MTP had already started the aircraft and he failed to brief them on routine or emergency procedures or on visual signals to be used during the tracking procedure. Neither of the men outside the aircraft had direct ICS communications with the MTP. They were using hand or arm visual signals to communicate with him.

When signaled by the pilot, the two maintenance personnel stood the tracking flag up and attempted to maneuver it into the main rotor system. The lower arm of the tracking flag was not being pulled downward by the tension cable because of the problem with the tension cable attaching bolt; therefore, the tape, which was stretched between the upper and lower arms of the tracking flag, was extremely loose and vibrating into and out of the rotor disk.

When the ground personnel couldn't get a reliable second hit because of the flexing and vibrating tape, they lowered the flag and signaled the MTP that the flag wouldn't work and to shut down the aircraft. The MTP shook his head and signaled them to try again.

After trying to tighten the lower arm tension cable, they raised the tracking flag for another attempt. This time, the turning main rotor blades almost tore the tape in half. They lowered the flag and again motioned the MTP to shut down the aircraft. He signaled them to try again and the higher-ranking of the two men shook his head at the MTP. The MTP nodded his head in the affirmative and pointed to the main rotor blades.



At his insistence, they raised the flag into the rotor system for the third time. The tape flexed far forward into the disk. The abnormal upward pressure on the unsupported lower arm when the rotor blades contacted the tape caused the lower arm to fail at the attaching point. The now free lower arm, a piece of 2-foot-long, 2-inch pipe, was pulled into the operating rotor system, damaging the tip cap and main spar of the rotor blade.

Investigation showed that a piece of 1-inch-wide by 1/8-inch-thick braided nylon webbing was sandwiched between the multiple layers of green tape and securely fastened to the upper and lower arms of the tracking flag. When the tape flexed into the operating main rotor system, the braided strap prevented the tape from breaking, transmitting excessive force to the upper and lower flag arms. Whether or not the webbing was visible through the tape before the operation started couldn't be determined.

Among the errors made by this MTP were his failure to brief maintenance personnel on routine or emergency procedures and his failure to ensure that there was adequate communication available between ground personnel and himself. He also should have ensured that the tracking flag was serviceable. Probably the most serious mistake he made, however, was his failure to heed the signals of the ground personnel and his persistence in continuing the tracking operation without trying to find out what was wrong. Damage to the aircraft amounted to nearly $7,800. ■

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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 - During contour training flight to tactical landing site, large bird struck and broke left chin bubble.

H series - Aircraft was 3 to 5 feet agl, hovering to a taxiway at a civilian airport. By the time the pilot saw a wire stretched across the taxiway, it was about 10 feet inside rotor disk. Wire was cut during backup maneuver. One of the poles supporting the wire was concealed by a building and the other by trees.

UH-1 Class E mishaps

H series - During NOE flight, engine oil pressure gauge fluctuated then dropped to zero. Caused by corroded cannon plugs.

H series - Aircraft was in NOE flight when pilot heard three sharp reports, aircraft yawed, and vibrated. Cause of compressor stall is unknown. During engine response check, compressor again stalled and aircraft was recovered for teardown inspection.

H series - Copilot opened his door to clear aircraft for start. Rotorwash from an aircraft hovering to the rear blew door open, cracking upper hinge. Interior portion of door post pulled away from bulkhead.

H series - As aircraft was picked up to hover, pilot felt binding in aft quadrant of cyclic. Caused by corrosion on synchronized elevator bellcrank bearings.

H series - During ground run, master caution and engine-driven fuel pump segment lights came on. Caused by failure of sending unit for engine-driven fuel pump.

M series - Aircraft had been in flight about 30 minutes when No. 1 hydraulic system warning light came on. Caused by electrical short in caution warning system.

V series - Aircrew, wearing NVGs, were attempting to land in a confined area. When pilots saw people running into the landing zone, aircraft paused. As attempt to land continued, pilots were again distracted by movement of people beneath the aircraft and allowed the helicopter to drift into a tree.

UH-60 Class A mishap

A series - Aircraft was in traffic pattern, on downwind leg of NVG flight, when it struck the ground, right side low, and bounced onto its right side. The main rotor blades and tail rotor cone separated from the aircraft. 8716.

UH-60 Class D mishap

A series - During runup, crew heard loud whining noise from No. 2 engine. All other indications were normal and mission continued. After return, pilot requested maintenance check on engine. A borescope inspection showed bent turbine blades in compressor. May have been caused by ice ingestion during runup.

UH-60 Class E mishaps

A series - During IMC flight at 10,000 feet msl, aircraft encountered visible moisture with temperature at minus 13° C. Engine anti-ice and rotor deice switches were on. Copilot's master caution, low rotor rpm, and engine-out lights came on and central display unit lights illuminated up full scale. After aircraft returned to VFR conditions and anti-ice and deice switches were turned off, all lights went out. Cause is unknown, incident couldn't be duplicated under VFR conditions. Investigation showed same type of incident had occurred twice before in similar environmental conditions and aircraft configurations.

A series - While simulating ITO after takeoff, flightpath stabilization (FPS), caution, and airspeed failure advisory lights came on. Pilot's airspeed indicator showed 10 knots and copilot's 100 knots. After being reset, FPS immediately failed again and stabilator also failed. Automatic reset wouldn't engage. Ice found in lines of pilot static system may have been cause of airspeed indicator not working properly.

A series - During approach, No. 2 reservoir low, boost, and stability augmentation system off lights came on. Caused by pitch trim failure.

A series - About 15 seconds into start, turbine oil temperature began rapid rise. At 800° C., pilot disengaged starter and turned fuel and power control levers off. TOT reached 960° C. before dropping rapidly to below 500° C. Pilot was slow to react with hot start procedures outlined in operators manual.

Attack helicopters

AH-1 Class B mishap

S series - During IP training in low-level autorotation, pilot decelerated too high. The aircraft fell through, striking the ground and severing the tail boom. Rotor blades, landing gear, and drive train were damaged. 8717.

AH-1 Class D mishaps

F series - Aircraft was in flight about 1 mile from airfield. Crew felt left yaw but thought it was caused by turbulence from wind gusts. Ground personnel noticed engine door open and notified tower. After landing, pilot found left engine cowling was open but damage appeared to be limited to a dent. Additional damage to door was found during postflight inspection.

F series - Damage during closed-circuit refueling was caused by refueling personnel's failure to keep refueling

nozzle perpendicular to CCR port.

F series - With the exception of low rotor rpm at touchdown, IP reported standard autorotation maneuver conducted as part of contact transition training was normal. When helicopter touched down slightly heels low, the result was 3 to 4-inch ballooning of aircraft. Crew felt severe vibrations in the entire airframe during 30-foot slide. Damage to viscus dampeners and main rotor push/pull rods amounted to more than $4,000.

AH-1 Class E mishaps

F series - During start, crew heard loud rumbling noise coming from rear of aircraft. Caused by failure of tail rotor drive shaft hanger bearing.

F series - As aircraft was being hover taxied to refueling point, crew heard squeal coming from hydraulic pump, and No. 1 hydraulic caution and master caution lights came on. During postflight inspection, No. 1 hydraulic reservoir was found empty and fluid could be seen leaking near yaw SCAS actuator. Caused by faulty hydraulic O-ring.

F series - Crew felt cyclic binding during hydraulic checks as aircraft was run up. No. 1 hydraulic system was bleeding over to No. 2 hydraulic system. Caused by failure of dual hydraulic servo.

S series - Copilot was on controls during NOE tactical training flight. During accelerating right turn at 10 to 15 knots, copilot applied excessive collective pitch, causing overtorque to 62 psi before pilot could react.

S series - Aircraft made several uncommanded roll SCAS inputs. Caused by internal electrical failure of roll SCAS card.

AH-64 Class C mishap

A series -Aircraft was at OGE hover just short of firing point. IP, who was at controls, diverted his attention inside the cockpit and aircraft began slight descent. When he became aware the symbology/imagery was changing on his helmet-mounted display, the IP's attention was drawn back to pilot night vision sensor and he immediately increased collective pitch to arrest the descent. As the aircraft began climbing, the crew felt lateral vibration and heard an unusual noise from the main rotor blades. Damage to trailing edge of all four main rotor blades amounted to more than $54,000.

Cargo helicopters

CH-47 Class E mishaps

A series - During final approach, flight crew noticed slight increase in aircraft vibration but attributed it to increasing winds. As aircraft was being shut down, crew chief reported that the rotor blades were making an unusual sound. During postflight inspection, No. 11 pocket of aft blade was found unbonded and beginning to peel back.

C series - Rotor tachometer failed during flight.

C series - As aircraft touched down, rpm and torque on No. 2 engine increased, resulting in high-side beep failure. Engine condition lever was used to control No. 2 engine, and aircraft landed without damage. Caused by loose cannon plug.

Observation helicopters

OH-58 Class A mishap

C series - While hovering in snow, aircraft rolled over and was destroyed. 8718.

OH-58 Class D mishap

C series - While copilot was performing NOE deceleration, aircraft began settling toward the ground. When collective was increased, transmission torque reached 120 psi for 2 seconds. Transmission will be replaced.

OH-58 Class E mishaps

A series - Aircraft was downwind to depart traffic pattern when engine tachometer generator quit. While on base leg, returning for landing, aircraft did momentary left and right shuffles, then smoothed out and all indications were normal. Crew then heard a loud whine which increased in volume. Engine quit on final and crew autorotated aircraft to runway. Diffuser tube on engine, leading from compressor to hot end, had

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	1- 28 Jan	3	3
	February	3	2			
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	11	13

cracked in two. Lack of airflow caused engine to quit. Other diffuser tube also showed a small crack.

A series - When pilot attempted to start aircraft, N1 gauge needle wouldn't rise above zero. Needle still would not rise when battery was replaced. Caused by failure of N1 tachometer generator.

A series - Aircraft was 500 feet over water at 100 KIAS. N2 rpm decreased to 96 percent and low rotor rpm warning light and low rotor audio warning came on. IP took controls, reduced collective pitch, and rpm returned to normal. Loss of engine power couldn't be duplicated, but excessive play in throttle was found. Throttle linkage was rerigged.

C series - Landing to refuel after test flight, pilot rolled throttle to engine idle and engine decelerated to 55 percent N1. Thinking he might have bumped the idle detent, pilot closed the throttle and shut down the aircraft. During attempts to restart engine, TOT rose and engine wouldn't respond to throttle increase. Caused by failure of fuel control.

C series - During maintenance test flight at 2,000 feet agl, pilot began check of autorotation rpm. Sprag clutch failed to disengage and aircraft landed.

C series - Aircraft was being started in below zero temperatures. As starter was engaged, N1 peaked at 13 percent. As throttle was opened, crew heard loud sharp reports from engine, and TOT went to 830° C for 2 seconds. Cold weather caused bleed air valve to freeze in open position.

Fixed wing

C-7 Class E mishap

A series - During takeoff and climbout, No. 2 engine rpm lagged behind No. 1 engine until aircraft reached 60 KIAS. While passing through 3,000 feet msl, No. 2 engine oil pressure began decreasing and oil temperature began increasing. As aircraft leveled at 5,000 feet msl, oil pressure decreased to 50 psi and oil temperature reached a maximum of 93° C. Caused by excessive leaking of engine supercharger oil seal.

OV-1 Class D mishaps

D series - Pilot was told by IP to perform a go-around from slow flight at 10,000 feet msl and 85 KIAS. After performing go-around, pilot began acceleration to normal cruise flight. At about 150 KIAS, both pilots felt an unusual airframe shudder. IP took control, reduced power, and asked pilot to check his side of aircraft. Pilot reported what appeared to be a flap or inboard aileron protruding from beneath the wing, but cockpit indicators showed gear and flap controls were in their proper positions. Pilot then observed that the left main gear long door was separating from the wing at the hinge point. An improper leaf butt hinge had been installed at the upper attachment. When it failed, the lower connecting rod was all that secured the door to the aircraft. The IP reduced airspeed and landed without further damage to the aircraft.

D series - Aircraft had performed aerobatic maneuvers for about an hour. During recovery portion of a high-speed dive, pilot's hatch opened, causing damage to window plexiglass and frame.

OV-1 Class E mishap

D series - During fuel boost pump check, boost pump caution light came on. Caused by failure of forward fuel boost pump.

SD-3-30 Class E mishap

During final approach, left main brake system showed zero pressure. Insufficient hydraulic fluid in slave cylinder allowed air to enter pressure indication system, causing erroneous pressure reading.

T-42 Class E mishap

A series - During takeoff roll, crew heard a popping noise and right alternator went off line. Left alternator indicated only minimal load. Buzzing noise developed in both pilots' headsets. Climbout continued as pilot cycled voltage regulators and reset alternators. Battery charge light never came on. As crew maneuvered to enter traffic pattern, aircraft had complete electrical failure. Cause is under investigation.

Maintenance

AH-1 Class E mishaps

E series - Master caution and fire lights came on during hover. Temporary repair of difficult location on cannon plug in fire detection system wiring harness resulted in a cold solder joint which failed due to vibration during flight.

F series - When additional power was added to bring aircraft to hover, pedals wouldn't move full travel. Electrical conduit was rubbing control tube for antitorque pedals. Conduit was repositioned.

CH-47 Class E mishap

C series - During engine runup, crew noticed aft transmission filter button was out and wouldn't reset. Aft transmission oil psi was set too high for cold weather at time of the incident.

OH-58 Class E mishaps

A series - As power was applied for takeoff, master caution and engine oil low pressure lights came on. Caused by loose engine oil cap.

C series - From pilot's station, excessive right cyclic was required to maintain stationary hover. Copilot's cyclic was centered. Caused by pilot's cyclic out of rig. The friction collar that receives pilot's cyclic stick does not have a notch or alignment pin. During scheduled maintenance, the cyclic had been pushed hard enough to cause it to slip in the collar.

T-42 Class E mishap

A series - When power was reduced for descent, right engine failed. Engine was restarted, but ran rough and again failed. Cotter pin was missing from right throttle linkage.

Safety messages

• Safety-of-flight technical message concerning inspection of K747 blade root fitting assembly on AH-1/TH-1/TAH-1 aircraft (AH-1-86-12, 200300Z

Mishap briefs

Dec 86). Summary: AVSCOM safety-of-flight emergency message (AH-1-86-09, 210030Z Nov 86) reported failure of two K747 root fittings and mandated separate inspection and collection of all serviceable fittings located at depots. During this inspection, a third cracked fitting was found which showed the same type of failure as the others. Investigation of the first failures revealed unusual failure mode assessed as stress corrosion. Analysis of the third cracked fitting confirmed the failure mode. Initial data indicated that low-flight-time parts were most likely to have the defects. Analysis now dictates that all root fittings be inspected. The purpose of this message is to prohibit all flight operations for AH-1, TH-1, TAH-1 helicopters configured with K747 root fittings until a special depot-level enhanced ultrasonic inspection can be performed. Ground runs at flight idle are still authorized. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message concerning flight restrictions on OH-6A and OH-58A aircraft with T63-A-700 engines (OH-6A-87-01 and OH-58A-87-01, 121900Z Jan 87). Summary: The purpose of this message is to furnish procedures which will allow lifting of flight restrictions imposed by safety-of-flight operational messages OH-6A-86-10, OH-58A-86-05, OH-6A-86-12, and OH-58A-86-11. Contact: Dick Mooy, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Correction

In the 17 December 1986 issue of *Flightfax*, an error in the description of an emergency for which an IP received a Broken Wing Award causes his subsequent actions to be misleading.

Mr. Jamie F. McKenzie, Pan Am Support Services, Inc., was IP on a UH-1H which had a complete loss of tail rotor control. Returning the aircraft to the airfield, Mr. McKenzie intercepted a shallow approach angle, reduced power to establish the rate of descent, and began slow deceleration with cyclic to keep use of collective at a minimum. The aircraft's skids were about 1 foot off the ground, at 20 to 25 KIAS, when the aircraft's nose began turning *right* (not left as stated). Mr. McKenzie reduced throttle to keep the nose aligned and allowed the aircraft to touch down. He continued to reduce throttle to maintain alignment and reduced collective to slow the ground run. As the aircraft slowed, the nose slid slightly right of centerline with collective full down and engine throttle at idle. Mr. McKenzie applied cyclic and brought the aircraft to a stop on centerline, 20 degrees right of runway heading. The aircraft was undamaged.

— thanks to CW3 Young, West Virginia ARNG, for bringing this to our attention. We appreciate readers who take the time to call or write to help us make *Flightfax* serve you better.

Put it down, and leave it down

"Following emergency actions, the helicopter shall not be flown until corrective action has been taken." If the pilot of an AH-1 had followed the instructions in paragraph 9-3 of TM 55-1520-236-10, he could have avoided some of the damage sustained by his aircraft.

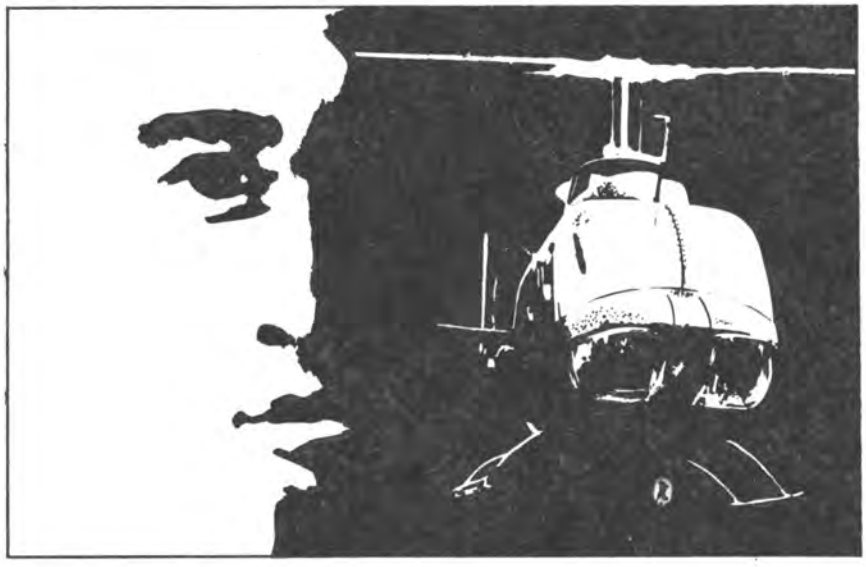
The trouble started during a maintenance test flight to complete phased maintenance of the AH-1. Preflight and normal postphase runup checks had revealed no grounding deficiencies in the aircraft, and it had been hovered twice for main rotor balance adjustments with no problems. Then the aircraft was started, hovered 50 feet to an area where a HIT check was performed, and again lifted to a hover. This time, two loud bangs were heard from the engine area. The aircraft landed and the maintenance test pilot and technical inspector agreed the noises probably were compressor stalls.

Although he suspected compressor stalls, the pilot chose to move the aircraft to a parking area 50 feet away for further troubleshooting. He brought the helicopter to a hover and while en route to the parking area, seven more loud bangs were heard coming from the engine area.

The damage sustained by this aircraft resulted from human error. First, although the technical inspector made an FOD inspection after installation of the particle separator, he failed to detect a loose nut in the engine inlet area. The nut must have been there before the particle separator was installed because there was no evidence that it had passed through the separator. A detailed FOD check before and after installation of the particle separator is specified in all powerplant tasks in Soldiers Manual STP 55-66Y-23-SM and is implied in paragraph 5-167, p. 5-49 of TM 55-1500-204-25/1. The unsecured nut was between the particle separator and the engine bellmouth, in a place difficult to visually inspect. When the nut was ingested into the engine, it damaged the compressor blades. The damaged blades interrupted the laminar flow of air, resulting in compressor stalls.

The second human error was made by the pilot. He performed the correct emergency procedures after the initial two compressor stalls. His error occurred when he continued to fly the aircraft after the problem had been detected. His concern with returning the AH-1 to the parking pad, where he could troubleshoot it, led him to take off again when he should have left the aircraft where it was. His continued operation of the aircraft is suspected to have caused additional damage to the drive train components due to the amount of instantaneous load damage caused by the additional compressor stall. ■

Human error multiplied



During autorotational check on a maintenance test flight of an OH-58A aircraft, engine rpm didn't decrease when the pilot reduced throttle to engine idle. The pilot rolled the throttle back on, but needles didn't split. N2 rpm and rotor rpm had increased with collective full down and slight overspeed had to be controlled with the governor. The test flight was aborted.

During shutdown, the engine couldn't be controlled with throttle and the engine had to be shut down by using the emergency fuel handle. During postflight inspection, disconnected throttle linkage to fuel control arm was found.

Numerous human errors were found during investigation of this incident.

- Aircraft components had been partially disassembled before arrival at the maintenance units, but no entries were made on maintenance forms.
- The unit assigned an AH-1 maintenance team to perform the maintenance because of a shortage of school-trained OH-58 personnel.
- One page of engine removal maintenance forms was missing from aircraft records.
- The bolt connecting throttle linkage to fuel control had been removed and linkage reconnected to fuel control with safety wire.
- Engine maintenance had not been properly signed off in accordance with DA Pamphlet 738-51.
- Improperly installed throttle linkage had not been detected during TI, PMO, or preflight.

Every one of these omissions and commissions could have easily been avoided. The fact that an accident didn't result from so many errors may have only been sheer luck. Don't let aircrew's lives depend on being lucky. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
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Night vision flying: A special report to the field

This report was prepared to provide the aviator, crewmember, commander, and others involved in NVG operations, training, and development with information on night vision flying. It is not nor is it intended to be a "how to" report.

Without debating tactics, it is clear that for our aviation force to be effective on today's battlefield it needs to fly low and use the terrain to mask and protect itself. To do this at night, night vision devices are absolutely necessary.

We at the U.S. Army Safety Center believe that operations at night can be performed safely with night vision devices. The key, though, is to understand the limitations inherent in the night vision devices, in our aircraft, and in ourselves. We need to understand that night vision devices do not turn night into day. They greatly enhance our ability to fight at night, but there are limits.

History of night vision flying

In 1969, the Army used a goggle-type device, on a limited basis, as a pilot's aid in night flying in Southeast Asia. In 1972, the U.S. Air Force used SU50 electronic binoculars for night search and rescue missions.

Tests conducted by the Land Warfare Laboratory and Combat Developments Experimental Command concluded that helicopters engaged in mid-intensity warfare must operate at nap-of-the-earth (NOE) altitudes during day and night. In 1973, the AN/PVS-5 was accepted as an interim—quick fix—pilot's night vision system.

In October 1976, AN/PVS-5 night vision goggles (NVG) entered the training and standardization field at the Aviation Center, Fort Rucker, Alabama. Four standardization instructor pilots (SIPs) began developing a flight and academic program to qualify rated aviators with the NVGs. The program consisted of 10 to 12 hours of unaided night hawk training and 10 hours of NVG flight.

In 1977 and 1978, the Aviation Center continued to train and qualify NVG instructor pilots for conducting a 4-hour NVG familiarization course with initial entry rotary wing (IERW) students.

In 1978, IERW students began to receive the 4 hours of NVG familiarization during their syllabus of training.

In 1983, based on a stated need from the field, the first IERW class graduates were NVG qualified. In November 1983, an NVG Instructor Pilots Course was established at the Aviation Center. Graduates of this course support field commands by conducting refresher, currency, sustainment, and mission training.

Early trials and errors

In 1976, the Night Vision Lab delivered four sets of AN/PVS-5 NVGs to the Aviation Center. It was an established fact that ability to see in the dark would enhance the aviation mission. However, without written doctrine on how the goggles would be used there were no procedures for training pilots. A program was established based on developing flying skills around the traffic pattern and emergency procedures. This would later prove to be a negative reinforcement in preparing aircrews to meet the demands of an NVG mission in the combat environment.

The inherent limitations of the NVGs, such as limited field of view, reduced visual acuity, and inability to quickly analyze emergency situations made the stagefield traffic pattern the logical arena for training. This controlled and sterile environment offered the best potential for numerous aircraft operations under near lights-out conditions.

Pattern altitudes were 500 feet agl and airspeeds were 90 to 100 knots. The tasks accomplished closely resembled day VFR contact maneuvers. Additional emphasis was placed on low-level autorotations and running landings. During this period, no tactical or terrain flight tasks were conducted with NVGs.

At this time, commands worldwide were beginning to receive NVGs and limited numbers of NVG instructor pilots. Commanders, recognizing the enhanced mission capability provided by NVGs, aggressively pursued establishing a program to perform NVG missions within their area of operation. The profile for these missions, when executed routinely, included multi-aircraft in tactical formations operating

at contour and NOE altitudes. Airspeeds varied from 30 to 100 knots, and navigation was required by map interpretation. This mission profile, when coupled with external load operations, placed aircrews in an "alien environment."

The field missions in no way resembled the flight parameters taught during NVG qualification training. The traffic pattern had provided aircraft separation by ATC personnel, obstruction clearances by altitude, and orientation by familiar surrounding areas. Aircrews were now trying to navigate over unfamiliar terrain, fly as close to the earth's surface as vegetation permitted, and maintain the integrity of a formation. Capabilities gained during qualification training were quickly exceeded by mission task loading.

More recent experience

During the 18-month period from 1 October 1982 through 31 March 1984, NVG-related accidents resulted in 17 fatalities and the loss of more than $20 million. Because of this, the Vice Chief of Staff of the Army reclassified NVG flight from a mission enhancement capability to a safety-of-flight issue.

Investigations indicated that 90 percent of the NVG accidents occurred during tactical terrain flight. Low ambient light and excessive airspeed for conditions were considered contributing factors. Accident reviews and staff studies conducted by experts in the training and standardization field indicated radical changes were needed in the qualification course.

In 1984, emphasis at the Aviation Center was shifted from the stagefield traffic pattern and its associated tasks to the terrain flight environment and tactical tasks. Aircrew preparation for NVG tactical missions required training in a similar mode of flight. Although some traffic pattern flight is still required during early training, it too is now accomplished at a much lower altitude and slower airspeeds. Currently, 85 percent of qualification training is conducted in the tactical terrain flight mode.

An NVG workshop symposium was hosted by the Army Aviation Center in February 1984. Field users, combat and materiel developers, and manufacturers attended the symposium. A broad level of experience in NVG operations (SIPs, IPs, ASOs, operations officers, company and battalion commanders) was represented.

The purpose of the workshop was to address and rectify voids existing in NVG training guidance. The efforts of the group were oriented towards standardizing NVG tasks and missions, enhancing safety, and improving combat readiness. The results of the workshop and other coordinating meetings at HQDA were provided in message HQDA DAMO-TR/FD, R312016Z May 84. This message provided the Army's policy on NVG flight training and operations. It included qualification and currency requirements, NVG operation restrictions and definitions, and NVG PIC, unit trainer, and IP criteria.

As a follow-on to this message, the Aviation Center published FC 1-219, NVG Aircrew Training Manual, in December 1984. The manual contains information from the HQDA message and other NVG selected data.

In the "early days," there was a lot of experimentation with NVGs. Several different aircraft NVG compatibility modifications were developed. Some were adequate and some were not. Oftentimes, the users did not define exactly what was needed and, just as often, the developers did not listen. Also, as soon as a modification was developed, a "better idea" would come along. Units were developing NVG procedures and trying to maximize the mission capabilities provided by NVGs.

Mistakes were made, but there were also some successes. PVS-5s were modified by cutting away the face plates, eliminating the need to focus in/focus out. Information was provided in Aviation Center booklets on dual battery packs and counterbalance systems. Aircraft NVG compatibility modifications were improved and their application expedited. IERW students were being NVG qualified, and aviators night vision imaging system (ANVIS) goggles were beginning to be fielded. But problems still remain.

Rising trend in NVG-related accidents

In the last three fiscal years, there has been a rising trend in night vision device-related accidents because we are flying more in this high-risk environment (fig. 3).

Figure 1 shows the number of Class A accidents at night and those accidents which occurred while night vision devices were being used. In FY 84, 14 percent of these night accidents involved night vision devices. In FY 85,

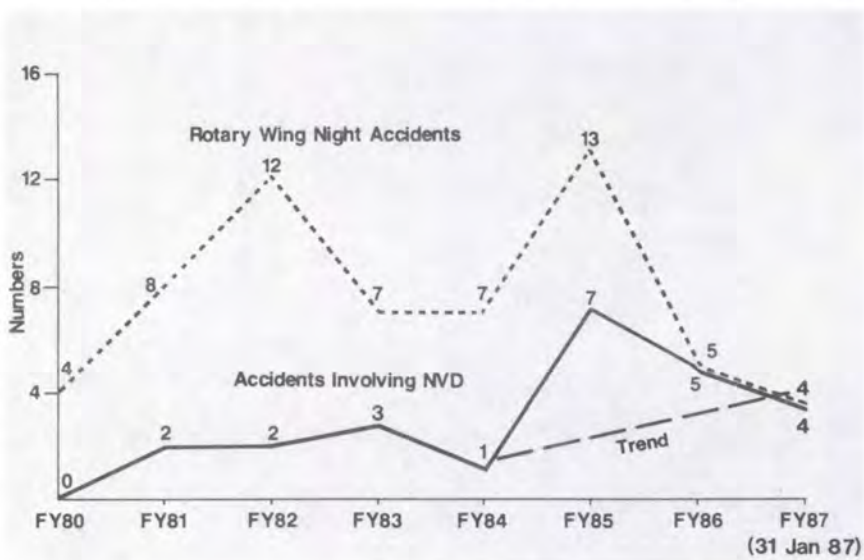


FIGURE 1. - Class A rotary wing night accidents and those involving use of night vision devices

53 percent involved night vision devices. In FY 86 and so far in FY 87, all of the night Class A accidents involved use of night vision devices.

Table 1 shows rotary wing Class A through C accidents involving night vision devices from FY 80 to 31 January 1987. Table 2 breaks out the Class A, B, and C night accidents by each type aircraft.

Increasing mission demands and training risks

Fifteen to 20 years ago when we flew observation missions at altitudes under VFR conditions, risks were relatively low. When the mission profile expanded to include tactical instrument flying, risks increased. As we gained proficiency in TAC instruments, the risk factor leveled off. But it was still greater than before TAC instruments.

Next came NOE flying. Again, the level of training risk rose in proportion to increased mission difficulty. The downward turn in risk associated with NOE operations shown in figure 2 may have been the result of new improved aircraft systems coming into the inventory. In any case, the overall risk level for sustained operations was still greater than before adopting NOE tactics.

TABLE 1. - Rotary wing Class A, B, C accidents involving use of night vision devices

FY 80 - 31 January 1987

ACFT	TOTAL A-C	FATALS	INJURIES	DAMAGE COST	INJURY COST	TOTAL COST
AH-1	19	4	4	$6,843,689	$1,362,090	$8,205,779
AH-64	2	0	0	1,076,544	-0-	1,076,544
CH-47	3	12	0	10,048,642	2,254,000	12,302,642
OH-6	3	0	0	755,866	6,848	762,714
OH-58	14	8	3	1,191,637	1,708,520	2,900,157
UH-1	10	0	10	2,821,942	205,370	3,027,312
UH-60	28	8	17	38,668,415	1,765,220	40,433,635
TOTALS	79	32	34	$61,406,735	$7,302,048	$68,708,783

TABLE 2. - Rotary wing accidents involving use of night vision devices by classification

FY 80 - 31 January 1987

AIRCRAFT	CLASS A	CLASS B	CLASS C	CLASS A-C
AH-1	5	1	13	19
AH-64	1	0	1	2
CH-47	2	1	0	3
OH-6	1	1	1	3
OH-58	6	0	8	14
UH-1	4	1	5	10
UH-60	8	1	19	28
TOTALS	27	5	47	79

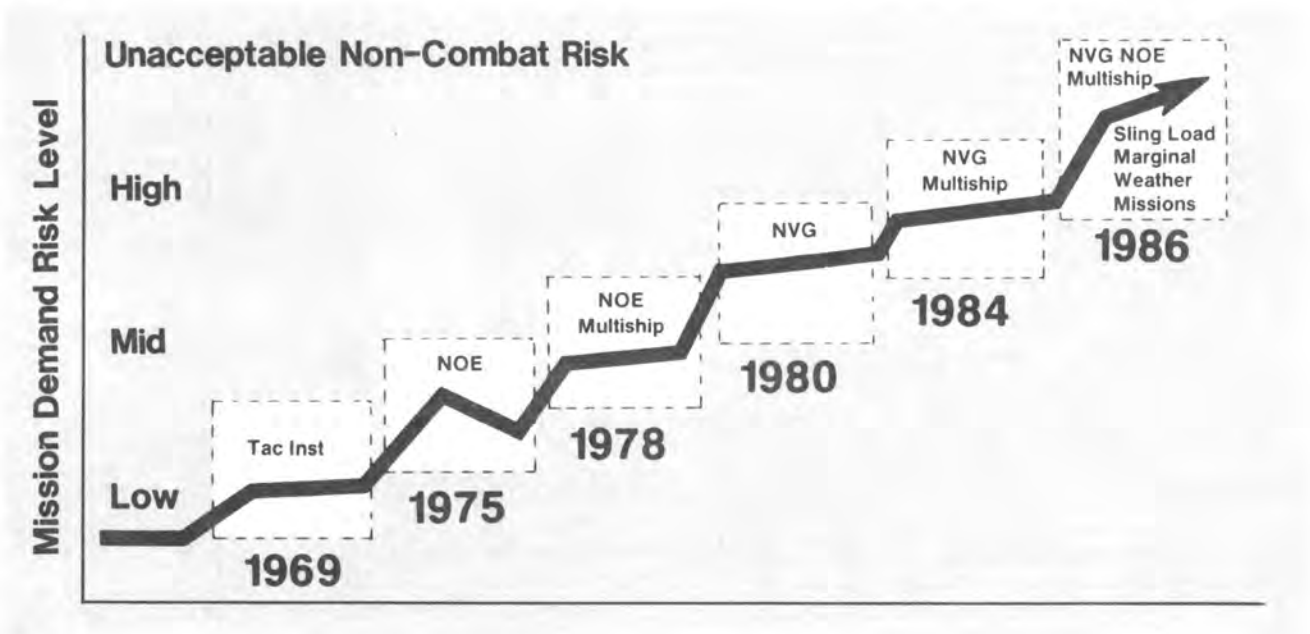


FIGURE 2. - Evolution of the Army aviation mission

Night vision flying

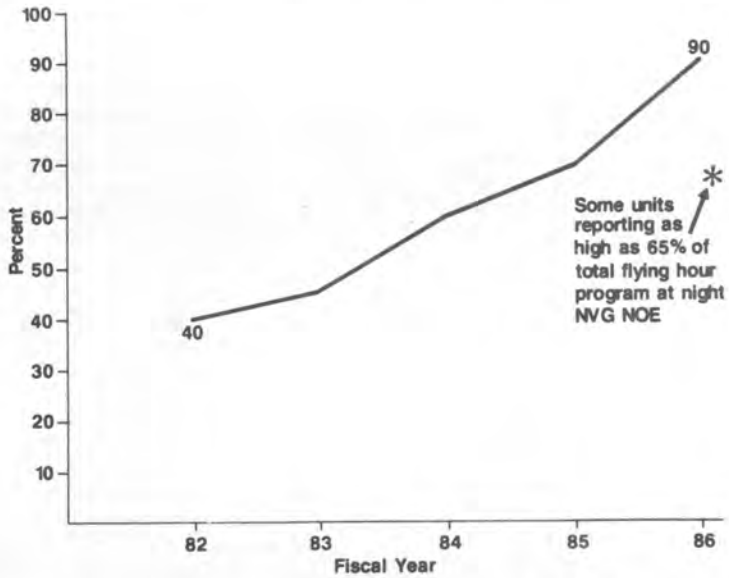


FIGURE 3. - Exposure to high risk environment (Percentage of total flying hour program)

The mission risks increased again as we began operating more in the night tactical environment. While night vision goggles expanded capability, they also increased demands placed on aircrews and equipment. These demands produced a corresponding increase in training risks. The inherent risk associated with NVG flying has continued to increase rather than leveling off, as in the case of tactical instruments, or decreasing, as in the case of NOE flying. TAC instruments and NOE are oriented toward specific tasks, conditions, and standards. On the other hand, NVG flying applies to a much broader range of complex tasks, conditions, and standards. This broader range of application is the primary reason for the sustained increase in risk while using NVGs.

Army aviators are flying more and more in the high-risk environment. The percentage of exposure shown in figure 3 is based on data from four of our combat-ready divisions. High-risk environment is defined as tactical, night, NVG, slingload, and hoist missions. Flight in this environment reduces the pilot's safety margin, increasing the chances that human error will result in an accident.

Because we are flying more in this high-risk night environment, we are having more accidents with night vision devices in use. A review of some of these accidents provides some insight into common trends.

Night vision device (NVD)-related accident briefs

• OH-58 No. 1 was cleared for south departure from lane 2 in west traffic. OH-58 No. 2 was cleared for takeoff from lane 3 in east traffic. No. 1 drifted left and No. 2 drifted right. The two aircraft collided 600 meters south of the lanes. The IP of OH-58 No. 2 failed to detect and correct for an incorrect ground track being flown by his student

Two OH-58s collided shortly after takeoff for NVG training flight.

During low-level NVG training flight, UH-60 struck a tree and crashed.

pilot because of one or more of the following: NVG visual limitations, lack of adequate ground references, loss of visual cues on the ground due to "shutting down" of the NVG as the moon was directly viewed, distraction of another aircraft making a go-around and climbing out overhead, significant change in wind direction and velocity encountered during climbout, and relative inexperience as an NVG IP. Result: four fatalities and cost of $1,064,680.

• CH-47 flew into island during night overwater navigation training mission. CH-47 was lead aircraft in a flight of two conducting NVG training over a lake. Illumination was reported as being at or near zero percent. The lead aircraft was 75 feet above the water at 100 knots airspeed. The crew of the lead aircraft did not see the island in time to avoid impact. The crew thought the island was a fog bank and they were off course. Result: six fatalities and cost of $5,480,478.

• UH-60 was No. 2 in a flight of three aircraft involved in a low-level NVG proficiency training flight. As the flight proceeded up a narrow valley, with the No. 2 aircraft to the right of the lead aircraft, at an airspeed of about 40 knots and an altitude of about 100 feet agl, the No. 2 aircraft's main rotor blade hit a 75-foot tree on rising terrain to the right of the aircraft. The UH-60 went into an immediate right bank, yawed left, and crashed into trees, coming to rest on its right side. Moon illumination was 86 percent and 30 degrees, but the tree that was hit was in shadows. The day recon of the route was flown at 500 feet agl and the NVG mission was flown at 100 to 200 feet agl. Result: four fatalities and cost of $6,208,700.

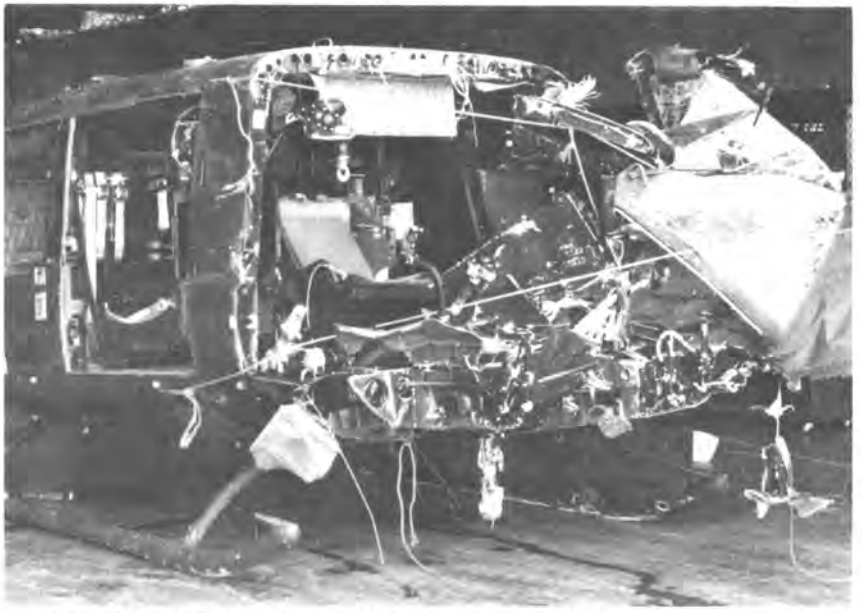
• A UH-60 crew was performing NVG training at an Army airfield in the traffic pattern because the conditions were not adequate to train in the training area. During the turn from crosswind to downwind, a caution/master caution light came on and the aircraft was allowed to descend 200 feet and crash. As the aircraft flew crosswind to downwind, there was no visible horizon. The terrain was snow-covered fields. Result: $4,650,820 in cost.

• While on training flight over lake, IP allowed UH-1 to descend into water at 80 knots. Crew became spatially disoriented. Result: $967,075 in cost.

• CH-47 and AH-1 collided while flying low level along an "approved" terrain flight transition route. The route had not been surveyed for NVG use and adequacy. Neither aircrew initiated any evasive maneuver, and it is probable they never saw each other. A contributing factor was limited visual acuity, depth perception, and peripheral vision of the PVS-5. Result: eight fatalities and cost of $8,762,356.

• AH-64, the No. 2 aircraft in a flight of six, hit a powerline support tower and wires and crashed. Crew was unable to detect support tower and wires with PNVS at sufficient range to perform evasive maneuver. Result: $1,022,476 in cost.

• UH-1 was making an approach to an unlighted sod area. The pilot was using, for a reference point, the position lights of a UH-60 that had just landed. The approach angle was too steep and



While on NVG training flight, IP allowed UH-1 to descend into lake.

Night vision flying

Two UH-60s collided during NVG formation flight.

the rate of closure excessive. The UH-1's tail rotor hit the UH-60. Result: $4,703,682 in cost.

• Two UH-60s returning from separate NVG training flights joined up to practice NVG multi-helicopter/formation flight. During an attempt to change lead by using an "overtake" method, the aircraft collided. Result: three fatalities and cost of $10,155,820.

• OH-58, with an IP and student pilot on board, was returning to an Army heliport as chalk 2 in a flight of five on a special VFR clearance at night with NVGs. The OH-58 was seen to enter clouds/fog at a greater than normal rate of descent and crashed. Result: two fatalities and cost of $428,782.

Analysis of these NVG-related accidents and all other Class A through C NVG-related accidents from FY 80 to the present clearly reveals a costly learning curve in the use of NVGs in 1980 to 1983. With the full-face PVS-5 goggles, the need to focus in and out was a contributing factor in some accidents. In virtually every Class A accident, the crew was flying far too fast for conditions and ambient light. Slower airspeeds helped reduce risks. Modified aircraft with infrared lights also helped reduce risks. Improved night vision devices are in the future, and that will also reduce risks.

Analysis shows that most NVG accidents from FY 84 to the present have been caused by spatial disorientation, flying too fast based on the visual cues and conditions present, wire strikes, or failure to see other aircraft. And the trend in Class A NVG-related accidents continues to increase.

Night vision flying workshop

Because of this increasing accident trend, the Army Safety Center conducted a night vision flying accident prevention workshop in December 1986. The purpose of the workshop was twofold: to gain a better understanding of how field units train and operate with NVGs in the high-risk night tactical environment and to define issues and develop lessons learned from operational experiences and NVG-related accident data.

Representatives from numerous Army commands, field units and agencies, the U.S. Navy, and U.S. Marine Corps attended the workshop. A broad range of NVG expertise was present. Lessons learned were developed, circumstances leading to the majority of NVG-related accidents were identified, and 17 issues were developed relating to NVG materiel, maintenance, supportability, safety, and operational concerns. These issues and other NVG-related subjects were briefed to the VCSA on 31 January 1987. As a result, the VCSA tasked the Army Staff to solve the issues. Additionally, the USAAVNC has established a night vision study group composed of subject matter experts to review the entire spectrum of night vision flying. The efforts of this study group and the results of a worldwide night vision users conference, scheduled for late March/early April 1987, will result in corrections for issues defined and taskings to the appropriate Army agency to correct any which remain unresolved.

Lessons learned from the workshop

• Do not conduct NVG training in areas of good contrast only and then try to operate in areas of low contrast.

• Train progressively. Start with and master the basic skills before going on to the more difficult ones.

• Train as a total crew. Oftentimes the difference between avoiding an obstacle and hitting it are the NVG-trained and -equipped crewmembers in the rear of the aircraft providing clearance information to the pilots.

• PVS-5 NVGs cannot "see" wires because of the "frequencies" involved. ANVIS can "see" some wires that PVS-5 cannot.

• Adjustment of the NVG is critical. If the tubes are not adjusted properly to match the "spread" of a crewmember's eyes, optimum visual acuity and depth perception will be affected.

• One way to check the serviceability of the NVG is to set up a room with NVG-compatible lighting, a $1.98 visual acuity chart, and a 20-foot viewing range. View the chart through the NVG first with one eye closed and then the opposite eye closed to determine what visual acuity is for each tube. If the tube acuity is different, then another set of goggles should be used.

• Well defined procedures must be developed and followed before operating with PVS-5-, ANVIS-, and PNVS-

equipped aircraft/crews in the same training area. Each has different capabilities and limitations which must be taken into consideration.

• NVG routes and operational procedures must be validated for adequacy. Checkpoints are often "choke" points. Ensure procedures clearly define where aircraft are to be and the required communication. Ensure everyone who uses the area knows the procedures and that non-NVG equipped aircraft stay out. Always plan and develop NVG areas and procedures based on the local conditions and environment. What worked at the last place will not necessarily work at the next place.

• If a problem with aircraft or NVG equipment develops, submit Quality Deficiency Reports. If there is a problem with doctrine or procedures, submit DA Form 2028. In both cases, send an information copy to the Army Safety Center.

• In most NVG-related accidents, the crew sensed/knew that everything was not right just before the accident occurred. The crew, or at least one member of the crew, was uncomfortable but, for some reason, did not let this be known or thought the other crewmembers had everything under control. Communicate as a crew. If any member of the crew is uncomfortable, he should make his feelings known, get out of the area, regroup, and try again if appropriate. If crews are unsure how close obstacles are or how close other aircraft are, they should assume they are too close and clearance is inadequate. Take corrective action.

• Most wires cannot be "seen" with NVGs. When aircraft suffered wire-strikes, crews were unsure or did not know the exact location of the wires.

• Low ambient light conditions create a high signal/noise ratio or graininess in the goggles. The definition of objects viewed by the pilot loses sharpness or contrast. This results in inability to see some obstructions, depending on the backdrop of that object. This characteristic is still present in newer generations of NVGs, although greatly improved. NVG flights under overcast conditions away from populated areas have resulted in accidents due to this phenomenon.

• Visual contrast is the most critical factor during NVG flight. Contrast matters little if altitude permits obstruction clearance and flight instruments are available to prevent disorientation. However, flights into, out of, or around areas of minimal contrast are hazardous. Proper visual scan techniques will aid, although in some situations they cannot prevent, spatial disorientation. Areas void of visual cues require a combination of internal and external viewing for orientation purposes. Highly skilled and properly trained crews with artificial lighting and the latest generation NVGs can still become confused without adequate visual cues to relate movement.

• The 40-degree field of view tends to promote disorientation through tunneled vision. However, with proper visual cues, orientation can be maintained. Viewing outside references through the tubes is the only method for accomplishing most rotary wing tasks. If available, radar altimeters aid in determining altitude but can be unreliable, depending on aircraft attitude and terrain below. Stationary visual cues or breaks of contrast provide the only reliable information. Sometimes it's as simple as having ground crews walk around in the snow, providing contrast through footprints. At other times, a low approach and dropping a few chemlights to provide a landing area will help. Seeking areas of contrast is a must during approach or hover work. Excessive hover height can also induce disorientation. Distant visual cues make it difficult to detect direction and rate of movement.

• Aircrew judgment in recognizing insufficient contrast and immediate execution of a takeoff or go-around is the best prevention for disorientation.

• Weather requirements for conducting NVG missions are directly related to mission profile, on-board equipment, and crew proficiency.

• Ceiling and visibility are not the primary factors in determining satisfactory conditions for NVG operations. Available ambient light, restrictions to visibility, and discernible contrast are the primary factors for safely employing NVGs.

• Flight with NVGs over water should be avoided if shoreline references are not available and the aircraft is not equipped with advanced flight stabilization equipment and radar altimeters and is not capable of instrument flight.

• Rolling, featureless desert/sand dunes provide hazardous NVG conditions requiring instrument flight.

• The urgency of certain emergencies while flying aided or unaided requires immediate and instinctive action by the pilot. The single most important consideration is aircraft control.

• Successful, safe NVG programs are generally those in which commanders at all levels are involved and participate.

Circumstances leading to most NVG-related accidents

• Lack of contrast and visual cues.

• Lack of crew communication/coordination and "total crew" training.

• Flying too fast based on visual cues and conditions present.

• Lack of recent NVG flight experience.

• Inability to determine distance to obstructions.

• "Invisibility" of wires.

• Sensing that things are about to turn bad and failing to take corrective action.

This article, portions of which were taken from a briefing prepared by CW4 Doug Joyce, AV 558-2442/6309, is by no means all encompassing. We need your input. POC at the Safety Center for NVG-related information is MAJ Ron Isbel, AV 558-4198/3901 or commercial 205-255-4198/3901. USAAVNC proponent for NVG doctrine and training is the Aviation Training Brigade, ATTN: ATZQ-ATB-O. POCs are CPT Selling and CW3 Helmer, AV 558-2425/5691. After duty hours, use the existing Fort Rucker aviation hot line, AV 558-6487.

Copies of this report are available from the Army Safety Center. Write Commander, U.S. Army Safety Center, ATTN: PESC-M, Fort Rucker, AL 36362-5363, or call AUTOVON 558-2062, commercial 205-255-2062. ■

CY 86 Flightfax index

A fatal mistake (simulated engine failure and feathered propeller result in mishap) - 7 May

A $50,000 error (UH-1 hits wire over river) - 21 May

A save for CH-47 crew (inflight servicing of transmission averts ditching at sea) - 25 Jun

Accident accountability (Safety Center needs help in keeping UIC master file current) - 12 Nov

Accident rate (1.98 Class A accident rate in FY 86 best ever) - 22 Oct

AH-1 pilot divides attention among too many tasks and fails to fly aircraft (accident review) - 30 Apr

AH-1 pilot violates altitude restriction and crashes (accident review) - 19 Feb

AH-64 hazard alert on engine chop collar - 19 Mar

Aircraft accident review (maintenance lubricates wrong fuel control on UH-1) - 29 Jan

Aircraft accident review (taxi accident involving two UH-60s costs $9 1/2 million) - 12 Feb

Aircraft accident review (pilot's error in judgment leads to AH-1 crash) - 19 Feb

Aircraft accident review (pad from cargo door hits UH-1's tail rotor) - 5 Mar

Aircraft accident review (human error causes OH-58 mishap) - 19 Mar

Aircraft accident review (OH-58 wire strike) - 2 Apr

Aircraft accident review (droop stop pounding) - 23 Apr

Aircraft accident review (pilot of AH-1 divides attention among too many tasks) - 30 Apr

Aircraft accident review (simulated engine failure on OV-1) - 7 May

Aircraft accident review (failure to record maintenance causes UH-60 mishap) - 14 May

Aircraft accident review (UH-1 hits known wire obstacle over river) - 21 May

Aircraft accident review (failure to monitor altitude and overwater visual illusion result in UH-1 accident) - 16 Jul

Aircraft accident review (OH-6 hits wire over river) - 3 Sep

Aircraft accident review (OV-1 pilot fails to follow procedures on retracting landing gear) - 17 Sep

Aircraft accident review (mid-air of two OH-58s) - 1 Oct

Aircraft accident review (U-21 pilot's failure to allow automatic fuel system to function leads to ditching at sea) - 15 Oct

Aircraft accident review (UH-60 strikes wire) - 5 Nov

Aircraft portable fire extinguishers (when hydrostatic testing is required and what extinguishers contain) - 10 Dec

Alert notice on SPH-4 flight helmets (fiberglass lining separating) - 16 Apr

ALSS-GRAM, (update on aviation life support equipment) - 8 Oct, 10 Dec

An error in judgment (accident review, violation of altitude restriction causes AH-1 mishap) - 19 Feb

Army aviation 44 years old - 18 Jun

Army to put flight data recorders in Black Hawk - 15 Oct

Aviation expertise needed (by USAARL) - 8 and 22 Jan

Aviation safety officer correspondence course available - 22 Jan

Aviation safety officer (more correspondence subcourses available) - 24 Sep

Aviation safety progress report (a look at how we've done and what we expect to do in Army aviation safety) - 4 Jun

Big problems start with small things (UH-60 accident review) - 14 May

Bird strikes (avoidance and ways to reduce severity) - 16 Apr

Black Hawk (Army to put flight data recorders in UH-60) - 15 Oct

Broken Wing Award, 10 receive (recipients from Nov 85 through Jan 86) - 5 Mar

Broken Wing Award, 10 receive (synopses of emergency for which awarded) - 9 Apr

Broken Wing Award, 13 receive (synopses of emergency for which awarded) - 30 Jul

Broken Wing Award, 12 receive (synopses of emergency for which awarded) - 26 Nov

Broken Wing Award, 7 receive (synopses of emergency for which awarded) - 17 Dec

C-12 damaged when it hits frozen bank of plowed snow during landing - 12 Nov

Caution...use the right hardware to install MILES devices (don't use standard aircraft screws) - 26 Mar

CH-47 crew saves aircraft from ditching in the sea by inflight servicing of transmission - 25 Jun

CH-47 falls victim to droop stop pounding (accident review) - 23 Apr

Check modified landing lights on UH-1 (reprinted from *PS Magazine*—if landing light on Huey was modified for NVG training, check it out before you need it) - 13 Aug

Class A accident rate of 1.98 in FY 86 best ever - 22 Oct

Correspondence course for aviation safety officers - 22 Jan

Corroded line causes accident (tube assembly fails between the governor and the fuel control unit on OH-58) - 17 Sep

CY 85 *Flightfax* index - 8 Jan

CY 85 STACOM index - 26 Feb

Density altitude and you (caution—density altitude affects gross weight and aircraft performance) - 20 Aug

Distributing *Flightfax* (don't use Safety Center mailing permit and return address when remailing) - 17 Dec

Droop stop pounding (accident review) - 23 Apr

Dynamic rollover (training film available) - 4 Jun

Error-free performance (uncorrected error leads to repetition) - 28 May

Film available ("SMA Morrell Speaks on Safety," discusses NCO responsibilities toward safety) - 13 Aug

Fire extinguisher can become a safety hazard (don't put unregulated air pressure in water-type extinguishers) - 2 Apr

Fire extinguisher (Halon 1211 has gauge problem) - 7 May

Fire extinguisher (OH-58 pilot's training saves observer's life) - 20 Aug

Fire extinguishers (portable for aircraft) when hydrostatic testing is required and what extinguishers contain - 10 Dec

Fire extinguishers (requirements on flight line) - 15 Jan, 5 Mar

Followups (of mishaps previously published) - 15 Jan, 26 Mar, 27 Aug, 10 Sep

Foreign object damage (F.O.D.—Familiarization, Observation, and Discipline) - 5 Mar

FY 85 UH-1 Class A mishap reclassified (total Class A mishaps for FY 85 reduced to 45) - 30 Jul

Halon 1211 fire extinguisher has gauge problems (gauges locked in charged position) - 7 May

Hazard alert (AH-64 engine chop collar) - 19 Mar

Hazard alert (aircraft flight following and flight routes in and around installations and training areas) - 21 May
Hazard alert (using space under pilot and copilot seats on UH-60 for storage has resulted in injuries) - 3 Dec
Helmets (alert notice of lining separating on SPH-4 flight helmets) - 16 Apr
Improved ladder available (A-frame lightweight ladders available through GSA) - 18 Jun
Incorrect maintenance on the UH-60 (self-retaining bolt for limiter roller in mixer assembly and tail rotor control cable) - 22 Jan
Information needed on reorganized units (Safety Center needs to know about units reorganized under J series TO&E) - 18 Jun
It had happened before (accident review, OH-6 hits wire over river) - 3 Sep
It could have been prevented (accident review, OH-58 merges into another OH-58) - 1 Oct
"It's an ill wind..." (effects of wind on rotary wing aircraft) - 9 Jul
Ladder (improved A-frame available) - 18 Jun
Last *Flightfax* this year - 17 Dec
Let the system function (accident review, pilot's attempt to manually cross feed fuel leads to mishap) - 15 Oct
Lest we forget (lights on Safety Center Christmas tree symbolize Army military and civilian personnel who died in accidents in FY 86) - 17 Dec
Maintenance lubricates wrong fuel control (UH-1 accident review) - 29 Jan
MILES devices (use only MILES screws to install) - 26 Mar
More correspondence subcourses available for aviation safety officers - 24 Sep
Necessity...the mother of invention... can also father an accident (accident review, pads used on cargo door hit tail rotor) - 5 Mar
Night vision goggles (aviators wearing standard-issue spectacles and flying with NVG risk eye injury) - 4 Jun
Of witches and switches and other scary tales (mishaps caused by aviation crews hitting the wrong switch or button) - 6 Aug
OH-6 hits wires over river (accident review) - 3 Sep
OH-58 IP course (prerequisites, records, and equipment needed) - 15 Jan
OH-58 hits wire not marked on copilot's map (accident review) - 2 Apr
OH-58 strikes antenna support pole (accident review) - 19 Mar
OH-58 failure of line between governor and fuel control unit caused by corrosion - 17 Sep
OH-58 merges into another OH-58 and both aircraft crash (accident review) - 1 Oct
OV-1 pilot fails to follow procedures on retracting landing gear (accident review) - 17 Sep
OV-1 IP's failure to initiate simulated engine failure in accordance with FC-1-221, and feathered propeller, lead to mishap (accident review) - 7 May
Potential hazard exists for aviators flying with NVG (wearing standard-issue spectacles) - 4 Jun
Recap of AVSCOM messages (from 1 Oct through 31 Dec 85) - 7 May
Recap of AVSCOM messages (from 1 Jan through 31 Mar 86) - 2 Jul
Recap of AVSCOM messages (from 1 Apr through 30 Jun 86) - 1 Oct
Report on first quarter FY 86 Class A aircraft accidents - 5 Feb
Report on first half FY 86 aircraft accidents - 11 Jun
Ringology 101 (wearing rings around aircraft can result in losing your finger) - 10 Dec
Safety-of-flight messages
- AH-1/TH-1/TAH-1 and UH-1 main rotor hub - 8 Jan
- AH-1, TAH-1, and TH-1 comprehensive safety inspection - 4 Jun
- AH-1 maintenance test flight and hydraulic systems check procedures - 2 Jul
- AH-1 M97 series turret spring pins and saddle shaft mounting bolts in TAH-1S, AH-1E(ECAS), and AH-1F(MC) - 24 Sep
- AH-64 shear pin actuated decoupler - 5 Feb
- AH-64 main rotor blades - 5 Feb
- AH-64 grounding due to cracking in main rotor blades - 12 Feb
- AH-64 main rotor head assembly - 26 Mar
- AH-64 grounding due to failed bolt in mixer assembly - 26 Mar
- AH-64 message assigned incorrect control number - 2 Apr
- AH-64 replacement of mixer support bolts, lock washers, inspection of mixer support bushings, and pitch link rod ends - 30 Apr
- AH-64 laser boresight safety - 4 Jun
- AH-64 remote circuit breaker/relay K3 - 2 Jul
- AH-64 change in serial numbers in previous laser boresight message - 9 Jul
- AH-64 replacement of electrical contacts at engine four-way fuel valves - 23 Jul
- AH-64 assembly of drive shaft couplings - 1 Oct
- AH-64 vertical stabilizer bolts - 22 Oct
- CH-47 flight control mounting pallets - 8 Jan
- CH-47 pitch link connecting bolts - 23 Apr
- CH-47 inspection of rotor blades for debonding - 7 May
- CH-47 cold weather procedures - 7 May
- CH-47 message on cold weather procedures assigned incorrect control number - 21 May
- CH-47 corrosion problems - 2 Jul
- CH-47 manual release cable to forward hook - 20 Aug
- CH-47 transmission pressure switches - 5 Nov
- CH-54 input couplings - 5 Feb
- CH-54 upper link assembly - 19 Mar
- CH-54 primary servo switches - 9 Apr
- CH-54 corrosion of pitch change link assemblies - 7 May
- EH-60 and UH-60 tail rotor drive shaft bearings - 12 Mar
- EH-60 and UH-60 tail rotor drive shaft nuts - 12 Mar
- EH-60 and UH-60 tail rotor drive shaft nuts - 19 Mar
- EH-60 and UH-60 revision to replacement of tail rotor drive shaft bearings -19 Mar
- OH-6 grounding due to loss of tail rotor blade abrasion strip - 25 Jun
- OH-6 update of AVSCOM efforts to get fleet ungrounded - 2 Jul
- OH-6 inventory check of tail rotor blades and report procedures - 2 Jul
- OH-6 recall of certain tail rotor blades - 2 Jul
- OH-6 requirements for ungrounding - 30 Jul
- OH-6 and OH-58 flight restrictions on aircraft with T63-A-700 engine - 3 Sep
- OH-6/H-6 tail rotor assembly - 24 Sep
- OH-58 and OH-6 T63-A-700 turbine engine compressor - 8 Jan

CY 86 Flightfax index

- OH-58 and OH-6 T63-A-700 turbine engine compressor - 22 Jan
- OH-58 and OH-6 revision to inspection of T63-A-700 turbine engine compressor - 26 Mar
- OH-58 operating limitation with controllable landing light installed - 16 Apr
- OH-58 MILES/AGES equipment - 11 Jun
- OH-58 transmission support fittings - 24 Sep
- OH-58 changes to operators manual and crew checklist for NVG operation -1 Oct
- OH-58 engine power droop retrofit modification kit - 8 Oct
- OH-58 TRADOC message directing all TRADOC units to take action to comply with AVSCOM message on engine power droop retrofit modification kit - 8 Oct
- OH-58 and OH-6 AVSCOM message regarding T63-A-700 engine compressor case and vane assemblies - 8 Oct
- OH-58 repair of fuel filler cap retention cable - 5 Nov
- OH-58 restrictions on weight on landing gear - 3 Dec
- OV-1 restricted flight maneuvers - 19 Feb
- OV-1 and RV-1 inspection and replacement of deice generators - 20 Aug
- T-42 inspection of fuel line for chafing on heat and vent duct - 28 May
- U-8 wing attachment fittings - 11 Jun
- UH-1 and EH-1 collective lever assembly - 19 Feb
- UH-1/EH-1 and AH-1 inspection of T53-L-13B series engines - 26 Mar
- UH-1/EH-1 tail rotor drive shaft nuts - 4 Jun
- UH-1/EH-1 trunnion bearings - 4 Jun
- UH-1/EH-1 and AH-1G T53-L-13B series turbine engines - 5 Nov
- UH-60 revision to reporting down time - 8 Jan
- UH-60/EH-60 grounding due to unknown causes - 26 Mar
- UH-60 stabilator/automatic flight control system panel retrofit - 7 May
- UH-60/EH-60 replacement of stabilator actuators - 4 Jun
- UH-60 and AH-64 oil cooler assembly - 18 Jun
- UH-60/EH-60 revision to reporting ungrounding - 2 Jul
- UH-60/EH-60 revision to message on removal of AN 310-8 nuts - 3 Sep
- UH-60 contractor inspection of transmission oil cooler fan splines and tail rotor drive shaft - 5 Nov
- UH-60 restriction of rappelling operations involving H-60A series aircraft - 5 Nov
- UH-60 restriction on use of airframe eyebolt - 12 Nov
- UH-60 tail rotor drive shaft spline couplings and removal of material from under crew seats on UH-60/EH-60 aircraft - 3 Dec
- UH-60 inspection of crew seats for longitudinal movement of lock pin adjustment - 10 Dec

SD-3-30 what it looks like - 10 Dec

SMA safety film available ("SMA Morrell Speaks on Safety," NCO responsibilities toward safety) - 13 Aug

Snow claims Black Hawk (slope landing in whiteout) - 8 Jan

Snow + helicopters - caution = trouble (warning of hazards to aircraft from snow) - 12 Nov

STACOM - 26 Feb, 12 Mar, 23 Jul, 13 Aug, 24 Sep, 29 Oct, 19 Nov, 3 Dec

Switches (dumped slingloads and other problems caused by aviation crewmembers hitting the wrong switch or button) - 6 Aug

Taxi accident costs $9 1/2 million (UH-60 accident review) - 12 Feb

The human in human error (OH-58 accident review) - 19 Mar

The lake was like a mirror (UH-1 accident review) - 16 Jul

The pilot went with experience instead of procedures and lost (OV-1 accident review) - 17 Sep

Too busy to fly (AH-1 accident review) - 30 Apr

Training film available ("Helicopter Dynamic Rollover Characteristics") - 4 Jun

Training (pilot's training on fire extinguisher saves observer's life in OH-58 mishap) - 20 Aug

U-21 pilot's manual crossfeeding of fuel leads to ditching at sea (accident review)- 15 Oct

UH-1 engine fails because maintenance lubricated wrong fuel control (accident review) - 29 Jan

UH-1 pads used on cargo door during parachute jump hit tail rotor (accident review) - 5 Mar

UH-1 crew hits known wire obstacle over river (accident review) - 21 May

UH-1 pilot's failure to monitor altitude and overwater visual illusion results in mishap (accident review) - 16 Jul

UH-1 Class A mishap in FY 85 reclassified (total Class A mishaps in FY 85 reduced to 45) - 30 Jul

UH-1 (if landing light was modified for NVG training, check it out before you need it) - 13 Aug

UH-1 pilot fails to follow procedures for operating in snow - 12 Nov

UH-60 encounters whiteout during slope landing and crashes - 8 Jan

UH-60 (two hazardous incidents caused by incorrect maintenance) - 22 Jan

UH-60 taxi accident costs $9 1/2 million (accident review) - 12 Feb

UH-60 aircraft operated with drained gearbox because mechanic didn't keep proper records (accident review) - 14 May

UH-60 narrowly averts disaster when undocumented maintenance resulted in nut, washers, and cotter key being left off pitch rod - 2 Jul

UH-60 (Army to put flight data recorders in Black Hawk) - 15 Oct

UH-60 strikes wire (accident review) - 5 Nov

UH-60 encounters whiteout during slope landing and rolls over - 12 Nov

UH-60 (using space under pilot and copilot's seats for storage prevents seats from stroking and has resulted in injuries) - 3 Dec

Use and release of information from safety investigation reports - 2 Jul

Wartime safety lessons learned from India-China airlift still apply - 18 Jun

What if...(failure to document maintenance leads to near miss when UH-60 flies with nut, washers, and cotter key missing from pitch rod) - 2 Jul

What's your training worth? (pilot's training on fire extinguisher averts tragedy in OH-58 mishap) - 20 Aug

Will the accused please rise (accident review, UH-60 strikes wire) - 5 Nov

Wire strike (OH-58 accident review) - 2 Apr

Wire strike (UH-1 accident review) - 21 May

Wire strike (OH-6 accident review) - 3 Sep

Wire strike (UH-60 accident review) - 5 Nov ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap

V series - Aircraft departed on MAST mission under special VFR clearance. The pilot reported leaving the control zone but did not arrive at the accident site, and search and rescue operations were begun. The aircraft was found early the next day. All four crewmembers had been killed. 8719

UH-1 Class D mishaps

H series - As UH-1 took off, rotorwash lifted solid-top maintenance stand and rolled it into parked OH-58, causing structural and sheet metal damage.

V series - During instrument training in IMC conditions at 5,000 feet msl, ice built up on No. 1 FM antenna. Antenna end was frayed when it contacted tail rotor.

UH-1 Class E mishaps

H series - Right fuel boost pump light came on during flight. As aircraft banked, 20-minute fuel light came on and fuel gauge read 475 pounds. Internal air-driven fuel pump failed due to cracked case.

H series - During flight, copilot noticed vibration followed by a whistling noise. Caused by separation of skin from leading edge at blade tip.

H series - During takeoff, pilot felt resistance in antitorque pedals. Antitorque servo cylinder malfunctioned.

UH-60 Class E mishaps

A series - Two aircraft had stabilator actuator failure during flight.

A series - During flight, No. 2 engine oil pressure dropped below normal operating limits. PIC retarded engine power control lever to idle. As pressure continued to decrease, PIC shut down No. 2 engine. Crew chief had failed to secure oil cap after servicing, causing loss of 4 quarts of oil.

A series - When forward cyclic inputs were made during hover, crew felt moderate vertical vibrations. Anti-flap restrainer had frozen in place, causing restrainer to fail.

A series - During approach, No. 2 reservoir low light came on. Boost, SAS, and trim failed. Reservoir low sensor switch corroded, causing sensor to open circuit.

A series - During hover, crew felt high-frequency vibration in No. 1 engine. No. 1 engine IPS blower failed, causing IPS shaft failure.

Attack helicopters

AH-1 Class E mishaps

F series - During approach, rpm warning light came on, engine oil pressure gauge and both N2 gauges began fluctuating. Caused by short in IPI engine disk cannon plug.

S series - Fuel gauge failed to indicate fuel consumption during flight. Fuel gauge circuit breaker wasn't fully engaged.

Cargo helicopters

CH-47 Class D mishaps

D series - When CH-47 released external load near parked UH-1H, rotorwash caused tiedown on UH-1's main rotor blade to snap. Blade flexed down and struck WSPS, making hole in rotor blade.

D series - During shutdown, crew chief spotted hydraulic leak. Copilot smelled smoke and noticed drop in hydraulic pressure in utility system. Caused by failure of utility hydraulic pump.

CH-47 Class E mishaps

C series - During climbout, flight engineer reported severe hydraulic leak from ramp area. During landing, pilot noted utility system pressure gauge dropped to zero. Safety release valve had ruptured, causing leak and loss of pressure in utility hydraulic system.

D series - Failure of No. 2 engine transmission sprag clutch to engage during runup is suspected in two incidents. In each case, No. 1 engine was started and advanced to flight position with no problems. No. 2 engine stabilized at around 62 percent N1 and No. 2 gearbox was allowed to reach 40° C. before engine control lever was moved to flight position. N1 then advanced a couple of percentage points before falling back to 62 percent. No torque increase was noted.

D series - No. 2 engine transmission light came on during hover. Caused by failure of chip detector/temperature switch.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	1-11 Feb	1	4
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	12	17

Mishap briefs

Observation helicopters

OH-58 Class E mishaps

A series - Crew felt abrupt vibration during flight. Aircraft landed and vibration stopped when throttle was rolled to flight idle for shutdown. Vibration couldn't be duplicated.

C series - Low rotor rpm audio came on during NOE deceleration. Caused by governor out of adjustment.

Training helicopters

TH-55 Class D mishap

A series - Rotor was coasting down after aircraft had been run up to balance tail rotor and track main rotor blades. Wind gust caused main rotor blades to flex down and two blades hit top of tail boom. The third blade struck tail boom on left side. Tail boom and one main rotor blade were damaged.

TH-55 Class E mishaps

A series - After several takeoffs and landings, IP told student to perform simulated maximum performance takeoff. When aircraft was about 100 feet agl, IP noticed large decrease in manifold pressure reading and told student to maintain power. Student replied he had throttle full open. IP took controls and lowered collective but aircraft continued to lose rpm and IP autorotated to landing. Caused by defective fuel pump.

A series - During final approach, engine began to backfire and lose power. IP took control and autorotated to landing. No. 2 fuel line had broken at fuel flow divider connection.

Fixed wing

C-12 Class E mishap

C series - Taxiway wasn't visible because of packed and blowing snow and pilot attempted to center aircraft between two rows of taxi lights. Aircraft was moving on the taxiway at about 2 mph when left main wheel sank in mud and snow.

OV-1 Class C mishap

D series - As aircraft turned down wind, torque on No. 2 engine decreased. Suspect Dzus fastener on upper propeller afterbody failed, allowing fastener keeper to be ingested by engine. FOD to stator vanes on No. 2 engine resulted.

OV-1 Class E mishap

D series - During cruise flight, technical observer saw fluid coming from No. 2 prop spinner and permeating engine cowling area. Caused by prop seal failure.

U-8 Class E mishap

F series - IP lowered landing gear during practice stall maneuvers, and noted unsafe gear indication on left main landing gear. Attempts at recycling and manual extension were unsuccessful. After visual check by maintenance personnel on the ground, aircraft made safe landing.

Maintenance

UH-1 Class E mishap

H series - As aircraft N1 was brought up to 69 percent during start, fire guard saw fuel leaking from fuel control internal filter. O-ring was installed improperly.

CH-47 Class E mishaps

C series - Master caution and No. 2 flight boost lights came on during flight. No. 2 flight pressure line under tunnel cover had chafed at phenolic block, causing it to rupture.

C series - Aircraft was at 20-foot hover with a slingload during NVG flight. Master caution light came on and hydraulic pressure on No. 2 flight boost system dropped to zero. Load was placed on ground and aircraft landed. Rigid line under C-box had been installed without Teflon tape at phenolic block. Hydraulic line chafed and failed, causing loss of No. 2 flight boost system pressure.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

U.S. ARMY SAFETY CENTER

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THE SIXTH SENSE OF SAFETY
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Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - Aircraft was on base leg for landing during NVG flight. Illumination was zero and IR light was not being used. Midway through base leg, lights on the ground east of traffic pattern blinded crew, causing them not to see aircraft was descending into trees until just before aircraft struck a tree top. IP took the controls and applied collective and cyclic, but $2,200 damage was done to chin bubbles, battery compartment door, nose sheet metal, and left skid by tree strike.

UH-1 Class E mishaps

H series - Aircraft was in flight at 80 KIAS. During hydraulics-off check, aircraft pitched hard nose-up and rolled left as cyclic hardover occurred in left rear control quadrant. Caused by failure of right irreversible valve.

H series - Engine oil pressure fluctuated in flight and engine oil pressure caution light came on during final approach. Caused by cap missing from T-fitting between engine oil reservoir and engine oil tank.

H series - During climb, crew heard loud report from engine compartment. Torque fluctuated, aircraft yawed, and 90-degree gearbox chip light came on. Aircraft was inspected for compressor stall and variable inlet guide vane was readjusted from high- to mid-range.

H series - During flight, crew heard five reports from engine and egt rose to 550° C. Suspect compressor stall.

H series - Crew heard bang during takeoff from small landing zone. Pilot failed to maintain adequate clearance and allowed blade to strike obstacle.

H series - Two aircraft were being repositioned in blowing snow. During high hover, crews noted intermittent cyclic binding and feedback caused by snow melting and refreezing on cyclic control tubes.

UH-60 Class D mishaps

A series - After more than 5 hours of NVG slingload operations into unlighted, unimproved tactical landing areas, damage was found to cargo door and UHF antenna. Aircraft had descended too close to load during hookup operation.

A series - Right front cargo door window was lost during flight. Suspect cargo door window was inadvertently jettisoned by passenger.

UH-60 Class E mishaps

A series - Stabilator audio and light came on during instrument approach. Caused by defective No. 2 stabilator actuator.

A series - Master caution and No. 1 engine chip lights came on during flight. Engine was replaced.

A series - During HIT check on engine, crew noticed unusually loud whine coming from No. 1 engine. Damaged compressor blade was found during inspection. Suspect extremely cold weather caused moisture in compressor to freeze and damage blade.

A series - Aircraft was being repositioned after failing HIT check. No. 1 reservoir low caution light came on, but

Mishap briefs

there was no backup pump advisory light. Caused by failure of left relay panel.

Attack helicopters

AH-1 Class C mishaps

F series - During third start attempt, tgt rose to more than 880° C. for 5 seconds and fire guard saw flames coming from exhaust. Pilot's failure to ensure ignition key was on resulted in hot start and more than $26,500 damage.

S series - Engine quit during straight and level flight at 60 KIAS. Aircraft was autorotated but during hard landing, skids spread and lower wire cutter and skin on lower side of aircraft were damaged.

AH-1 Class D mishaps

F series - Crew was in aircraft, ready to begin start procedures. APU truck pulled up as close as possible to left side of aircraft, facing in opposite direction. Starter was engaged and on the third revolution, the main rotor blade flexed down and struck top of truck. Suspected cause was gusty winds. APU cable on truck wasn't long enough to allow it to park outside rotor disk.

F series - During flight, engine oil bypass caution light came on and aircraft landed in open field. Crack in fitting on engine oil line at cooler caused loss of oil and activated bypass caution light. During shutdown, landing light was inadvertently turned on, causing grass fire. Electrical cable and fiberglass fairing on 20mm gun were damaged by heat.

AH-1 Class E mishaps

E series - As aircraft turned on final after completing maintenance flight for tail rotor installation, N2 and rotor rpm drooped to 98 percent and then returned to 100 percent. Instrument indications were normal during approach but, at about 15 feet agl, N2 and rotor rpm drooped to 75 percent. MTP lowered collective and N2 and rotor rpm were regained. After landing, MTP tried increasing collective and droop reoccurred. Suspect fuel control malfunction.

E series - Master caution, alternator, and rectifier lights came on during flight. Voltage regulators were set for extremely cold weather and when temperature increased, voltage regulators caused alternator/rectifier to kick off line.

E series - During simulated high-speed forced landing, aircraft developed a thump with feedback in controls. Transmission damper was replaced.

F series - Copilot initiated accelerated maneuver from 100 KIAS, 200 feet agl. Overtorque light came on and torque went to 102 percent, but no damage was found. Copilot applied excessive collective pitch during acceleration maneuver.

P series - Both fuel boost lights came on during flight at 2,500 feet msl. Caused by failure of aft fuel boost pump.

S series - During hover, IP in front seat heard sound of rushing air from forward area of cockpit. After landing, IP found rain removal system was on and switch in cockpit was off. Linear direct valve stuck and was replaced.

S series - During power cylinder check at 10-foot hover, No. 1 hydraulic system failed. Forward and aft cyclic were stiff and lateral cyclic was even stiffer. Caused by failure of hydraulic pump.

AH-64 Class C mishap

A series - While crew was performing slope operations during pilot night vision system training, main rotor blades were allowed to hit a tall bush. Damage amounting to about $54,000

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	1–18 Feb	1	4
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	12	17

was found by maintenance personnel during tap (void) test on blades.

AH-64 Class E mishaps

A series -Before takeoff from refueling, master caution and main transmission chip lights came on. Caused by fuzz on main transmission plug.

A series - Two aircraft had utility hydraulic lights to come on at the end of high/low G maneuvers. All other indications were normal. On one aircraft, hydraulic pressure gauge indicated 3,000 psi immediately after pressure light flickered. Problem couldn't be duplicated in either case.

A series - Crew was preparing to land after conducting slope operations and an NOE training flight. Before-landing-check showed parking brake released, but when aircraft touched down brakes were still locked. IP brought the aircraft to a hover and stopped forward movement, then landed. Both main tires had rotated on the rim and deflated.

A series - During flight, crew noticed odor in cockpit followed by high-pitched whine and shaft-driven compressor light. Caused by failure of shaft-driven compressor.

A series - When power was reduced to maintain cruise flight, No. 2 nose gearbox chip light came on. Chip detector plug in gearbox was replaced.

A series - When No. 2 engine was started during runup, torque spiked, fuel boost caution light came on, and environmental control unit went off line. Crew couldn't get the fuel boost light to go out or the ECU to come on line and when pilot was told smoke was coming from No. 2 engine, he quickly shut down the aircraft. Air turbine starter had hung in the start position and disintegrated.

Cargo helicopters

CH-47 Class E mishap

C series - At 800 feet agl, 120 KIAS, pilot felt feedback in pedals. After landing and shutdown, aft swiveling actuator made erratic movements when flight controls were moved. Caused by failure of aft swiveling actuator.

Observation helicopters

OH-58 Class E mishaps

A series - When pilot reduced power during flight, crew felt high-frequency vibration in airframe and heard loud buzzing noise. Problem couldn't be duplicated.

A series - N2 gauge fluctuated and then failed during landing. Wire on tachometer generator cannon plug had come loose.

C series - Copilot, in left seat, was at controls. Pilot noticed slight drift of aircraft and warned copilot there were trees to right front. As copilot applied collective to avoid the trees, torque went to 105 percent.

C series - During flight at 1,000 feet agl, 100 KIAS, engine rpm went to 92 percent. When collective was lowered, rpm increased to 100 percent, but as collective was pulled to maintain flight level, rpm again drooped to 92 percent and low rpm warning light and audio came on. Caused by broken wire on fuel control linear actuator.

C series - As aircraft turned downwind, the entire airframe began vibrating. Suspect cause was ice in oil cooler compartment.

C series - During start attempt, throttle was advanced to engine idle at 15-percent N1 and combustion occurred. Pilot released starter button and TOT rapidly rose to about 900° C. Pilot became confused about which button to push and IP diverted his attention from the TOT gauge to assist pilot in engine abort start procedure. IP suspects TOT went to between 927° C. and 950° C. for 1 or 2 seconds but no damage was found.

C series - Master caution light came on when aircraft lighting was placed in NVG enable mode. Tail rotor chip detector light flickered as aircraft was shut down. Excessive metal particles were found in tail rotor gearbox.

Fixed wing

C-7 Class E mishap

A series - During climbout after takeoff, crew felt intermittent vibration in airframe and slight roughness in No. 1 engine as aircraft passed through 3,000 feet msl. Reduction in manifold pressure had no effect on vibration. Aircraft continued climb to 7,000 feet msl and had begun leveling off when crew chief reported white smoke coming from inboard augmentor tube. During return to airfield, smoke increased and power on No. 1 engine was completely lost. Engine was feathered and aircraft landed. Exhaust valve guide failed, allowing valve to contact piston.

C-12 Class E mishaps

C series - During climbout, increasingly heavy smoke could be seen trailing from No. 2 nacelle. Oil pressure dropped to 60 psi and oil was seen on outside of cowling. Packing/gasket on oil transfer tube below compressor section failed, causing oil to be pumped overboard.

C series - Aircraft was climbing to 29,000 feet msl. As it passed through 18,000 feet, outer layer of copilot's windshield cracked. Aircraft was in light icing, with minus 8° OAT, and windshield heat was on.

C series - After completing lineup, power levers were advanced for takeoff. Rpm on both engines developed normally to about 1700 rpm, then No. 1 engine failed to develop additional rpm, although torque, tgt, and N1 continued to increase. Caused by failure of primary governor.

D series - During takeoff climb, No. 2 generator came off line, was reset, and again came off line. Caused by failure of voltage regulator for No. 2 generator.

D series - Aircraft began pulling to right during taxi. Right main outboard tire was deflated and inboard tire was losing pressure rapidly. Aircraft had been outside for 5 hours in temperatures averaging minus 30° F. The tubeless tire sidewalls stiffened in low temperatures, causing loss of air seal between tire and rim when aircraft was moved.

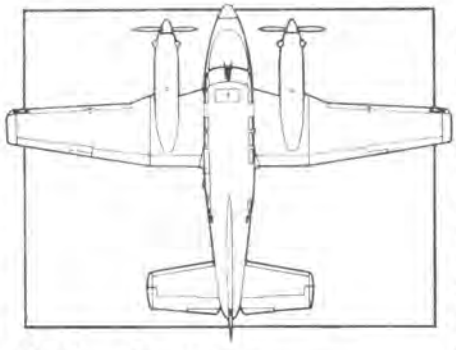
OV-1 Class E mishaps

D series - As aircraft was being recovered from high-speed dive, pilot noticed egt on No. 1 engine was rising. He reduced power, and although egt continued to rise, limits were not exceeded. Visual instrument display system (VIDS) failed due to electrical malfunction, possibly caused by moisture.

D series - No. 2 engine fire light came on during flight. Sensing element was chafing against exhaust shroud. Suspect vibration caused shroud to flex into sensor.

D series - Pilot noticed airspeed indicators were erratic during takeoff roll. Caused by obstruction in pitot tube. Pitot tube covers were not being used in the unit.

D series - During ILS approach in heavy rain, pilot attempted to turn windshield wipers on, but they failed to operate. On rollout, aircraft veered off centerline and brakes required excessive pressure. Pilot confirmed total hydraulic failure by checking VIDS. Flexible hydraulic hose between speed brake actuating cylinder and actuating valve ruptured and hydraulic fluid was lost.



U-21 Class E mishaps

F series - During refueling, IP noticed fuel flowing from closed auxiliary tank filler cap while main tank was being filled. Rubber FOD from tank caused one-way check valve to stick in open position, allowing main tank fuel to gravity feed into auxiliary tank.

H series - Oxygen system failed due to faulty oxygen fill valve.

Maintenance

UH-60 Class E mishap

A series - Tgt fluctuated during flight. Caused by chafed wires on manual APU pump handle.

OH-6 Class E mishap

A series - Plastic spacer used to ensure snug fit on all battery cells was not large enough to prevent cell expansion during normal operation of aircraft. Cell ruptured due to expansion.

U-8 Class E mishap

F series - During landing, IP noticed unsafe gear indication on left main landing gear. Indication was caused by poorly crimped terminal end at downlock switch.

C-12 Class E mishap

C series - Fuel leak on No. 1 engine fuel control was noticed after runup. O-ring was pinched during installation.

U-21 Class E mishap

A series - During takeoff climb, power on No. 1 engine was partially lost; N1 decreased to 60 percent and torque went to zero. During approach and landing, power levers for No. 1 engine couldn't be pulled back beyond 10 o'clock position. Maintenance personnel failed to cotter key upper end of 11-inch rod, allowing nut and bolt to fall out of throttle linkage.

Safety messages

• Safety-of-flight technical message concerning one-time inspection of CH-47D helicopter pivoting and swiveling actuator lower structural connections for proper hardware (CH-47-87-03, 022030Z Feb 87). Summary: CH-47D manuals have been found lacking with respect to applicable illustrations to show slip bushings and the text did not identify slip bushing requirements. A review of

TM 55-1520-240-23-6

TECHNICAL MANUAL

AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE MANUAL

CH-47D HELICOPTER

HEADQUARTERS, DEPARTMENT OF THE ARMY
6 MAY 1983

TM 55-1520-240-23-6, TM-55-1520-240-23P-1, and TM 55-1520-240-23P-3 shows that they do not adequately describe the connections and their hardware. Expedited manual changes are being prepared. Omission of the

(continued on back page)

Stacom

Standardization Communication

Aircrew information

Aviation units will establish and maintain aircrew information/reading files in accordance with AR 95-1 and TC 1-210.

Files should be divided into general and specific functional areas containing reference material concerning aviation standardization, safety, armament, regulations and directives, standing operating procedures, and other appropriate literature. The front section of each general and specific area will contain new information received during the previous and current month.

Newly assigned aircrew personnel will read and become familiar with these files upon arrival in the unit. To clarify the term "become familiar with," we should say that this doesn't mean aviators must read each publication contained in the reading file each time they review the file. However, they should be familiar with what information is in the file and expect that when they have to research an area from reference material in the reading file, it will contain the most recent or current data.

To clarify any misunderstandings of general and specific functional areas—

• Specific functional areas are defined as information on specific projects; e.g., letters from the commander and information that is temporary in nature.

• General information is of a much broader scope. Because no list is published of information that is needed, we recommend that, as a minimum, the following publications be included in the general functional area:

—FAR part 91 (U.S. only) or applicable ICAO/foreign government regulations (overseas)

—AR 95-1

—Applicable supplements to AR 95-1

—AR 95-16

—AR 95-21

—AR 385-40

—AR 385-95

—AR 420-90

—Appropriate SOPs

—TC 1-210

—Current *Flightfax*

—Appropriate local command safety/standardization memorandums

—Chain of command policy letters affecting aviation operations.

This is an UPDATE of information contained in STACOM Nos. 92, 93, and 107.

New flight time changes

Q. AR 95-1, paragraph 4-3a, change 6, indicates that aviators who have logged 50 hours as pilot-in-command have no IFR takeoff minimums. The old regulation made no provisions for pilot-in-command time so only P or IP time applied. Does the P and IP time logged under the old rules apply to the total of 50 hours of pilot-in-command time under the new regulation?

A. Yes. Time logged as P or IP weather time under the old rules will be captured on part II, Column F: Historical, of the new DA Form 759, and may be counted toward the 50 hours of pilot-in-command time required by paragraph 4-3. Remember, too, that pilot-in-command includes IE, UT, IP, SP, MP, ME, XP, and PC.

Q. SFTS time is tracked on the new DA Forms 759 in the same manner as aircraft time. What flight condition symbol is used when instrument time is flown in the SFTS, W or H?

A. Since SFTS time is tracked on a totally separate DA Form 759-1: Aircraft Closeout Summary, which indicates in block 6 that the time, duty, and conditions are for a specific SFTS (see FM 1-300, figure 7-5), "W" time logged in an SFTS cannot be credited as aircraft time.

New telephone numbers

Telephone numbers for the Aeroscout Attack Branch at DES are AUTOVON 558-2427/2531/ or 2532.

CY 86 STACOM index

STACOM 114, 26 Feb - Big sky...little aircraft. CY 85 STACOM index.

STACOM 115, 12 Mar - Securing aircraft during adverse weather. Maneuvering limits of aircraft.

STACOM 116, 23 Jul - FAA flight certification in Army aircraft. Establishment of Eastern Flight Standardization Branch of DES. Identification of Friend or Foe (IFF) training. New director for DES.

STACOM 117, 13 Aug - FC 1-216, task 1060. Attention CH-47D operators. CH-47 NVG operations. Reminder on DA Forms 2028. Telephone number changes.

STACOM 118, 12 Sep - Safety awareness boards.

STACOM 119, 29 Oct - Change to TM 55-1500-328-25 and DA Pamphlet 738-751. Operating electronic equipment aboard aircraft.

STACOM 120, 19 Nov - 1986 UPDATE TM 55-1520-210-10.

STACOM 121, 3 Dec - New change to AR 95-1. ■

STACOM 122 18 February 1987

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JOHN C. SHAW, JR.
Colonel, Aviation
Director, DES

Mishap briefs

bushing causes heavy loads to be imposed on the connecting bolt and the adjacent lug. Failure of either could cause loss of the aircraft. Presence of a slip bushing can be determined by inspecting for a gap between the lug in which the bushing is installed and the washer under the adjacent bolt head or nut. Each slip bushing protrudes outside its lug so that the washer will bear against the end of the slip bushing and not contact the lug. Each lug that requires inspection for presence of a slip bushing is identified in paragraph 9b of this message. The purpose of this message is to require an inspection of pivoting actuator, P/N 145H6600 series, and swiveling actuator, P/N 145H6700 series, lower connections, both forward and aft, to ensure slip bushings are installed. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight operational message concerning restricted flight maneuvers of certain serial-numbered OV/RV aircraft (OV-1-87-01, 032010Z Feb 87). Summary: A review of flight usage data, analytical fatigue prediction studies, and experience gained during depot inspection/repair on aircraft undergoing the programmed restoration has established certain thresholds for economical repair. These repair thresholds are significantly influenced by aircraft flight loads which induce localized structural overstress conditions. To minimize exposure to possible high flight loads on aircraft which have not recently been inspected, a restriction is being imposed on selected OV/RV-1D serial numbers which limits airspeed and load factors and prohibits practice evasive maneuvers and aerobatic flight as defined in Aircrew Training Manual Surveillance Airplane, OV-1, FC 1-217, dated 30 Dec 84. By separate message, operators will be notified when these aircraft shall be returned to Grumman Aircraft, Stuart, FL, for inspection and local repairs as necessary. The aircraft named shall remain under this restriction until this inspection/repair has been accomplished. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time and recurring inspection of aircraft elevator attachment points on U-21 and RU-21 series aircraft (U-21-87-01, 061615Z Feb 87). Summary: During the daily inspection of the U-21A aircraft at one unit, a 4-inch crack was noted on the upper surface of the trailing edge of one of the elevators. A more detailed inspection of the elevator revealed a crack in the area of the outboard hinge mounting point. Inspection of other U-21s disclosed cracks in the same area of four more elevators. This message directs a one-time inspection of U-21A, RU-21A, RU-21B, RU-21C, U-21D, and certain RU-21H elevators in accordance with paragraph 9. Contact: Roger Heidenreich, AUTOVON 693-3300, commercial 314-262-2200.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

U.S. ARMY SAFETY CENTER

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THE SIXTH SENSE OF SAFETY
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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 took off from pinnacle with 13 people on board. Rotor rpm decayed and PIC lowered collective and went to emergency governor in an attempt to regain rpm. Aircraft's left skid was damaged when it hit a rock, but aircraft damage was minimal. Accident cost was increased by radio equipment jettisoned to reduce weight.

V series - After takeoff, copilot asked PIC to demonstrate a return to target. PIC selected an area, crossed the site at 80 KIAS, 25 feet above vegetation, and began a cyclic climb and reduced collective. When airspeed reached 40 KIAS, he lowered aircraft's nose to gain airspeed and accelerated. He then began deceleration and applied power to level off, but the aircraft continued to descend. PIC applied more power, but the aircraft struck the ground, skidded 60 feet, and returned to a hover. The CE reported extensive damage to the landing gear and the aircraft was returned to the airfield and landed on a stack of wood.

UH-1 Class D mishaps

H series - Dzus fastener and spring clip on vertical fin drive shaft cover fell off during flight, striking tail rotor blades and causing about $1,400 damage.

H series - Rotorwash from UH-60 blew maintenance platform, located about 75 feet away, 30 feet into parked UH-1, breaking left chin bubble.

H series - After flight into unforecast light icing conditions, severe damage was found to No. 2 FM antenna. Ice accumulation on antenna apparently caused it to flex into tail rotor.

UH-1 Class E mishaps

H series -During test flight to determine what caused master caution light during previous flight, fuel pump segment light came on. Caused by failure of differential fuel pressure switch.

H series - Aircraft was on approach, about 20 feet agl, when panel marker blew up through rotor system, striking both blades. Supported unit personnel failed to use stakes to secure marker.

H series - During hover, pilot felt stiffness in rear portion of cyclic travel area. Caused by failure of irreversible valve.

H series - During runup, crew smelled burning odor and saw smoke coming from copilot's chin bubble area. When aircraft was washed, moisture got into bypass cannon plug on KY 58 radio mount, causing short and electrical fire. Crew chief failed to install protective plastic cover on cannon plug.

H series - Fire warning light came on during flight. Caused by malfunction in fire warning system control box.

H series - During flight at 8,500 feet msl, transmission oil pressure dropped to 10 psi, engine oil pressure to 40 psi, and engine oil and transmission oil temperature showed 68 degrees. Main inverter was malfunctioning and not producing enough voltage to operate instruments. Armature was replaced.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	1-25 Feb	2	4
	March	4	3			
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	13	17

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Mishap briefs

V series - Aircraft began vibrating during flight at 90 KIAS, 1,050 feet agl. When vibration worsened, aircraft landed. Caused by 24-inch separation of skin on main rotor blade.

UH-60 Class B mishap

A series - Three blades were damaged when main rotor hit obstruction during landing to pinnacle. 8720

UH-60 Class D mishaps

A series - Aircraft was preparing for start with APU running. When front window anti-ice was turned on, pilot's side windshield cracked. Caused by short in center element of windshield.

A series - Aircraft was chalk 2 in flight. After troops were loaded and aircraft took off, chalk 3 informed pilot of dangling rear strut. Aircraft returned to field and attempts to reinsert strut in housing were unsuccessful. Troops exited while aircraft hovered 2 feet above sod area and aircraft landed with tail boom supported by mattresses. Takeoff from extremely muddy field caused suction on tail wheel, however, strut may have failed prematurely and QDR will be submitted.

UH-60 Class E mishap

A series - Cyclic became stiff in fore and aft axis during flight. Caused by moisture freezing in flight control system.

Attack helicopters

AH-1 Class A mishap

S series - Engine failed during takeoff and aircraft autorotated from 50 to 100 feet agl. Major damage resulted to main rotor head and blades and tailboom. 8721

AH-1 Class D mishap

S series - During gunnery training, crew had completed standard ammunition upload and were in holding pattern awaiting their turn. After 5 or 6 orbits, they were cleared for first firing run. The aircraft, with a student pilot at the controls, rolled out level on a heading of 355 degrees, 50 feet agl, 55 KIAS. Then the aircraft suddenly yawed left, warning lights came on, and rpm began decreasing. As the IP, in the front seat, took the controls, the aircraft was almost in the trees. He lowered collective pitch and looked for a place to land. To avoid tall trees, he was forced to apply aft cyclic and some collective pitch. He had chosen an area of small trees but, seeing a paved road to the left, he decided to try to make it to the road. He sacrificed rotor rpm to clear the trees and made a sharp right turn, aligning with the road. He began applying cushioning pitch at 10 to 15 feet agl, but ran out of sufficient pitch at 3 to 4 feet. The extra weight on the aircraft caused the landing gear to fail as it touched down, resulting in slight damage to the aircraft's underside. Engine failure was caused by failure of the starter generator shaft which locked up the accessory gearbox and cut off the fuel control.

AH-1 Class E mishaps

F series - During flight, pilot saw transmission oil gauge needle fluctuating and transmission oil pressure dropped to 40 psi. In the next 2 minutes, transmission oil pressure dropped to zero. Failure of internal transmission oil filter gasket allowed transmission fluid to leak out.

S series - Aircraft, with gross weight of 7,800 pounds, entered standard autorotation at 600 feet agl, 100 KIAS. Collective pitch was lowered to full down position and throttle reduced to idle stop. Rotor rpm was low at 290 rpm and N2 tachometer needle and rotor needles remained joined. Throttle was increased to full open position and normal landing made. Sprag clutch inside quill assembly was dragging, allowing engine to drag rotor rpm down slightly.

AH-64 Class E mishaps

A series - During flight, No. 2 engine nose gearbox chip detector light came on. Aircraft climbed and accelerated to single engine airspeed. At about 100 KIAS, crew heard a loud snap and felt lateral vibration. Vibration increased and crew decided to land. Vibration was caused by a 2- by 12-inch debonding of one main rotor blade. Chip detector light was caused by normal fuzz.

A series - During NOE flight, shaft-driven compressor light came on. Caused by failure of shaft-driven compressor.

Cargo helicopters

CH-47 Class D mishaps

C series - During flight at 350 feet agl, 130 KIAS, large flock of birds was seen on converging course with aircraft. Before crew could take evasive action, aircraft struck birds, breaking left upper and lower windows and denting nose access panel. The gray and white birds blended into snow-covered terrain, making them difficult to see.

C series - UHF antenna was broken when pilot allowed it to hit a rock during up-slope landing.

D series - While crew was performing inflight vibration checks at 150 KIAS, 1,500 feet agl, left cabin escape panel came off and dropped into remote swampy area.

CH-47 Class E mishaps

B series - After completing HIT check, crew brought aircraft to hover. All instruments were normal except for No. 1 engine torque indicator, which dropped to zero. After aircraft landed, torque needles matched. Engine trim and emergency trim operated normally. Aircraft was brought to hover and again torque needles split. Synchronized differential transmitter had spun coupling assembly off transmitter pin, causing torque needle to be limited to 280 pounds.

C series - During flight, transmission oil pressure on No. 2 engine dropped below 20 psi and caution light came on. Caused by failure of engine transmission transmitter.

Observation helicopters

OH-58 Class D mishap

A series - During climbing turn to crosswind, upper jettison rod on pilot's door sheared and door was bent in half.

OH-58 Class E mishaps

A series -Aircraft was in left bank at 85 KIAS, 500 feet agl, while conducting overview of simulated ground attack. Master caution and hydraulic pressure

lights came on and pilot felt feedback in cyclic. He leveled aircraft, adjusted airspeed, and pulled hydraulic boost circuit breaker; but hydraulics were not restored. Pilot pushed circuit breaker in, turned hyraulic boost switch off, and made run-on landing. Hydraulic fluid could be seen on both sides of aircraft. Hydraulic hose fittings had vibrated loose, allowing fluid to be lost.

A series - Aircraft was hovering over hot refueling pad when it experienced fuel exhaustion and engine quit. Fuel gauge and low fuel warning system were working properly, but pilot and copilot failed to heed 20-minute fuel warning light and low-level readings. Pilot violated AR 95-1 by neglecting to maintain VFR fuel reserve.

C series - Pilot suspected fuel contamination because sample taken during preflight had a light green color and smelled like mogas. Sample was analyzed and found acceptable. Green color was caused by substance used to purge fuel storage tanks.

D series - While at a hover, aircraft began to drift. IP applied aft cyclic, but cyclic wouldn't move aft of center. Crew made running landing. Boot on lower part of cyclic had slipped down and wadded up, causing restriction on aft travel of cyclic.

Fixed wing

C-12 Class E mishap

C series - During climb, crew saw smoke plume coming from bottom of exhaust stack on No. 2 engine. A few seconds later, oil sprayed from forward section of No. 2 engine and engine was engulfed by smoke. Torque fluctuated and oil pressure dropped. Caused by O-ring failure.

OV-1 Class C mishap

D series - All three gears remained up and locked when landing gear handle was placed in down position. Gear handle was recycled with same result. Pilot called for checklist for hydraulic failure. As technical observer read off "emergency landing gear release handle-pull," pilot pulled emergency stores release handle. Both drop tanks were destroyed when they fell from the aircraft and one tank caused minor damage to a parked POV. The pilot then pulled the emergency landing gear release handle and the TO saw the left main gear extend and appear to lock. Wheel and flap indicator showed both main gears in transit and nose wheel up. When the pilot pulled the emergency release handle again, all three gears indicated down and locked, and aircraft landed. During postflight, hydraulic fluid could be seen on outside of aircraft and dripping from numerous panels. Hydraulic hose to left flap actuator burst, causing loss of hydraulic fluid.

OV-1 Class E mishap

C series - Landing gear wouldn't fully extend during instrument approach and hydraulic pressure showed zero. Attempts to recycle gear were unsuccessful and gear was extended by using emergency air pressure. Pilot had maintained brake pressure during taxi, causing brake assembly to overheat. When O-rings in brake piston assembly failed, hydraulic fluid leaked past piston assembly.

Maintenance

AH-1 Class E mishap

F series - After aircraft entered standard autorotation, rotor rpm climbed to 105 percent. IP twice applied collective to maintain rotor rpm within limits. Aircraft was in stable autorotation at 80 KIAS. Rotor rpm was incorrectly adjusted for autorotation rpm.

AH-64 Class E mishap

A series -During start sequence, No. 1 engine wouldn't advance above engine idle. Engine accelerated normally when power lever was brought to lockout position. Engine cutout relay was set for engine chop cutout. Engine performed normally after chop collar was reset.

OH-58 Class E mishaps

C series - When collective pitch was applied after deceleration during landing, low rpm audio came on. All other indications were normal. Visual inspection after landing revealed installed N2 tachometer generator was for an AH-1 aircraft. Tachometer generator was not marked with part number.

C series - Aircraft had completed OGE hover check and was being hovered towards open field for practice of ATM maneuvers. Master caution and engine chip lights came on during approach. Lower engine chip cannon plug pin was not correctly installed in plug.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time inspection of 90-degree gearbox assembly on UH-1/EH-1 series helicopters (UH-1-87-03, 101500Z Feb 87). Summary: Urgent TB 55-1520-242-20-26 was dispatched prior to this message because it was felt that a long list of serial numbers might become garbled during retransmission of a message. It was not realized at the time that an excessive time lag in receiving TBs would cause problems in suspense date reporting. This message is an updated version of referenced TB, and the message will take precedence wherever discrepancies exist. Purpose of this message is to alert the field that certain serial-numbered 90-degree gearboxes overhauled at CCAD during February, March, and April 1982 timeframe may have a discrepancy consisting of a possible undertorque of the pinion gear retaining nut. One 90-degree gearbox out of this suspected lot is known to have recently failed during MOC. As a precautionary measure, a records search and hardware check is directed. If report has been made in response to referenced TB, a duplicate report is not necessary. If no report has been made, report per instructions in this message. Contact Dick Mooey, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning installation of obsolete fuel control on engine of OH-58 helicopter (OH-58-87-02, 101600Z Feb 87). Summary: During a records review at the Allison Plant,

(continued on page6)

ALSS-GRAM

ALSS questions and answers

Q. Who is the chief of the Aviation Life Support System Training School, Fort Eustis, VA, and what is the telephone number?

A. CW4 Marion Krauss took over this responsibility in April of 1986. SFC Barney Baker is also still with the school as a senior instructor. The telephone number is AUTOVON 927-5651/5645.

Q. What can you tell us about the three phases of ALSE training at Fort Eustis?

A. Phase A is an indepth study of the Army Aviation Life Support Program. It includes: shop procedures, publications, forms and records, and supply procedures, with extensive use of microfiche and related publications and material.

Phase B covers flotation equipment (life preservers and life rafts), first aid kits, survival kits, survival vests, anti-exposure suits, and armor vests.

Phase C includes helmets, oxygen equipment, survival radios, flight clothing, harness sewing, survival training programs, and new ALSE systems.

Note: Each phase incorporates inspections, maintenance, repairs, testing, and hands-on exercises into the instruction. There are more hands-on exercises in the specialist course than in the supervisors course.

Q. The ALSE Syposium/Steering Council meeting in August of 1986 provided users with some valuable information. Will this be an annual event?

A. There will be another symposium in 1987 and we plan to hold ALSE Steering Council meetings even more frequently.

Q. Problems with shortdated ALSE items in survival kits and vests continue to plague ALSE personnel and commanders. Items are being received which may have no more than 3 to 6 months of service life remaining. Medical items have been the biggest problem, but emergency rations are also a problem. Is anything being done in this area?

A. We recognize that this is a problem and there is definitely a need to work toward longer-life items and minimize the need for inspections. We're doing everything within our power to resolve this issue and while we've been successful in some areas, we don't have the solution yet.

Q. The question has come up any number of times about interim use of MRE (meal, ready to eat), NSN 8790-00-149-1094, until requisitioned emergency rations for survival kits are received. Would having emergency rations on requisition be a valid condition to use the interim MRE replacement?

A. We reviewed this at great length with Natick Laboratories and jointly concluded that MREs are not a suitable replacement for the general purpose survival rations, NSN 8970-00-082-5665. The MREs are not designed to withstand the temperature range survival rations are subjected to during storage or in a survival scenario. MREs also take up more space than is currently available in survival kits or vests. A suitable interim replacement for the general purpose survival rations is the emergency NATO food bar, Coast Guard No. 8970-17-054-7246, which is commercially available from DATREX, Inc., 3795 NW 25th Street, Miami, FL 33142, telephone 305-327-6451.

Q. We have received several telephone calls asking how to dispose of batteries from the PRC-90 survival radio and strobe light.

A. These batteries contain mercury and when no longer useful must be disposed of through property disposal channels. Follow the requirements of TM 55-1680-322-12 and mark tags **"contains mercury."** We have submitted a DA Form 2028 to add these instructions to the regulation.

Thanks to LTC Howard and CW4 Medina, USAREUR Aviation Safety and Standardization Board, for bringing the following problems to our attention:

- There is a lack of information being distributed on how use of ALSE has reduced injuries and saved lives.

A. We agree, more needs to be done in this area. We are addressing some of the issues that concern you in *Flightfax*, but we would also like to encourage you to share your success stories. Send them to us at the address shown at the end of this ALSS-GRAM. We have included one such success story in this issue.

- Many Army aircraft currently in use have been designed and purchased

ALSS-GRAM

Deputy for Aviation Life Support Equipment AUTOVON 693-3215, Commercial 314-263-3215		
Title	**Name**	**Area of Responsibility**
AMC Product Manager		AMCPM-ALSE
Deputy AMC Product Manager	A.B.C. Davis, Jr.	Chief, Logistics Readiness
Logistics/Readiness	Harlyn Hubbs	Senior Logistics/ Readiness
Logistics Readiness	Jim Dittmer	Mission Environmental Equip
Logistics Readiness	Boone Hopkins	Egress/Survival Rescue Equipment
ALSE Maint Specialist Technican	SFC Edward Bruck	ALSE Maint/Tng Admin

"off-the-shelf" without considering the need to allow adequate space for ALSE, such as survival kits.

A. Unfortunately, this is an age-old problem and we must get on top of it. As new aircraft are developed, there must be planning for ALSE space and placement early in the design cycle. Input from the PM ALSE and performance requirements from the Army Aviation School must be a part of the effort to provide for survival and rescue of our aviation personnel.

• A lack of trained ALSE personnel continues to be a problem in USAREUR. Although the command continues to train ALSE personnel regularly, the courses taught do not adequately meet the requirements of AR 95-17: The Army Aviation Life Support Equipment Program. We need an exportable aviation life support specialist course, not only in USAREUR but in other areas.

A. We agree there is a problem in ALSE training and qualification, one that needs early resolution. Our greatest hope for resolving this issue is the action being taken to establish an ALSE MOS career field. A practical interim solution would be an exportable aviation life support specialist course such as Course No. 600-ASI Q2 from the Army Aviation Logistics School. Such a course would have to be funded by TRADOC and approved by Department of the Army.

An ALSE success story

An Army aircraft was on an IFR flight when the crew suddenly lost communications on all transmitters. During descent at destination, the aircraft entered VFR. The crew used a PRC-90 survival radio to contact the tower for clearance and landed safely.

The radio problem was traced to a broken wire on the audio PC assembly. ■

ALSS-GRAM 3 25 February 1987

Prepared by the Deputy AMC Product Management Office, Aviation Life Support Equipment, 4300 Goodfellow Blvd, St. Louis, MO 63120-1798, AUTOVON 693-3215, commercial 314-263-3215. Information published generally precedes normal staffing and distribution of Army official policy and is intended as advance information to enhance the critical area of ALSE.

A.B.C. Davis, Jr.
Deputy AMC Product Manager
Aviation Life Support Equipment

Potential health problems exist in eyewash units

The following information was extracted from a message dated 15 December 1986 from Cdr, TRADOC, to safety offices.

An organism identified as Acanthamoeba has been found in numerous portable and stationary eyewash units at some government installations. This organism is capable of causing serious eye infections with severe consequences. Acanthamoeba can survive conventional water treatment. Treating water in portable eyewash stations to effect a free chlorine residual of approximately 25 ppm destroyed the amoeba, but caused corrosion of some stainless steel eyewash units. Flushing plumbed eyewash units for 3 minutes drastically reduced the number of positive samples while 1-minute flushes did little to reduce the number of amoeba.

American National Standards Institute, ANSI Z358.1-1981, requires that plumbed eyewash units be activated weekly to flush the line and verify operation. However, because the potentially hazardous amoeba may be found in any water supply, recommend that all plumbed eyewash units be flushed for at least 3 minutes once a week.

The water in portable eyewash units should be changed weekly pending more information about a safe method to destroy the amoeba. Portable eyewash units should only be used in remote areas when installation of a permanent system is not feasible. ■

—thanks to Bill Chaffin, Industrial Hygienist, U.S. Army Aeromedical Center, Fort Rucker, AL, AUTOVON 558-7055.

Mishap briefs

Indianapolis, IN, it was discovered that an obsolete fuel control, Bendix P/N 2524886-9, without a snubber, was installed on engine T703-AD-700, SN AE410039. This message provides instructions regarding inspection of assemblies/components and replacement of fuel control. Contact: Bill McDonald, AUTOVON 693-1355, commercial 314-263-1355.

• Safety-of-flight maintenance mandatory message concerning recurring inspection of K747 blade root fittings on AH-1/TH-1/TAH-1 aircraft (AH-1-87-02, 102300Z Feb 87). Summary: Safety-of-flight emergency message AH-1-86-09, 210030Z Nov 86, reported failure of two K747 root fittings and called for removal of low-flight-time fittings (below 200 flight hours) based on the fact that both failures had occurred with low or no flight time and there was no evidence that high-flight-time fittings were suspect. It was not a metal fatigue problem. A third failure reported in safety-of-flight technical message AH-1-86-12, 200030Z Dec 86, caused a revision of the earlier assessment and led to a requirement to inspect all fittings, using an innovative, enhanced ultrasonic inspection technique developed to specifically look for onset of crack formation. A conductivity test was also used in conjunction with the ultrasonics to indicate a susceptibility for crack development. Testing to date has not proven conductivity to be a reliable indicator of acceptable root fittings; therefore, ultrasonic inspections will be used to clear components for flight. Ongoing laboratory work has now been able to duplicate, in small test specimens, a condition exhibiting characteristics of all three actual fitting failures. The determination of the failure mechanism was complicated by exhibiting some, but not all, of the characteristics of both stress corrosion and hydrogen intrusion. Testing shows that the combination of high stress, high humidity, and high temperature accelerates the process of cracking. Laboratory work is continuing to duplicate the condition in a production fitting. Purpose of this message is to establish follow-on inspection procedures and schedules for the aluminum K747 root fitting. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• The following is not a safety-of-flight (SOF) message as defined in AR 95-18. Message dated 101700Z Feb 87 from Cdr, AVSCOM, concerns SOF compliance reporting. SOF missions and functions were assigned to the AVSCOM safety office effective 1 December 1986. Some units, however, are still sending SOF compliances to AMSAV-MEM and AMSAV-MPSD. This is incorrect. When reporting is required in an SOF message, compliances should be sent to the Safety Office, ATTN: AMSAV-XSOF (SOF Compliance Officer). In addition to the means for transmitting compliances specified in AR 95-18, the safety office has access to a data facsimile machine which may be accessed by calling AUTOVON 693-3271 and is an alternate method for receiving compliances. Telephone compliances are not acceptable. Contact: J. Rodriguez, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

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.

A. E. Hervey, Jr.
Colonel, Aviation
Commander, Army Safety Center

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Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 30 Oct 85 issue (8602) □ During a service mission to provide orientation flights for ROTC cadets, the pilot channeled his attention on maintaining clearance from another aircraft and failed to monitor his altitude and rate of descent. From an altitude of 150 feet agl, he began a right descending turn with 45- to 60-degrees bank. In an attempt to recover from the descent, the pilot applied power, rolled the aircraft level, and raised the nose in a slight flare. The UH-1 entered trees at about 40 KIAS, striking several of the 60-foot trees before it hit the ground in an upright attitude. It then rolled onto its right side and came to rest in a ravine. The pilot had completed several similar maneuvers during the flight, but none were in a gusty downwind condition, at such low altitude and steep angle of bank. The pilot and four passengers were injured.

UH-1 Class B mishap in 5 Feb 86 issue (8616) □ Aircraft was in flight at 1,000 feet msl en route to a training area. The aircraft shuddered, yawed left and right, and the low rpm light and audio came on. The IP took control and began an autorotative descent. When the governor was switched to emergency mode, there was no response from the engine. The aircraft was autorotated to a frozen swamp covered with numerous dead trees. It landed slightly tail low, bounced, and landed again in a level attitude. After sliding about 10 feet, the UH-1 came to rest in an upright position. Although there was damage to the fuselage, copilot's lower chin bubble, and spreading of the crosstube assemblies, neither pilot was injured in the crash. An apparent malfunction in the engine compressor section caused the N1 accessory drive gearbox to fail. As a result, the engine fuel pump inside the fuel control ceased to operate and the engine failed due to fuel starvation. The cause of the apparent malfunction was poor alignment of the N1 input drive bevel gear, resulting from failure to remove excess shim stock material during depot engine overhaul.

UH-1 Class A mishap in 26 Mar 86 issue (8622) □ Crew was conducting hoist training. While the aircraft was at a 160-foot, out-of-ground-effect hover, the UH-1 yawed right 30 degrees then immediately returned to the original heading. The pilot began a descent by lowering the collective and nosed the aircraft over to gain airspeed. The aircraft began a gradual right descending turn of about 120 degrees. The pilot then applied power, which resulted in additional right yaw, and the aircraft continued to settle into a depression. The main rotor blades struck the slope, causing the main rotor system and part of the main transmission to separate from the aircraft. The UH-1 bounced and rolled down the 22-degree slope, coming to rest on its top at the bottom of the depression. When the PIC attempted to fly out of the unstable hover situation, he failed to properly respond to the uncommanded right turn, which had progressed for 120 degrees. He attempted to reduce power to correct the yaw rather than using all available left pedal. The rotors struck the hillside and the aircraft crashed.

UH-60 Class A mishap in 26 Mar 86 issue (8623) □ The UH-60, with an IP and two rated student pilots on board, was conducting VFR traffic pattern work at a remote training site. Following 40 minutes of ground operations, the aircraft was seen to take off and turn crosswind for right traffic. The aircraft was next observed at about 1,000 feet msl at normal traffic pattern airspeed, on a downwind heading. The aircraft experienced two pitch-down events. Sufficient altitude was available for recovery from the first event, but insufficient altitude was available for recovery from the second pitch down. The aircraft entered an excessive nose-down attitude and crashed in heavily wooded terrain, in a near-inverted attitude. The three occupants were killed on impact. Due to lack of onboard flight data recorders and resultant lack of conclusive evidence of materiel malfunctions or human error, causes of the accident have not been determined. Investigation continues.

Attack helicopters

AH-1 Class A mishap in 29 Jan 86 issue (8613) □ The flight of four OH-58s and two AH-1s were en route to a field site. The aircraft, in a loose trail formation, were flying at contour level, approximately 120 feet agl and 80 KIAS. The flight was approximately 6 kilometers from the field site when they made a right turn from a heading of 310 degrees to 015 degrees. The mishap OH-58 in position four turned to 015 degrees and was flying straight and level when the AH-1 in position five overtook the OH-58 on the right side. The main rotor blades of the OH-58 struck and penetrated the AH-1 left engine cowlings, severing the main fuel and oil lines and the engine mounts.

(continued on back page)

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - Aircraft was in flight at night, about 200 feet over a river, at 90 KIAS. Large bird hit aircraft's nose, breaking nose compartment radio door.

UH-1 Class E mishaps

H series - During low-level flight at 50 feet agl, 50 KIAS, pilot began left turn and made slight power reduction. Crew heard two loud bangs, followed by slight power loss and momentary marginal control. Pilot further reduced power and began descent to flat area on top of hill. At about 10 feet agl, pilot started to pull power to slow descent. Aircraft began drifting right, despite pedal input, and started vibrating. At about 3 feet agl, vibration stopped and pilot was able to maintain directional control. Suspect compressor stall caused by sand and dust in environment.

H series - During flight, pilot noticed 45 psi torque was required to maintain airspeed at 100 knots. Oil pressure began falling and temperature registered full-hot. Engine seemed to be losing power, and aircraft entered autorotation from 1,500 feet, 100 KIAS. Cockpit filled with smoke and pilot shut engine down and turned fuel off. Aircraft was engulfed in white smoke as it landed. Cause unknown; suspect engine oil line blockage or failure of engine oil pump or oil cooler thermo valve.

H series - During completion of emergency governor operations at a hover, student pilot inadvertently increased throttle, instead of decreasing it. Engine rpm increased to 7100 and rotor rpm to 345, but there was no damage.

H series - As aircraft landed at pickup zone, pilot was told engineer tape had gone through tail rotor. As rotor blades slowed, some of the tape went up into swashplate.

H series - After shutdown, crew chief noticed upper bolt had broken from bipod mount assembly. Remaining bolt was loose.

V series - During flight, copilot noticed engine oil temperature was 150° C. Suspect high temperature existed for about 5 minutes. Failure of thermal bypass caused engine oil temperature to exceed limits. Engine will be replaced.

UH-60 Class C mishap

A series - Mishap aircraft was chalk two in flight of 10 under NVGs. During approach, first three aircraft made go-arounds because of extremely dusty conditions. Chalk two made its second approach to what appeared a suitable area to right of seven aircraft which were now on the ground. Tail wheel strut collapsed when it struck a 3-foot berm, resulting in $13,000 damage.

UH-60 Class D mishaps

A series - The day following an uneventful flight, report was received from General Aviation District Office that the UH-60 had hovered too close to a civilian aircraft, resulting in very minor damage to an elevator.

A series - Pilot opened door during runup and rotorwash blew door open, bending rod end bearings.

UH-60 Class E mishaps

A series - After takeoff, right front cargo door window blew out. Window was recovered and reinstalled.

A series - Lower stabilator actuator failed at 30 degrees, 50 KIAS.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	1-4 Mar	1	0
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	13	17

A series - During first attempt to start aircraft, APU failed. During second attempt, there was fire in APU stack. O-ring failed, plugging combustor drain line and causing fuel to remain in combustor.

A series - Torque on No. 1 engine went to zero during flight and torque on No. 2 engine went to 80 percent. Tgt on No. 1 engine was about 650° and tgt on No. 2 engine stayed around 670°, with bursts to 750°. Ng fluctuated several percent. Caused by failure of ECU on No. 1 engine.

Attack helicopters

AH-1 Class D mishaps

E series - CCR nozzle did not seat properly during attempted hot refueling. Refueler jerked nozzle out and front of nozzle caught on bracket. Part of CCR bracket broke off.

E series - Aircraft was in traffic pattern at 1,000 feet msl when pilot heard loud bang and immediately brought aircraft around for landing. Just before touchdown, master caution and oil hot lights came on. Oil cooler fan had disintegrated, throwing pieces of the fan into forward structural wall and side panels of compartment. Damage amounted to about $9,000.

F series - After about 4 hours of NOE flight, $6,000 damage to tail rotor was found during postflight inspection. Tail rotor will be replaced.

AH-1 Class E mishaps

S series - As aircraft hovered to south of rock formation, leeward downdraft, created by 20- to 30-knot northerly winds, caused aircraft to begin settling into rocks. Pilot turned aircraft's nose away from rocks and aircraft continued to settle, but cleared rocks. Torque spiked to 60 psi for about 1 second.

S series - Transmission oil pressure dropped below 40 psi during flight. O-ring on transmission oil filter failed, allowing oil to leak out.

AH-64 Class C mishap

A series - During photo documentation flight at low level NOE, main rotor blades struck a saguaro cactus and a tree, causing more than $53,800 damage.

AH-64 Class E mishaps

A series - During runup for second flight, fault location/detection system indicated multiplex bus failure in left and right forward avionics bay and aft avionics bay. Heading and attitude reference system and digital automatic stabilization equipment were also inoperative. Caused by failure of fire control computer.

A series - During approach, utility hydraulic bypass caution light came on, with no master caution light. Hydraulic filter was replaced. This was second precautionary landing on same day for this aircraft for same reason.

Cargo helicopters

CH-47 Class E mishaps

D series - During flight, transmission chip detector caution light came on and couldn't be reset. Excessive chips were found in filter and chip detector, and transmission was replaced. Caused by possible bearing failure.

D series - During engine start, first engine started normally and ECL was advanced to flight position. No. 2 engine was started and ECL advanced to flight position with N1 at 69 percent. Attempt to match torque with normal engine trim had no effect. When emergency engine trim was used, N1 increased to 71 percent, then crew heard a loud bang and felt a violent shudder in the aircraft. Caused by sprag clutch failure.

D series - When ECLs were advanced to flight position during runup, No. 2 engine wouldn't accelerate past 66 percent and ECLs were moved to stop position. During coastdown, at about 50 percent, crew felt aircraft shudder. No. 2 engine sprag clutch failed to engage.

Observation helicopters

OH-58 Class A mishap

C series - During NVG training flight, aircraft experienced a left yaw, followed by low rpm audio, and engine-out light. Aircraft hit the ground, coming to rest on its left side, with the transmission and main rotor system separated. 8722.

OH-58 Class D mishaps

A series - After completion of MWO, which included installation of segmented tail rotor driveshaft and two-piece tail rotor driveshaft cover, contractor personnel called unit for MTP to run up aircraft for adjustment of N1. Six minutes after aircraft was cranked, aft section of tail rotor driveshaft cover opened, rotated on its hinges, and was struck by tail rotor. Safety retainer cable, which is supposed to limit opening of aft portion of the cover, had not been attached at tail boom. When dzus fasteners failed in aft tail rotor driveshaft cover, cover opened completely. Suspect vibration and flexing of tail boom may have caused dzus fasteners to fail prematurely. The tail rotor driveshaft cover on the OH-58 opens toward the tail rotor, setting the stage for this kind of mishap. The cover on utility and attack helicopters is hinged so that it opens away from the tail rotor.

C series - IP, in right seat, started aircraft while pilot acted as fire guard. Pilot got into left seat, placing knee board on dash. Knee board fell and hit chin bubble, causing several cracks and small hole. Plexiglas was brittle due to minus 14° C temperature.

OH-58 Class E mishaps

A series - Pilot felt airframe vibration when he placed collective in full-down position during autorotational check. When he increased collective to about 45 psi torque, he could still feel vibration and noted feedback in the controls. Vibration and feedback decreased when collective was increased to cruise power. Pilot decreased altitude by adding forward airspeed and made a running landing. Cause unknown.

A series - During flight, engine temperature climbed to 125° C. Caused by failure of engine oil temperature transmitter.

A series - After completion of standard autorotation, aircraft was brought to hover and transmission chip light came on. Caused by failure of transmission assembly.

C series - Alternator rectifier light

came on during landing and all lights in master caution panel went out during shutdown. Caused by weak solder joint from NVG relay.

C series - During start, pilot fixed his attention on N1 gauge. IP noticed TOT at 900° C. for about 15 seconds. Pilot was wearing leather gloves because of minus 6° C. temperature, and couldn't feel detent. He thought he had throttle off, but instead had attempted start at idle setting. Pilot had trouble rolling throttle off and had to be assisted by IP.

Fixed wing

C-12 Class E mishaps

D series - Bird strike resulted in cracked radome.

D series - During landing, flap switch was in approach flap position but indicator showed flaps full up. Visual inspection confirmed flaps were up. Caused by failure of split flap switch.

D series - When gear was placed in down position, left main down light wouldn't come on. Recycling had no effect. When gear was manually extended, light flickered. Caused by failure of downlock switch.

OV-1 Class D mishap

D series - Pilot felt vibrations during takeoff roll and landing rollout. Right main tire was deflated. Suspect low tire pressure caused vibrations and tube failure.

OV-1 Class E mishap

D series - During flight at 14,000 feet msl, 93 percent N1, pilot heard several sharp reports and saw sparks and flames coming from No. 1 engine. He reduced power to 91 percent N1 and, after a short interval, heard and felt several more sharp reports. Power was further reduced and aircraft landed. After compressor was washed and VIGVs adjusted, problem could not be duplicated.

SD-3-30 Class E mishap

During takeoff roll, autofeather magnetic indicator showed system was inoperative. Salt in the atmosphere caused corrosion buildup and deterioration of autofeather microswitch adjustment.

U-8 Class E mishap

F series - When gear handle was placed in up position during recovery from slow flight, gear wouldn't retract. Recycling had no effect. After IP verified landing gear was down and locked, he disabled system by pulling landing gear relay circuit breaker and disengaging landing gear clutch from the electric motor and made a normal landing. Landing gear safety switch on right main landing gear malfunctioned and kept gear from retracting.

U-21 Class E mishap

H series - During MOC for reinstallation of propeller, No. 2 engine was shut down. When engine was restarted and propeller lever advanced, propeller wouldn't unfeather. During downwind, propeller unfeathered and returned to normal rpm. Solenoid valve for autofeather had failed.

Maintenance

UH-1 Class D mishap

H series - Aircraft had been ground run during maintenance operation to purge fuel. During postflight, several small holes were noticed in tail rotor driveshaft cowling near No. 2 hanger bearing. A ratchet and socket wrench had been left in driveshaft area by maintenance personnel. The wrench was under the driveshaft during ground run, resulting in minor damage to hanger bearing and driveshaft cowling.

AH-1 Class E mishaps

F series - Spare caution light came on during hover. Maintenance personnel had installed spare caution light in place of radar countermeasures light on master caution panel. Light came on when circuit breaker for AN/ALQ popped.

P series - Average HIT checks on aircraft were plus 14 degrees. After operation in sandy environment, HIT check twice read plus 40 degrees. After two engine flushes, reading was still plus 31 degrees. When tgt harness was checked, thermocoupler was found installed with one ring cocked, causing high reading.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time validation of correct torque of T700 engine fuel differential pressure indicator on UH-60A and AH-64A series aircraft (UH-60A-87-01 and AH-64A-87-03, 122015Z Feb 87). Summary: Factory and subsequent Army investigation determined a vendor of the pressure indicator, P/N RC965MFOH7, NSN 2995-01-094-5644 (figure 22, item 77 and item 53, TM 55-2840-248-23P special tools list T700-GE-700 and 701), did not, in his quality program, validate that the indicator specification torque was met. As a precautionary measure, a random sample of 10 field engines was checked for torque and 9 units displayed torque values less than specification. Although there have been no reported incidents in the field, a small potential for seepage could exist due to below-specified torque. Therefore, subject indicators must be retorqued by the next scheduled 10-hour, 14-day inspection. As an added precaution, until the retorque is completed, specific attention must be paid to the area around the subject indicator during the pilot's preflight and postflight inspections. Purpose of this message is to identify the suspect components, provide information for proper torquing, and validate the correct torque is applied to the differential pressure indicators. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning revision to message on T700 engine fuel differential pressure indicator (UH-60A-87-01 and AH-64A-87-03, 182220Z Feb 87). Summary: The purpose of this message is to correct the technical bulletin (TB) number cited in the referenced message. The correct number is TB 55-2840-248-50-44. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Fire extinguisher update

Inquiries are being made by units in the field about flightline fire extinguisher requirements. Revision of AR 420-90: Fire Protection has been completed and the regulation is now undergoing administrative processing. In the meantime, the following information on Halon 1211 50-pound and 150-pound wheeled extinguishers has been extracted from the revised regulation and is provided for your information.

Organizations will supply one 50- or 150-pound Halon 1211 extinguisher (as appropriate) for equipment and areas shown below. Existing 50-pound CO_2 extinguishers or their equivalent (20-pound Halon 1211, which actually exceeds the capability of the 50-pound CO_2 about 4 to 1) may be used until the Halon wheeled extinguisher is available. If units wish to use alternatives to the 50- or 150-pound Halon requirement: i.e., 20-pound Halon 1211, requests for approval for modification of this requirement should be sent to the responsible MACOM fire protection office.

Note: The intent is to allow safety officers greater latitude in determining their actual needs based on the site, surface conditions, and so on.

Small and medium helicopters

Every three parked small/medium helicopters (UH-60/AH-64 and below) require a 50-pound Halon 1211 wheeled fire extinguisher. The 20-pound Halon handheld portable extinguisher may be substituted when approved by the responsible MACOM. (See above paragraph for approval procedures.)

Note: Halon 1211 handheld portable units are presently in the field in sizes ranging from 17 through 22 pounds, depending on the manufacturer. Thus the term "20-pound" **should not** be taken as a literal term. In fact, 17-, 20-, and 22-pound Halon extinguishers have identical Class B ratings. They differ in Class A (paper, common combustibles) ratings only. Therefore, any one of these extinguishers may be substituted until the Halon wheeled extinguisher is available.

Many people feel that the 50-pound CO_2 fire extinguisher is ideal for flightlines. It isn't. The 50-pound CO_2 has only a quarter of the capability of the handheld Halon 1211 20-pound portables. The Halon 1211 portable unit also weighs 80 percent less (about 40 pounds as opposed to almost 180 pounds for the 50-pound CO_2). In addition, the cost of the Halon 1211 portable is only 12 percent of the cost for a 50-pound CO_2.

Small fixed wing and large rotary wing aircraft

Every three parked small fixed wing and large rotary wing aircraft (CH-47 or equivalent) require 150-pound Halon 1211 wheeled fire extinguishers.

Note: This requirement is based primarily on the needed throw range of the agent, which the smaller wheeled or handheld portables cannot provide. Thus substitution would not be in the best interest of safety.

Large frame aircraft

Each parked large frame aircraft (C-130, C-141, C-5, or equivalent) requires a 150-pound Halon 1211 wheeled fire extinguisher.

POL areas and landing strips

- Each large petroleum, oil, and lubricant (POL) tanker truck dispensing point requires a 150-pound Halon 1211 extinguisher. Smaller unit POL areas may continue using the 20-pound Halon 1211 portable extinguishers.
- Each large POL tanker truck parking area requires a 150-pound Halon 1211 extinguisher.
- Each landing strip and helipad without regularly assigned crash fire rescue vehicles requires a 150-pound Halon extinguisher.
- Existing 125/150-pound wheeled dry chemical extinguishers installed at POL storage and dispensing areas, and other areas having a Class B fire risk need not be replaced by Halon 1211 extinguishers until the existing extinguisher is no longer serviceable. However, dry chemical extinguishers, although just as effective and sometimes more effective, than Halogenated agents (Halon 1211 or Halon 1301), **should not** be used around aircraft. This is primarily due to the extensive cleanup costs and potential corrosive damage to electronics which result from their use. ■

—CW4 R.J. Rendzio, Investigation Division, AUTOVON 558-3262

The following information on Halon 1211 extinguishers is furnished for your use.

Agent	Size	Rating	Approximate Cost	NSN
Halon 1211	20	4A80BC	$82.56	4210-01-089-0875
Halon 1211	17	3A80BC	$75.00	4210-01-128-1674
Halon 1211	50 wheeled	10A120BC	$448.00-$471.00	See Notes 1, 3
Halon 1211	150 wheeled	30A240BC	$1,003.20	See Notes 2, 3

Note 1: Ordered off line under FSC 4210, model 695, GSA contract GS-00F-87716, special item N1S-G-0671. Item is shipped charged. A tow loop, available for an additional $10.00, is recommended when purchasing.

Note 2: Ordered off line under FSC 4210, part 1, section A, model 600, GSA contract GS-08F-38147. Specify military grade for additional discount. Unit may also be purchased uncharged for a substantial savings.

Note 3: To avoid errors, coordinate purchase with Amerex Corporation, ATTN: Military Sales, P.O. Box 81, Trussville, AL 35173-0081, (205) 655-3271, and your installation supply.

Followups

The AH-1 immediately caught fire and the OH-58's main rotor head and blades separated from the aircraft. The OH-58 fell to the ground, impacted on its left side, bounced back into the air, and came to rest on its left side. The copilot was killed and the pilot and passenger were injured. The AH-1 continued straight ahead in a rapid descent, hit two trees, struck the ground, rolled over and burned. The copilot, although injured, got out of the aircraft unassisted, then reentered the aircraft and, with assistance from a civilian, removed the unconscious pilot from the wreckage. The pilot of the AH-1 died a few days later from his injuries. The pilot of the AH-1 was confident in his ability to fly in the loose trail formation and failed to maintain visual contact with the aircraft he was following. When he attempted to close on what he thought was the OH-58 he had been following, but was in fact another OH-58 in position three, he failed to see number four aircraft and overtook it from a position above and to its right rear. The OH-58 pilot could not see the overtaking AH-1.

AH-64 Class A mishap in 5 Mar 86 issue (8619) □ Aircraft was on a maintenance recovery mission at 100 feet agl, 70 KIAS. The flight mechanic in the front seat inadvertently activated the engine chop control, causing both engines to go to flight idle. There were insufficient time and altitude to bring the engines back to flight power and the aircraft descended into trees and crashed. The AH-64 was destroyed and the two crewmembers received major injuries. The flight mechanic lacked required training and failed to identify the engine chop collar-type switch from that of the collective friction control while attempting to check the friction position. The engine chop control on the AH-64 does not have a caution/warning label, nor is it painted with caution/warning color markings. The critical potential hazard of activating this control in flight is not addressed as a caution/warning in the AH-64 operators manual.

Observation helicopters

OH-58 Class A mishap in 19 Mar 86 issue (8621) □ While attempting to land to a ridgeline, pilot encountered a sudden and unexpected wind gust from his left rear. Sudden wind condition caused aircraft to yaw violently to the right to a point where pilot's inputs were ineffectual. Aircraft spun to the right, struck the ground, and rolled onto its right side. Pilot and passenger required only first aid treatment. Aircraft was on short final to a ridgeline when it experienced loss of tail rotor effectiveness. It entered an uncommanded right spin and experienced N2 droop. Pilot lost control and aircraft crashed on a 15-degree slope of the ridgeline. LTE occurred because the aircraft was landed with a quartering left tail wind of about 12-knot velocity. Terrain offered no cues to wind speed or direction and weather forecaster had improperly listed winds as variable at 10 knots. According to Air Weather Service regulations, true wind direction is to be forecast to the nearest 10 degrees. When wind direction varies more than 60 degrees, prevailing direction is supposed to be given and the limits specified in remarks. Forecasts which fail to specify a wind direction when winds are expected to exceed 5 knots are unacceptable. Forecaster's failure to comply with weather regulations deprived the pilot of vital information. The weather forecaster was TDY at the training area and was unfamiliar with the type of training being conducted, wind conditions associated with the local terrain, potential for gusty wind conditions in the training area, and the criticality of this information to pilots of OH-58A helicopters. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
AWARENESS • ACTION
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AH-1 overtakes OH-58 and both aircraft crash

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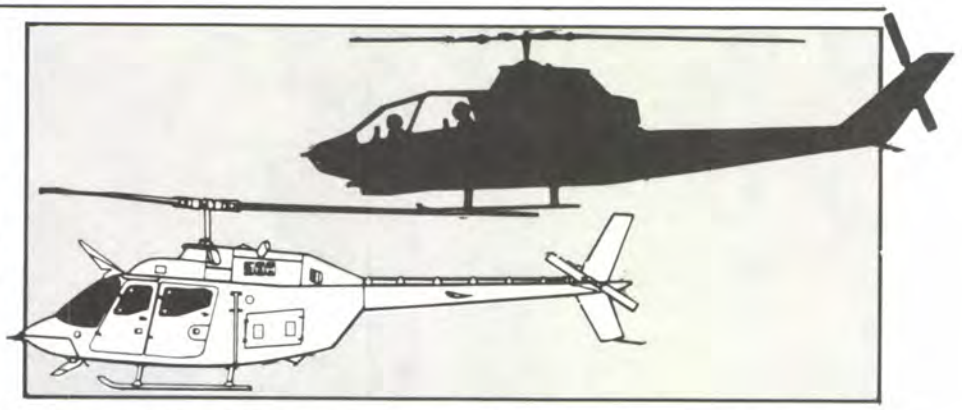
A flight of four OH-58s and two AH-1s were flying at contour level, approximately 120 feet agl and 80 KIAS, en route to a field site.

The flight, with the four OH-58s in the lead, made a right turn from a heading of 310 degrees to 015 degrees. The mishap OH-58, in position four, had turned to 015 degrees and was flying straight and level when the AH-1, in position five, overtook the OH-58 on the right side. The main rotor blades of the OH-58 struck and penetrated the AH-1's left engine cowlings, severing the main fuel and oil lines and the engine mounts. The OH-58's main rotor head and blades separated and the aircraft fell to the ground. The copilot was killed and the pilot and passenger were injured.

The AH-1 immediately caught fire when the OH-58's blades slashed through its fuel and oil lines. The AH-1 continued straight ahead in a rapid descent, hit two trees, struck the ground, rolled over, and burned. The copilot was injured but he managed to get out of the aircraft. Then, with the help of a local civilian, he got the unconscious pilot out. The pilot of the AH-1 later died from his injuries.

The PIC of the AH-1 had only recently been assigned to the unit, but he had a very good professional reputation and was well-liked by his peers. He had 1,052 total hours of flight time; 62 hours as a civilian pilot. He had flown 809.8 hours in the AH-1, 199 of them as an IP. The 25-year-old copilot of the AH-1 had a total of 370 hours of flight time.

The six aircraft had been flying in a loose trail formation, 150 feet above the highest obstacle. The PIC of the AH-1 was so confident of his ability to fly in the formation without any problem that he allowed himself to become complacent. He was talking to his copilot and watching him in the mirror.



The distance between number 3 OH-58 and number 4 OH-58 had widened to about 1/4 mile when the lead aircraft changed headings. The accident OH-58, flying in position number 4, increased his airspeed to 85 knots in order to close up with number 3. The accident AH-1, in position number five, had accelerated to about 125 knots. The PIC had lost sight of the OH-58 in number 4 position and when he saw number 3 aircraft, he thought it was the one he had been following. The AH-1 was slightly higher than the OH-58 in number 4 position and was flying about 35 knots faster. The PIC failed to see that OH-58 and overtook it from the right rear side. The copilot, in the back seat, saw the OH-58 when the AH-1 was about 20 feet away from it, but he was not at the controls and there was no time to react.

In the confusion following the midair collision that had caused his engine to fail, the AH-1 pilot hesitated beyond the point from which a successful autorotation could have been made. A low-level autorotation was possible, but only if he had lowered collective and decelerated immediately. The aircraft continued forward, struck trees, and had inadequate rotor rpm to cushion the impact with the ground.

There was nothing the OH-58 crew could have done to preclude this accident. The pilot could not reasonably be expected to see the AH-1 which was directly behind and slightly above him. When the AH-1 overtook them, the main rotor blades from the OH-58 penetrated the AH-1 as far forward as the transmission compartment before sudden stoppage caused the OH-58's main rotor head and blades to separate. The OH-58 fell to the ground, impacting on its left side, slightly nose low. The left skid tube was ripped off and the airframe came to rest basically intact. The left side was damaged extensively, with the left front cockpit area, where the copilot was sitting, sustaining the most damage. The copilot in the left front seat was killed on impact. The pilot in the right seat and the passenger in the right rear seat were injured, but survived. ■

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Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps

H series - Transmission oil pressure fluctuated between 37 and 60 psi during flight. Caused by malfunctioning of transmission oil pressure transmitter.

H series - During flight at 2,000 feet msl, 90 KIAS, crew felt sharp lateral vibration. About 1 minute later, another sharp lateral vibration was felt. During approach, crew discovered tail rotor was producing zero thrust. Caused by failure of tail rotor cross-head bearing.

H series - Crew heard loud report from engine area during hover, N2 drooped to 6200 rpm, and egt rose 500° C. Suspect compressor stall.

H series - During flight, engine N2 tachometer decreased to zero and rpm warning light came on. Caused by failure of tachometer generator drive shaft.

H series - Loose wire on transmission oil pressure transducer caused transmission oil pressure to fluctuate from 50 to zero psi during hover.

H series - During takeoff, crew heard loud explosion from engine area. Bleed air actuator was sticking and slow to respond to power changes.

M series - During flight at 1,500 feet msl, crew heard unusual noise from transmission area, saw lateral vibration in instrument panel, and felt vibration in cyclic and collective. Aircraft twice

yawed slightly to the left, without abnormal engine indications. After aircraft landed, unusual noises could still be heard from transmission with control at flight idle position. Caused by failure of left forward cyclic servo.

UH-60 Class B mishap

A series - Aircraft was chalk 4 in flight of six UH-60s during NVG airmobile training mission. As flight crossed a ridgeline in staggered left formation, chalk 4 lost sight of chalk 3. After regaining sight of chalk 3, pilot of chalk 4 initiated descent and, while maneuvering back into position, hit his head on the seat, causing NVGs to turn off. The dual battery pack is located on the back of the helmet and has a guarded toggle switch. As the pilot told the copilot his goggles had failed, the copilot alerted the pilot to watch out. The copilot, who had been navigating from the left seat, was on the controls assisting the pilot when the aircraft descended into treetops, striking several trees before landing in first available area. Damage amounted to more than $236,000. 8725

UH-60 Class D mishaps

A series - During approach to field pickup zone, ground guide failed to move out of way of approaching aircraft. Pilot increased collective and aft cyclic to avoid hitting ground guide and tail wheel hit wet, soft ground and dug in, causing trailing edge of stabilator to strike the ground. Damage amounted to more than $4,200.

A series - Aircraft was in lead position and had started to take off over 60-foot tree. Medevac aircraft parked just beyond tree diverted copilot's attention and he began left turn to avoid overflight. Rotor blades hit the tree, damaging three tip caps.

UH-60 Class E mishaps

A series - During flight, left accessory module chip light flickered and crew heard grinding noise. Caused by main thrust bearing failure of main transmission.

A series - During flight at 3,000 feet msl, pilot detected intermittent bumping in cockpit floor accompanied by moderate vibration. Forward vibration absorber bearings were worn.

A series - Pilot felt vibration during takeoff. Anti-flap cam stuck, causing stress fracture of anti-flap assembly bracket.

A series - During 10-hour inspection, fairing section was found missing from aircraft and was found on ramp. Suspect bracket and fairing cracked and failed while aircraft hovered after return from mission.

Attack helicopters

AH-1 Class C mishap

F series - Aircraft had returned to FARP after conducting live fire during JAAT exercise. Damage to tail rotor blades was found during postflight inspection. Aircraft had been hovering in deep, narrow draw in high shifting winds. Tail rotor probably struck a tree during rearward flight.

AH-1 Class D mishaps

F series - During MOC, engine was started with forward main rotor tiedown attached to blade but not secured to aircraft. Result was $9,500 damage to tail rotor and vertical fin. Pilot preflighted aircraft, but it was at night with no illumination. Aircraft was on firing range and pilot did not go forward of the weapons.

F series - Refueler applied downward pressure while attempting to remove CCR nozzle after rapid refueling. Rivets on CCR ring sheared.

S series - Aircraft hovered by unattended OH-58A. Unsecured copilot door on OH-58 blew open, damaging door post.

AH-1 Class E mishaps

F series - During simulated forced landings, IP noticed N2 and rotor dropped to between 80 and 95 percent before needles split and rotor wouldn't recover to more than 90 percent. IP rejoined needles and landed. Collective shear pin had broken. Cause is under investigation.

F series - During hover, 20mm gun elevation drive motor failed and gun depressed to full-down position. Aircraft flew to refueling point and hovered while armament personnel manually raised gun.

F series - Alternator failed during flight.

P series - Master caution and No. 2 hydraulic segment lights came on during flight at 2,000 feet msl. Caused by failure of No. 2 hydraulic pressure switch.

S series - During flight, PIC saw engine oil temperature had increased above 93° C. and reduced power to descend. By the time aircraft landed and was shut down temperature had been above maximum for 5 minutes. Engine oil cooler fan seized.

AH-64 Class D mishap

A series - During NOE flight, while performing tactical training mission, main rotor blades hit a tree, resulting in more than $3,600 damage.

AH-64 Class E mishaps

A series - During flight, shaft-driven compressor (SDC) light came on and pressurized air system was lost. During shutdown, chip light on main transmission came on. Shaft in SDC froze and sheared the female splines in accessory gearbox. SDC and main transmission were replaced.

A series - During flight, master caution, primary hydraulic psi, and oil low primary hydraulic lights came on and all three channels of DASE disengaged. Primary hydraulic pressure line had ruptured.

A series - IP was performing cyclic climb when he noticed tgt on No. 2 engine was at plus 90° C. and torque was about 120 percent. Instruments for No. 1 engine were in green zone. No. 2 power lever was put in ground idle position. During final approach, No. 2 power lever was brought forward in attempt to match torque with No. 1 engine. Tgt on No. 2 engine started to exceed limits and torque was at 13 percent. No. 2 power lever was brought back to idle position and single-engine approach was made. During MOC, No. 2 engine started slow and when No. 2 power lever was brought forward of ground idle position, tgt began exceeding limits. A cursory inspection of the engine indicates probable FOD damage. Dzus fastener from transmission cover just forward of No. 2 engine inlet was found missing and may have been ingested into the engine.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	1-25 Mar	4	2
3rd Qtr	April	1	8			
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	16	19

A series - During hover, utility hydraulic pressure dropped to 2,000 psi. Replaced grounding pin at station 631.

A series - During hover, main transmission chip light came on. Replaced chip detector.

A series - During hover, aircraft lost all ac electrical power. After 1 or 2 minutes, No. 2 generator was recycled and came back on line. Repeated attempts to bring No. 1 generator on line failed. Replaced No. 1 generator spline adapter.

A series - While performing control sweep/trim check during runup, utility hydraulic pressure light came on and utility hydraulic pressure fluctuated from 3,000 psi to zero. Condition couldn't be duplicated. Suspect control sweep was too rapid for hydraulic pump output to maintain adequate pressure.

Cargo helicopters

CH-47 Class D mishap

C series - During hookup of external load, copilot failed to maintain position over load. Aircraft contacted load, slightly damaging lower rescue door.

CH-47 Class E mishaps

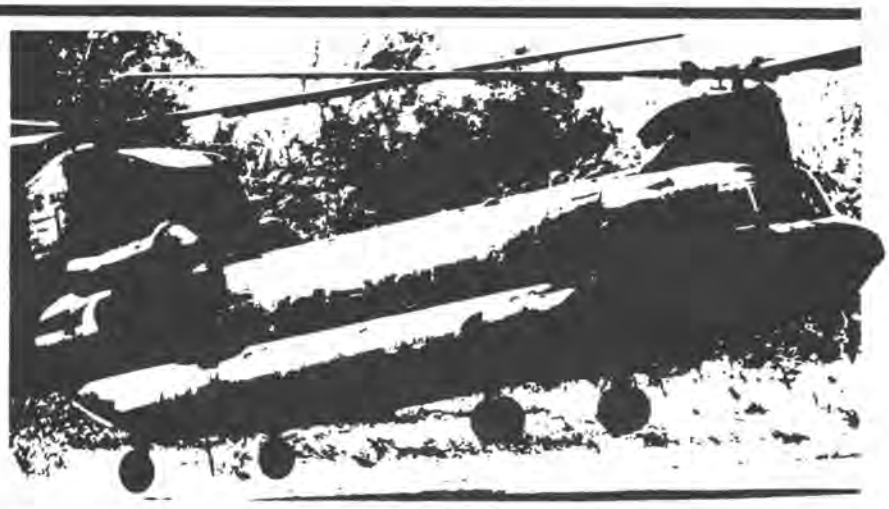
A series - During cruise check, crew discovered transmission temperature gauge showed constant temperature when various transmission temperatures were selected. Caused by failure of transmission temperature gauge.

B series - Cargo hook loading pole was being used to secure sling to cargo hook. Aircraft descended and touched load, causing small puncture in aircraft's skin.

C series - During final, transmission chip detector light came on. Combining transmission was condemned.

D series - Aircraft was on short final with gamma goat as external load. Fuel cap on gamma goat came off and fuel was siphoned from gas tank by rotorwash into flight engineer's eyes, causing him difficulty in calling load. Suspect load was released about 1 foot agl, but there was no apparent damage.

D series - When aircraft engines were accelerated from ground to flight position after refueling, No. 2 engine debris screen latch indicator on maintenance panel tripped. Screen was cleaned and 2 minutes later tripped again. No. 2 engine transmission was replaced.



D series - During flight, caution lights for No. 2 AFCS and No. 2 hydraulic flight control system came on. Flight engineer noted indications of hydraulic fluid loss and decrease of hydraulic pressure. Caused by failure of hydraulic boost pump for No. 2 hydraulic flight control system and hydraulic line fitting.

D series - Five minutes into flight with internal and external load, PIC noticed No. 1 engine oil pressure was 10 psi. Upon touchdown, pressure dropped to zero then jumped to 170 psi. Caused by failure of engine oil transmitter.

D series - During flight, transmission chip detector light came on and latch indicator for aft transmission activated. Excessive metal debris was found in transmission oil sump. Caused by failure of cylindrical roller bearing in aft transmission.

CH-54 Class C mishap

A series - During takeoff with sling-load of CH-54A transmission in shipping container, attaching points separated from container at 75 feet agl, allowing container to fall. Mast on main gearbox was damaged when shipping container cracked open.

Observation helicopters

OH-58 Class A mishap

C series - Aircraft was at a hover 200 feet agl when it began a right spin. After spinning around two or three times, the aircraft hit the ground hard. Both pilots were injured. 8726

OH-58 Class D mishap

A series - Crack in leading edge of tail rotor blade was found during postflight inspection. Screw vibrated loose from cover plate for VOR antenna and struck leading edge of tail rotor blade. Aircraft had just had tail rotor modification. Damage amounted to more than $2,800.

A series - During postflight inspection, seatbelt was found outside aircraft. Seatbelt had been left outside when cargo of fuel samples was unloaded. Minor damage to honeycomb was not found until later.

C series - Small hole in underside of aircraft was found during postflight inspection. Aircraft landed on a corn stalk.

OH-58 Class E mishaps

A series - Crew heard a thud during takeoff from "Y" pattern under NVGs. Aircraft took off from an airfield and had not struck anything. Inspection showed defect in main rotor blade resulted in damaged blade end cap.

A series - During hover to takeoff, transmission chip light came on. Transmission was replaced.

C series - Aircraft was hovering into 25-knot wind while directing A-10s and artillery. Aircraft began left turn at 20 feet agl, 40 KIAS. Three-quarters of

Mishap briefs

the way through the turn, aircraft began uncommanded rapid vertical descent. Pilot applied aft cyclic and collective to stop descent but aircraft continued descending as torque reached 100 percent. At 5 feet agl, pilot pulled 103 percent torque for 1 second and managed to get aircraft's nose into the wind. High wind condition forced aircraft into unstable condition.

C series - Master caution and dc generator lights came on during flight. Caused by failure of dc generator.

C series - During bounding overwatch maneuvers, IP began dash across an open field and pulled in 95 percent torque. Droop caused torque to increase to 103 percent for 1 second, but no damage was found.

Training helicopters

TH-55 Class C mishap

A series - During checkride, student entered standard autorotation. He decelerated at 25 feet agl, leveling nose at 10 feet agl. IP took controls and continued autorotation to touchdown. IP pulled initial pitch at 3 feet agl, using two-thirds of available collective and made what appeared to the IP to be a normal touchdown. Ground slide was 162 feet. Just before aircraft stopped, tailboom was struck by second main rotor blade. Suspect IP used too much rotor rpm at touchdown and, during long slide, control of rotor disk was lost, causing blades to flex down and strike tailboom. Estimated cost is $27,500.

Fixed wing

C-12 Class E mishaps

C series - When gear was deployed during approach, nose gear safe light didn't illuminate and lights in gear handle remained on. Caused by faulty gear switch.

D series - During climb, IP saw fuel siphoning from right main fuel filler point. Latching mechanism on fuel cap was out of adjustment.

D series - While being vectored for landing, crew smelled electrical smoke in cockpit. Printed circuit board shorted out.

D series - Engines were run for 2 minutes and shut down. When engines were recranked, No. 2 engine was lagging. Small rocks on taxiway and ramp resulted in FOD damage.

F series - During practice stalls, gear wouldn't extend. Selector solenoid shorted, causing landing gear power circuit breaker to pop.

SD-3-30 Class E mishap

Landing gear wouldn't retract after takeoff. Left and right main landing gear pins were not removed during preflight.

U-21 Class E mishap

B series - Left boost pump failed during flight.

Maintenance

UH-60 Class E mishap

A series - During flight, left input chip light came on and after crew unsuccessfully attempted to clear light, power control lever was pulled back. During final, right accessory chip light came on. Transmission oil pressure began dropping during short final. When aircraft touched down, main transmission pressure dropped to zero

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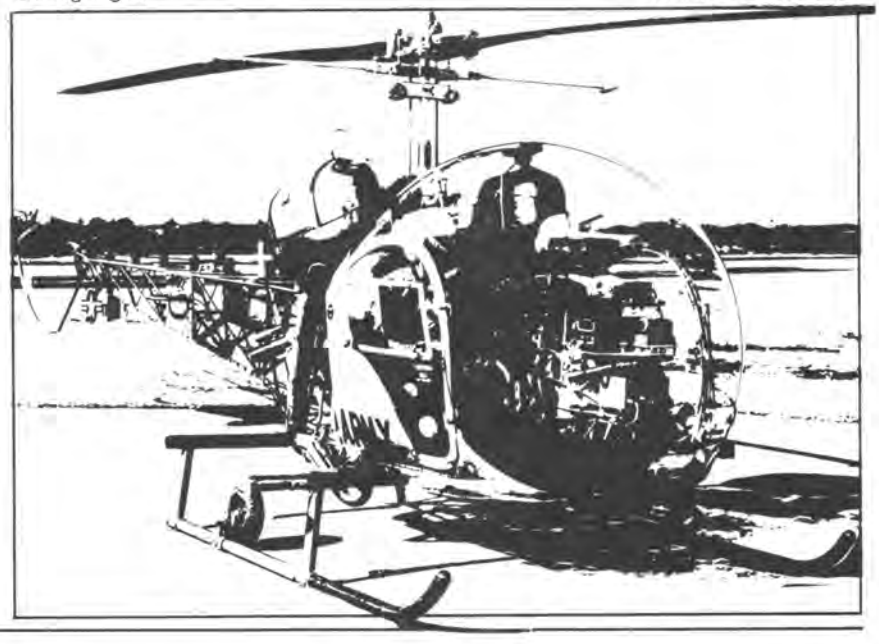

Mishap briefs

and main module chip and oil pressure lights came on. No chips were found on left input detector but right input and accessory chip detectors were covered with chips. Left input module chip light and right input module chip light were cross wired to opposite modules.

AH-1 Class E mishap

P series - During flight at 700 feet agl, 70 KIAS, crew heard one sharp report from engine, followed by right yaw. Momentary loss of power was followed by torque increase to 88 percent without any collective input from crew. During landing, 85 percent torque was required to hover IGE. PPC predicted 73 percent torque. During engine change, variable inlet guide vanes had been set 2 percent less than minimum required.

AH-64 Class E mishap

A series - During flight, oil psi main transmission light came on. Caused by chafed wire to pressure transducer on No. 2 oil system of main transmission.

CH-47 Class E mishap

D series - During flight, transmission low oil pressure and auxiliary low oil pressure lights came on. Crew chief noticed electrical arcing in vicinity of maintenance panel and circuit breaker for panel tripped and wouldn't reset. Chafed electrical wires for transmission oil pressure and auxiliary oil pressure lights created short, causing caution lights to come on.

OH-6 Class E mishap

A series - After refueling, aircraft failed deceleration check several times, using three different time indicators. Engine idle was set low at 61.0.

U-21 Class E mishap

H series - During takeoff roll, crew saw electrical flashes coming from under copilot's instrument panel. Caused by loose ground wire.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

NSN change for static discharge probe

According to supply letter A29-86 issued by the Director of Materiel Management, U.S. Army Aviation Systems Command, Army units, activities, or elements who use the static discharge probe, a component of the aerial recovery kit used in aircraft aerial recovery and slingload operations, will use a Navy NSN on requisitions beginning in FY 88.

NSN 1670-01-194-0926 is obsolete and has been deleted from the Army system. Navy NSN 4920-01-192-5535 has been approved for Army users, but procurement under this NSN has been postponed by the Navy until FY 88 to allow for additional development and testing of the wand.

In the interim, Army personnel will use NSN 1670-00-574-8044 to requisition a suitable substitute. Wands acquired under this NSN should only be used in accordance with AVSCOM ground support equipment safety-of-use technical message SOU-GEN-MEM-84-03, 021815Z Nov 84. Point of contact at AVSCOM is Mattie Harris, AUTOVON 693-3808/3810. ■

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.

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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 - During flight, IP initiated simulated engine failure by retarding throttle to engine idle. Main input quill to transmission failed to disengage, causing engine to remain connected to main rotor system during autorotation.

H series - Engine oil pressure dropped to zero during flight and master caution light came on. Quick disconnect on engine oil intake line to oil pump failed.

H series - During flight at 1,800 feet msl, transmission oil hot light came on. Caused by failure of thermostatic switch.

H series - While aircraft was at engine idle with crew observing laser acquisition, crew smelled fuel. Caused by cracked fuel line on auxiliary fuel tank.

UH-60 Class C mishap

A series - While being ground taxied into parking position, aircraft's main rotor blades struck the tail rotor paddle of parked UH-60, damaging both aircraft.

UH-60 Class D mishap

A series - During roll-on landing, brake on right main landing gear locked up, causing three flat spots on right tire. Parking brake was not engaged during roll-on; quick disconnect on brake line had come undone, causing right main gear brake to engage.

UH-60 Class E mishaps

A series - During shutdown, oil was found leaking under right engine. Caused by failure of input module seal.

A series - Aircraft encountered moderate icing during flight. Although power switch was on, deicing system failed to detect and prevent icing. Pilot placed switch in manual mode for moderate icing, but airframe continued ice buildup with resultant vibrations. Reason for failure of ice detection system has not been determined.

A series - During preflight at minus 10° C. anti-flaps worked properly. During takeoff, two anti-flaps stuck. Caused by cold operating conditions.

A series - Aircraft was en route to field site at 100 feet agl when crew noted engine and rotor rpm at 105 percent. N1 engine torque fluctuated between zero and 50. Shear pin on load demand spindle cable had sheared, causing loss of collective signals to N1 HMU.

Attack helicopters

AH-1 Class D mishaps

F series - During flight at 50 feet agl, 100 KIAS, bird struck main rotor blade, knocking out small chunk just inboard of tip cap.

F series - When refueler removed CCR nozzle, outer ring of CCR port was pulled from aircraft. Refuelers are not removing nozzles horizontally. Weight of nozzle and hose assembly allows lip of new CCR nozzle to catch on receptacle, tearing it from its mount.

S series - During takeoff for MTP

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	1 Apr	0	0
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	16	19

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Mishap briefs

evaluation, collective servo authority check was attempted. When No. 2 hydraulic system failed, MTPE increased collective to check torque. Pilot reengaged power to No. 2 hydraulic system. Collective control was regained rapidly and MTPE was unable to decrease collective pitch prior to reaching 59 psi torque. Lack of crew coordination allowed pilot to reengage power to No. 2 hydraulic system prior to MTPE relaxing pressure on collective.

S series - During terrain flight training, aircraft was being maneuvered at 5- to 6-foot hover in confined area prior to takeoff. Tail rotor struck a bush. Both pilots had visually cleared the aircraft. Absence of foliage caused bush to blend into terrain.

AH-1 Class E mishaps

E series - When cyclic was cycled through fore and aft travel during pylon mount check at 8-foot hover, crew heard loud grinding noise in transmission area. No. 1 hydraulic and master caution lights came on, pedals became stiff, and cyclic was stiffer than normal. Caused by failure of No. 1 hydraulic pump.

S series - During flight, master caution, transmission oil pressure, and bypass lights came on and transmission oil pressure dropped to 20 psi. Elbow tube fitting on transmission sump case cracked, causing loss of transmission oil.

S series - During flight, aircraft began to yaw from left to right and N1 and tgt fluctuated. Caused by broken P3 bleed air line.

AH-64 Class D mishap

A series - Class C mishap reported in 18 Feb 87 issue has been downgraded to Class D. During pilot night vision sensor training, while performing slope operations, main rotor blades contacted tall bush. Cost of repair is about $1,100.

AH-64 Class E mishaps

A series - During flight at 500 feet agl, 110 KIAS, with forward and aft fuel levels matched and a total of 220 pounds of fuel, No. 1 engine flamed out due to fuel starvation.

A series - During hovering flight, pilot felt vibration in controls, heard loud hum from transmission, and smelled fumes in cockpit. Shaft-driven compressor (SDC) light came on. Caused by failure of SDC.

A series - SDC light came on during flight. During shutdown, cockpit filled with smoke and fumes. Caused by failure of SDC.

A series - Master caution and No. 1 nose gearbox (NGB) chip lights came on during flight. No. 1 engine NGB was replaced.

A series - During takeoff, primary hydraulic light came on and primary hydraulic gauge showed drop to 2,000 psi. Pressure rose to 2,500 psi and primary hydraulic light became intermittent. Caused by failure of primary hydraulic pressure switch.

A series - Aircraft was hovering after leaving hot refueling point when main transmission chip light came on. Transmission will be replaced due to high metal content in oil.

Cargo helicopters

CH-47 Class C mishap

D series - Aircraft was in level flight when FE reported an apparent problem with right front sling. During approach, sling came loose and load flipped upside down. Copilot terminated approach at low hover and crew decided there was no way to turn load upright. Crew set load down as gently as possible;however, damage to towed Chapparal amounted to $18,000. Jack screw cap nut was not properly secured. When it became unscrewed, the sleeve and shackle assembly detached.

CH-47 Class D mishaps

C series - Pilot made a steep approach to landing at static display site. Surface winds of 15 to 20 knots, combined with downwash from aircraft, caused large road barricade 200 yards from landing point to blow across road and hit moving automobile, causing $800 damage.

D series - During external pickup, pilot allowed aircraft to descend onto an M151A2. Rear-mounted antenna on the M151A2 tore aft hook wire bundle assembly from aircraft and made a small tear in sheet metal near aft hook.

CH-47 Class E mishaps

C series - During takeoff on sling-load training mission under NVG, external load of M101 howitzer was being picked up. As sling came taut, pilot allowed aircraft to drift forward and howitzer rocked forward on its axles, allowing muzzle to strike ground. Limited flying hour program resulted in low pilot proficiency.

C series - Shortly after takeoff, crew chief reported aft transmission filter button had popped out. Attempts to reset failed. Caused by surging of transmission oil pump.

C series -Fitting on oil supply line to combining transmission vibrated loose during flight, allowing oil to leak.

C series - During flight, utility hydraulic oil cooler fan leaked fluid when blower fan was turned on. Fan was replaced.

D series - When thrust was applied during takeoff with M561 truck as external cargo, No. 1 engine began rapid, uncommanded acceleration. Pilot controlled engine surge and returned cargo and passengers to pickup zone. Suspect malfunction of N1 actuator.

CH-54 Class E mishap

A series - During flight, No. 2 engine was retarded to engine-idle position for simulated engine failure. While engine was being accelerated back to full rpm, engine overtemped to 720° C. After landing and shutdown, metal particles were found in exhaust extension. Suspect engine failure.

Observation helicopters

OH-58 Class D mishaps

A series - Pilot was conducting NOE flight below effective translational lift between two trees. When he applied power, he heard a sound which he attributed to wind. There was no vibration. During postflight, damage was found to one main rotor blade tip cap. Pilot failed to ensure adequate clearance from trees.

C series - Two aircraft had holes punched in underside from landing on cornstalk stubble in landing areas.

C series - Freewheeling unit assembly was replaced in two aircraft due to overtorque resulting from failure to use proper procedures during NOE deceleration.

OH-58 Class E mishaps

C series - During landing, transmission chip detector and master caution lights came on and off twice and then lighted intermittently. Main transmission will be replaced due to high metal content in oil.

C series - During NOE flight, transmission oil hot light came on. Dust and debris from desert environment were found in oil cooler.

Fixed wing

C-12 Class E mishaps

C series - During obstacle clearance takeoff at about 500 feet agl, pilot attempted to reduce power and felt resistance in left engine power lever. Power wouldn't reduce below 70 percent torque. When power lever was advanced, torque increased; when power lever was retarded, torque decreased, but not below 50 percent. Generator terminal protection cover had come loose and fallen into the linkage, causing the initial binding and later preventing the spring-loaded linkage from returning to idle position when power was reduced.

C series - During climbout with heater controls in normal position, cockpit and cabin areas filled with smoke and duct overtemp light came on. Left bypass assembly malfunctioned.

OV-1 Class E mishap

D series - During flight, crew felt moderate vibrations in airframe and flight controls at all power settings and airspeeds. Caused by malfunction of No. 2 propeller assembly.

SD-3-30 Class E mishap

During flight, No. 2 engine tachometer generator failed, causing tachometer gauge to indicate zero.

T-42 Class E mishap

A series - During takeoff with landing gear handle in up position, crew smelled electrical fire. Landing gear actuator motor had failed.

U-21 Class E mishap

A series - During after-takeoff check, fuel was seen coming from right main fuel tank cap. Fuel cap wasn't properly seated.

H series - During approach, No. 1 engine fire light came on. Caused by moisture in sensing system.

Maintenance

UH-1 Class D mishap

H series - During ground operation, pilot smelled wires burning and crew chief gave pilot emergency shutdown signal. Engine was operating at flight idle when pilot shut down aircraft. Aft engine deck was damaged by heat when exhaust tail-pipe assembly came off. Maintenance had improperly installed exhaust tail-pipe assembly. Damage was more than $4,200.

UH-1 Class E mishaps

H series - During tail rotor bearing repack, mechanic allowed oil to be lost from 90-degree gearbox. No notation was made in aircraft records. Sight glass was stained, making transmission appear full of oil. Aircraft was ground run with insufficient oil in 90-degree gearbox.

H series - While at a hover with 5- to 7-knot wind 90 degrees to left of aircraft's nose, aircraft began a slow turn to the right with full left antitorque pedal applied. Tail rotor drive chain sprocket retaining nut was loose.

H series - During hovering flight after running landing with left crosswind, copilot noticed binding in cyclic controls. Pilot took controls and felt binding and stiffness when cyclic was moved from neutral position to left rear quadrant. Caused by chafing antenna cable under floor on pilot's side of aircraft.

H series - IP felt slight feedback in cyclic and master caution and segment lights came on. Caused by improper installation of new hydraulic line.

CH-47 Class E mishap

C series - When No. 2 engine condition lever was advanced from stop to ground position, engine appeared to start normally. When start motor was placed in off position, engine continued to accelerate through 63 percent. When condition lever was brought to stop, engine had accelerated to 90 percent N1 and 82 percent torque. No. 2 engine N1 actuator cannon plug wasn't adequately connected.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time inspection for nonconforming 90-degree fittings on UH-1H/V/X and EH-1H aircraft (UH-1-87-05, 122330Z Mar 87). Summary: A total of nine nonconforming fitting assemblies which attach the 90-degree gearbox to the tail boom may have a safety impact and could possibly fail prematurely. These fittings can be identified by inspection and are only suspect on 40 aircraft and 21 tail booms listed in paragraph 3. The 21 tail booms in question have been shipped by CCAD and received by units since 15 Aug 86 along with nonsuspect tail booms. Therefore, to narrow the search down, any tail boom which arrived in units since 15 Aug 86 is suspect. This includes tail booms installed on aircraft after this date. Contact Dick Mooey, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time and recurring inspections on the first three tail rotor drive shaft spline couplings on UH-60A/EH-60A aircraft (UH-60A-87-03, 132215Z Mar 87). Summary: There has been a mishap with an H-60 type aircraft where loss of tail rotor drive was experienced due to a fretting failure of the transmission oil cooler splines. This is the same type of failure that caused a previous UH-60 Class A accident in October 1986. The purpose of this message is to direct an immediate unit-level inspection on the first three tail rotor drive shaft spline couplings for the presence of red oxide (brick-red dust). This inspection is identical to the one-time inspection issued via safety-of-flight maintenance mandatory/operational message UH-60A-86-20, 070030Z Nov 86, except that it is to be visual and not require special tools or disassembly of aircraft. Photographs of the brick-red-colored dust condition were provided to all local UH-60 logistics assistance representatives in conjunction with message UH-60A-86-20. Oil cooler assemblies will not be replaced in lieu of this inspection. This message establishes a recurring inspection requirement as part of PMS-1 at 10-hour/14-day intervals. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Aviation Life Support Equipment (ALSE) advisory message (ALSE-87-1, 161400Z Mar 87) concerning nonsuitable material NSN 6850-00-958-7166, water purification tablets, iodine, manufactured by Wisconsin Pharmaceutical during 1979 and 1980. This item is a component of first-aid kits which are contained in Army aircraft survival kits and survival vests. Subject material failed tests and evaluation for serviceability. Extension is not approved; survey and destroy. Replacement and credit not applicable. Contact: D. B. Hopkins, AUTOVON 693-3215, commercial 314-263-3215.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

ALSS-GRAM

ELT and survival radios

A UH-60 midair collision has generated concern about the operational characteristics of the emergency locator transmitter (ELT) and the survival radio (PRC-90). The electronic devices were working, however, this accident has highlighted the need to understand and use proper operating procedures for this equipment, both in search and rescue of downed crews and while airborne.

Simultaneous transmissions on 243.0 MHZ with the PRC-90 survival radio and the emergency locator transmitter cause interference, confusion, and may delay critical rescue efforts. There are some things about the operational characteristics of this equipment that must be kept in mind.

- The ELT transmits on VHF 121.5 and UHF 243.0 MHZ.
- The survival radio beacon mode transmits on 243.0 MHZ and has voice transmitting and receiving capability on 243.0 and 282.8 MHZ.

To prevent problems in operating this equipment, turn off the ELT and select 243.0 MHZ on the PRC-90 for voice communication. If the ELT is operating and is inaccessible, select 282.8 MHZ (alternate frequency) on the PRC-90 for voice transmission.

Remember these line-of-sight transmissions are blocked by terrain features. Rescue aircraft must ensure adequate altitude to compensate for the line-of-sight limitation and they must remember to monitor the appropriate guard frequencies.

The VHF/UHF (line-of-sight) survival and rescue frequencies were jointly agreed upon by international agreement. These frequencies are closely monitored by ground, air, and satellite communications for safety and rescue efforts in emergency situations.

ELTs should be checked after landing and before takeoff and mishandling of the equipment must be avoided. (Transmission checks should be cleared with control tower facilities.)

Deputy for Aviation Life Support Equipment
AUTOVON 693-3215, Commercial 314-263-3215

Title	Name	Area of Responsibility
AMC Product Manager		AMCPM-ALSE
Deputy AMC Product Manager	A.B.C. Davis, Jr	Chief, Logistics/ Readiness
Logistics/Readiness	Harlyn Hubbs	Senior Logistics/ Readiness
Logistics/Readiness	Jim Dittmer	Mission/ Environmental/ Equip
Logistics/Readiness	Boone Hopkins	Egress/Survival/ Rescue Equipment
ALSE Maint Specialist/ Technican	SFC Edward Bruck	ALSE Maint. Tng/ Admin

Ear plugs

Reference message SGMMA-MMOC-0421, 191920Z Jun 86, concerning suspension instructions for medical materiel.

Activities are advised to dispose of NSN 6515-00-137-6345, plug, ear, hearing protection, universal size, 400S, manufactured by Plasmed, Inc., DLA 120-84-C4295 all lots, in accordance with AR 40-61, paragraph 2-10.

Cite your original contract requisition number, DPSC project number K86137205, contract number, lot number, and quantity previously reported as suspended. Submit an SF 364 to DPSC-RSQ-CP for credit. Point of contact is Martha Dolm, SGMMS-OC, AUTOVON 343-2045. ■

ALSS-GRAM 4 1 April 1987

Prepared by the Deputy AMC Product Management Office, Aviation Life Support Equipment, 4300 Goodfellow Blvd, St. Louis, MO 63120-1798, AUTOVON 693-3215, commercial 314-263-3215. Information published generally precedes normal staffing and distribution of Army official policy and is intended as advance information to enhance the critical area of ALSE.

A.B.C. Davis, Jr.
Deputy AMC Product Manager
Aviation Life Support Equipment

Shortfax

Aviation NVG training

In a message dated 082320Z Jan 87, about NVG training, the Army Chief of Staff provided definitive guidance to commanders and Army aviators with regard to NVG training.

The Aeronautical Services Office would like to remind aviation commanders and officers that it may be able to assist you in complying with the message. The Director of USAASO is the executive agent for DCSOPS, HQDA, on all matters pertaining to the national airspace and has action officers assigned to USAASO to provide guidance and assistance to aviation units. Additionally, the Department of the Army Regional Representatives (DARR) assigned to all FAA regions can assist units in their NVG training programs. The DARRs have been instructed to make NVG training a topic of discussion during their periodic visits to Army installations and to respond to requests for assistance from the field.

Commanders and action officers are invited to contact the DARRs or USAASO directly for guidance and assistance on conducting NVG training in the national airspace. USAASO project officer for NVG matters is Mr. Jesse Burch, AUTOVON 284-7796. ■

—from Army Aviation Flight Information Bulletin, TB AVN 1-2017, 3 Feb 87

Preliminary reports of aircraft mishaps (PRAM)

The U.S. Army Safety Center (USASC) has identified several problems concerning the accuracy and completeness of PRAM messages. Specifically, aviation safety officers/message drafters are requested to provide the information relating to cause factors in items 12, 13, and 14 of the PRAM message (see appendix C, AR 385-40).

AR 385-40 does provide for submission of supplemental messages if the information is not readily available. However, by being as complete as possible in the original PRAM you will reduce your workload and assist USASC in developing a more accurate data base. The benefit for aviation accident prevention will be a more reliable base from which trends can be identified and countermeasures developed.

Point of contact at USASC is PESC-SPA, AUTOVON 558-4198. ■

Teardown and analysis

The U.S. Army Safety Center (USASC) has been informed that several items submitted for teardown and analysis were received after first having undergone field disassembly and inspection.

Units requesting teardown and analysis through USASC for the purposes of accident prevention or accident investigation should comply with the provisions of DA Pamphlet 385-95 when requesting USASC control numbers. Failure to follow these instructions can compromise the value of the teardown analysis and possibly allow a potential hazard to go undetected.

Point of contact at USASC is PESC-SPA, AUTOVON 558-4198. ■

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Utility helicopters

UH-1 Class E mishaps

H series - During flight at 500 feet agl, 80 KIAS, crew heard loud whine from rear area of aircraft. All indications were normal; then engine began to surge. As aircraft was lined up for final approach, it began having severe compressor stalls. Power was reduced. Heater and deice were off. At about 50 feet agl, aircraft was becoming uncontrollable and PIC reduced throttle to flight-idle position and completed autorotation to landing. Suspect internal failure of compressor section.

H series - After takeoff, crew felt high-frequency vibration in airframe. Caused by failure of hydraulic pump.

H series - During flight, crew felt binding in cyclic controls in all quadrants. Caused by failure of servo cylinder.

H series - Master caution and engine fuel pump lights came on during final approach. Caused by failure of fuel pump differential pressure switch.

H series - Crew heard high-pitched whine during climbout and crew chief noticed transmission and engine oil pressures were low. Pressures did not return to normal when copilot switched to spare inverter and he switched back to main inverter position. On short final, inverter master caution light came on. This time, a switch to spare inverter resulted in correct pressure readings. Main inverter was replaced.

H series - By the time N1 reached 15 percent during attempted engine start, blades were turning, igniters were popping, but egt remained at zero. Start procedures were continued for 25 seconds with no increase in egt. Caused by defective spark igniters.

H series - During runup, crew chief saw something leaking from aircraft's underside. Leak was caused by failure of hydraulic servo line to hydraulic filter.

UH-60 Class E mishaps

A series - Pilot's right windshield cracked while aircraft was IMC at 6,000 feet msl. Probable cause was change in ambient air temperature with anti-ice system on.

A series - Tail wheel was unlocked during runup. Aircraft turned about 10 degrees before pilot realized right brake pedal didn't work. Master brake cylinders will be replaced.

Attack helicopters

AH-1 Class D mishap

F series - Retaining rivets on CCR port bracket were broken by refueling personnel attempting to remove jammed CCR nozzle from the port.

AH-1 Class E mishaps

E series - During flight, crew felt increasing high-frequency vibration in cyclic and floor area. Caused by failure of No. 2 drive shaft hanger bearing.

F series - Master caution and engine oil bypass lights came on during flight. Postflight inspection showed engine oil reservoir was 4 quarts low. Seal failure caused high engine oil consumption.

AH-64 Class D mishaps

A series - IP confirmed before-landing checks while pilot attempted roll-on landing. Aircraft touched down and bounced several times. IP took controls and landed. Main landing gear tires had deflated, but maintenance could find no problem with parking brake system. Suspect crew failed to unlock brakes before landing.

A series - Damaged ADF antenna mount and missing antenna were discovered during daily inspection. There was no evidence of tree strike. Suspect aircraft snagged antenna on ground foliage while making numerous landings in unimproved landing area.

AH-64 Class E mishaps

A series - Aircraft was 300 feet agl at 70 KIAS. When pilot reduced power for landing, low rotor rpm audio and engine chop light came on and NP/NR rapidly decreased. Both pilots reset chop collar simultaneously. Descent was arrested at 30 to 50 feet agl and NR was noted at 85 percent. Aircraft had slight abnormal rotor vibration, but aircraft was landed without further incident. No overtorque damage was found, but pilot chop collar was found

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Mishap briefs

not locked. Since the pilot had reset the chop collar as part of the emergency procedure, it appears the chop collar failed to lock. Until cause is determined and corrective action initiated, recommend all AH-64A pilots physically check and visually ensure the chop collar is locked after performing runup chop collar check.

A series - During overspeed check of No. 2 engine, engine flamed out. Tgt exceeded limits for 1 second when engine automatically reignited.

A series - No. 2 nose gearbox (NGB) chip light came on during landing. After chip plug was cleaned and oil sample taken, aircraft was released for flight. After 12 minutes, NGB chip light came on again. Gearbox will be replaced due to metal wear.

A series - Crew heard loud whistle during rollout for takeoff. Caused by bonding separation on one main rotor blade.

A series - During flight, crew of another aircraft reported smoke trailing from aircraft's No. 1 engine area. After landing, copilot found fuel venting overboard from forward fuel cell. Float-type pilot valve failed to actuate shutoff valve in bottom of forward fuel cell.

A series - When No. 2 engine was started and No. 2 power lever brought to fly position after refueling, No. 2 engine began accelerating beyond normal limits and high rotor rpm light came on. Engine did not reach overspeed condition. Maintenance could not duplicate.

Cargo helicopters

CH-47 Class E mishaps

B series - During engine runup, No. 2 engine chip light came on. No. 2 engine gearbox had metal slivers on chip plug.

C series - During final approach, crew heard a bang, followed by high-frequency vibration. After landing, crew found No. 1 drive shaft flange had broken at point where balancing weight is attached. A piece of the flange broke off, but caused no further damage to the drive shaft.

D series - During flight, copilot reported fire and pointed to a small fire around the right windshield. During approach, copilot turned anti-ice off and fire went out. Windshield was cracked.

D series - After simulated engine shutdown, using emergency engine trim, engine failed to come back on line after trim switch was released. N1 dropped to 48 percent and PTIT climbed to 820° C. Engine condition lever was placed in ground position and PTIT momentarily decreased, then increased. Condition couldn't be duplicated.

D series - Engine fire light came on during flight but no fire was visible. Caused by malfunction of fire detection amplifier system.

Observation helicopters

OH-58 Class D mishaps

A series - N1 rpm failed to reach 15 percent during engine start and crew heard unusual rattle from engine compartment. After visual inspection by support crews, aircrew attempted to duplicate noise by motoring engine, but unusual noise wasn't duplicated. After another visual inspection showed nothing unusual, second start was attempted with APU. During 30-second start, N1 slowed around 58 percent, then reached 63.8 percent. Pilot advanced throttle from idle and loud report was heard. Pilot closed throttle and depressed starter switch. TOT dropped through 900° C. as pilot placed fuel shut-off valve handle and fuel boost switch in off position. Safety observer and maintenance supervisor reported noise from engine and black smoke could be seen coming from exhaust stacks. After shutdown, small chunks of metal were found on engine deck. Caused by internal failure of engine compressor. Damage amounted to nearly $10,000.

A series - During flight at 1,500 feet agl, transmission oil hot light came on. All control inputs and actions were normal. Maintenance officer suspected aircraft may have been flown with inadequate oil supply but aircraft's records failed to verify. After troubleshooting and repair of what was believed the problem, aircraft was released for one-time flight to home base where mast was to be removed to ensure airworthiness. Transmission oil was drained. Following morning, procedures for removing mast were begun. Maintenance supervisor checked oil level indicator and it still showed transmission was full. After confirming transmission was empty, sight glass indicator was removed. Plastic laminate on indicator had come loose and rotated enough to block the holes, trapping fluid between sight glass and indicator face and giving false indication transmission was full of oil. Damage to transmission, freewheeling unit, mast and mast bearings amounted to nearly $9,300.

C series - Pilot failed to ensure adequate clearance during NOE hover while conducting tactical scout mission from tree-covered hill. About $2,300 damage resulted when tail rotor hit a tree.

D series - Main rotor blade had wood chips stuck in weight cover plate and another blade showed damage to trailing edge. Crew didn't know when damage was incurred.

OH-58 Class E mishaps

A series - While aircraft was being ground run, soldier began throwing empty water cans out of aircraft. Empty water can hit main rotor blade but caused no damage.

A series - During cool down after landing, engine chip light came on. Next day, during MOC at full operating rpm, chip light again came on, crew felt high-frequency vibration, and smoke filled cockpit through heater ducts. Metal chips were found on magnetic plugs, engine oil filter showed metal chips and shavings, and small chunks of metal were found in exhaust collector. Turbine blades showed signs of impact from metal.

A series - Master caution and transmission lights came on during flight. Numerous chips were found on chip detectors and filter. Suspect transmission failure.

A series - Crew heard slight bumping sound during flight, followed by slight increase in vertical vibration. Caused by skin separation on main rotor blade.

C series - Unforecast winds caused moderate downdraft, creating left crosswind and resulting in high sink rate which required 103-percent torque for 1 second to avoid ground contact. Pilot failed to anticipate winds causing aircraft to experience overtorque.

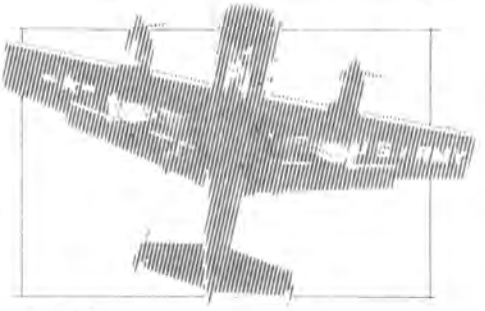
Fixed wing

C-12 Class D mishap

F series - Pilot failed to ensure No. 2 outboard engine cowling was secure prior to takeoff. On rotation, cowling came open, causing sheet metal damage in vicinity of hinged area.

C-7 Class E mishap

A series - During climb, No. 2 engine backfired and lost rpm. Fifteen seconds later, engine began running extremely rough and rpm fluctuated. Power reduction failed to solve problem and engine was secured. Caused by cracked cylinder.



OV-1 Class E mishap

D series - During taxi, No. 2 propeller was stuck in reverse. Caused by malfunction of auxiliary prop motor.

U-8 Class E mishap

F series - During approach, nose gear warning light showed unsafe. Recycling and hand pumping gear had no effect. Caused by water freezing in microswitch.

U-21 Class E mishap

F series - During descent for landing, left engine wouldn't reduce power below 81 percent N1. Rod end bearing froze on fuel control arm.

Maintenance

UH-1 Class E mishap

H series - When rpm was brought to 6600 during runup, tail rotor chip light came on. Crew chief used incorrect chip detector grommet, causing wire to chafe on tailboom.

UH-60 Class E mishap

A series - During takeoff, No. 1 reservoir low, No. 1 tail rotor, No. 2 tail rotor and backup pump lights came on. Tail rotor lines were improperly installed, causing chafing of return hydraulic line.

OV-1 Class E mishap

D series - During before - landing check, landing gear handle was placed in down position with no result. Hydraulic pressure indication was normal. When gear handle was recycled, gear extended halfway and stopped, with no hydraulic pressure indicated. After 5 seconds, hydraulic pressure came up and gear locked in full-down position. Right main landing gear actuator line was leaking. Suspect

(continued on back page)

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	1–8 Apr	0	0
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total to Date	33	27	Total for Year	16	19

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 2 Jul 86 issue (8634) □ While attempting a normal takeoff to a hover from a 5-degree slope, the student pilot overcontrolled the aircraft by applying collective too rapidly and applying excessive right cyclic. As a result, the aircraft rolled to the right and yawed left. The student's overcontrol was the result of inexperience; he was in the contact phase of the Initial Entry Rotary Wing (IERW) Qualification Course and did not have sufficient experience to recognize the onset of a dynamic rollover situation. The IP was late in taking corrective action when the student exceeded yaw and roll limitations. The IP failed to anticipate the student's actions because he was overconfident in the student's abilities. He was an above-average student and had just completed one slope operation uneventfully. After the IP got on the controls, he lowered the collective and attempted to add right pedal which had no effect. The aircraft continued to yaw left 180 degrees from its original heading, rolled onto its right side, and was destroyed. The crew were uninjured. When the aircraft rolled right and yawed left during the takeoff, the rear portion of the right skid became fixed against an 11-inch shoulder on the slope landing area. As a result, the shoulder became a pivot point for the dynamic rollover. The shoulder had become eroded into the slope by continuous helicopter usage over an extended period of time. There are no written requirements on the use, designation, or inspection of daylight slope landing areas for IERW contact students.

Attack helicopters

AH-1 Class A mishap in 2 Apr 86 issue (8624) □ The AH-1 was flying nap-of-the-earth along a twisting river as advance guard for a cavalry ground force. Neither the PIC/IP in the front seat nor the copilot, who was flying the aircraft at the time of the mishap, saw three transmission power lines strung across the river from the cliffs on either side. The aircraft struck the wires; the IP took control from the pilot, maintained forward airspeed with marginally effective control inputs, due to rotor blade damage, and landed the aircraft in 2 feet of water. The aircraft rolled to its left, causing the main rotor blades to strike the water and separate from the aircraft. Although the crew compartment came to rest partially submerged in water, the IP was able to activate the canopy removal system and both crewmembers, neither of whom was injured, were able to get out of the aircraft. Members of an engineer company in a nearby rubber raft assisted the aircrew out of the water and took them to the shore.

AH-1 Class A mishap in 16 Apr 86 issue (8626) □ Downgraded to Class B. The aircraft was at an out-of-ground-effect hover while simulating missile firing. The pilot channelized his attention on the target and allowed the aircraft to drift to the rear. The tail rotor struck a tree and began spinning to the right in a nose-low, left-side-low attitude. The main rotor blades struck a 25-foot-tall oak tree that had been to the rear of the aircraft during the target engagement and the aircraft "wallowed around" severing several limbs from the tree and causing extensive damage to the main rotor. Throttle was reduced, and the aircraft impacted the ground upright in a nose-low attitude. The tail boom broke just aft of the horizontal stabilizer as the tail boom went through the top of the tree. The crew were uninjured, but the aircraft sustained major damage.

AH-1 Class A mishap in 28 May 86 issue (8631) □ Aircraft was returning to base camp from a field training site. PIC was demonstrating use of the telescopic sight unit to an OH-6 pilot who was occupying the front seat. The scout pilot was not rated in the AH-1. While in a right turn at 200 feet agl, the crew heard a loud bang from the aft section, followed by a low rpm audio, and yaw to the left. The K-flex drive shaft had failed and pieces of the drive shaft and particle separator were ingested into the engine, causing massive damage to the first and second stage compressor sections. The pilot entered autorotation while continuing the turn to avoid a hill. He then attempted to stretch the glide to a road by lowering the aircraft's nose. He was unable to reach the road and the aircraft struck the ground on downsloping terrain. The aircraft hit hard, bounced, and came to rest 250 feet from the initial point of impact. There was major damage to the aircraft and the copilot suffered major injuries. The pilot's injuries were minor.

AH-64 Class A mishap in 23 Jul 86 issue (8639) □ Aircraft was chalk 2 in a night low-level flight of eight aircraft using the pilot night vision sensor for navigation. The pilot made an abrupt climbing left turn when he saw that he was on a collision course with a 170-foot steel tower supporting electrical transmission lines. The aircraft received major damage when it struck two 7/16-inch steel support cables and part of the tower structure. The pilot leveled the aircraft and began an immediate descent for landing. During the landing, the aircraft's main rotor blades and tail rotor were further damaged from strikes on trees and two small support cables. The aircraft landed upright, and the pilot and copilot/gunner, who were uninjured, left the aircraft unassisted.

Followups

Observation helicopters

OH-6 Class B mishap in 21 May 86 issue (8630) □ The aircraft was on a training mission to qualify unit pilots in aerial gunnery. The flight was routine and uneventful until the aircraft approached the firing line. As the crew were preparing to fire rockets, the P3 line to the engine governor broke, resulting in an engine overspeed. The aircraft's nose pitched up and turned to the right and there was an increase in noise from the engine and rotor system. The IP got on the controls and told the pilot to stay on the controls with him. In an attempt to control rotor rpm, the crew increased altitude and began rolling off the throttle. As the aircraft started to descend, the IP rolled some of the throttle on in an effort to try to maintain flight or at least to make a powered descent to avoid trees directly in front of them. During the powered descent, maintaining heading was difficult because of power surges from manually controlling the throttle. Once the aircraft was beyond the trees, the IP rolled the throttle back off and maintained the collective where it was. Before impact he tried to cushion the descent by applying collective, but the rotor rpm was too low. The collective was lowered completely at impact. The aircraft hit hard, causing the main rotor blades to flex down and chop off the tail boom. The OH-6 remained upright and slid about 8 feet. The uninjured crew got out of the aircraft unassisted. ■

FAR violations

The following information has been extracted from *Army Aviation Flight Information Bulletin*, **TB AVN 1-2017, 3 Feb 87. As the article reports, violations of FAR Part 91 have increased and, unless reversed, this trend could result in a catastrophic accident.**

During December 1986 and the first 2 weeks of January 1987, the U.S. Army Aeronautical Services Office received notification from the Federal Aviation Administration (FAA) of six alleged violations of FAR Part 91. This is about six times the average rate. What is happening out there?

Four of the above alleged violations were issued as a result of deviations from an assigned altitude. All four were against pilots of fixed wing aircraft deviating from 500 to 900 feet above or below an assigned altitude. At least one of these resulted in a near miss with another aircraft on an assigned IFR altitude.

The other two alleged violations resulted when two Army helicopters (separate incidents) entered a TCA without proper authority. One of these also resulted in a near miss.

Until about 5 years ago, FAA issued an alleged violation against an Army aviator about twice a year. Beginning about 5 years ago, an alleged violation was issued by FAA against an Army aviator approximately once every 6 weeks. Now for the last 6 weeks, an alleged violation has been issued at the rate of one per week. Again, what seems to be the problem? What can you do to help reduce the increasing number of FAR 91 violations? ■

Attaboy

Aircrews involved in the following incidents deserve special recognition for their ability to react quickly and skillfully to avoid what could have become an accident.

• **Lieutenant Michael K. Haider, B Company, 4th AHB, Fort Carson.** The OH-58C on which 1LT Haider was pilot was on climbout at about 100 feet agl and 70 knots when it suddenly yawed left. The low rpm audio and light and engine-out light all came on and LT Haider began an autorotational descent. At about 10 feet before touchdown, the engine surged, causing a 150-degree right yaw. The aircraft was landed under power while the engine was surging. Large amounts of sand were found in the fuel pump and main fuel filter housing.

In another incident, two days later, at the National Training Center, Fort Irwin, LT Haider was again flying an OH-58C. While in cruise flight at 300 feet agl and 80 knots, the aircraft's engine failed. LT Haider made an autorotation to sandy terrain with no damage to the aircraft. The fuel control, governor, and doublecheck valve have been replaced and troubleshooting continues.

•**CW2 Michael E. Trigger and CW2 John M. Zimmerman, 1st S&F Co, USAALS, Fort Eustis.** While flying at 2,000 feet msl, at an airspeed of 100 knots, the cockpit of the OH-58D began filling with smoke and fumes. When the heater was turned off, the smell seemed to dissipate. The crew made a precautionary landing in a peanut field with no damage to the aircraft. The problem was internal failure of the heater diaphragm.

• **WO1 James T. Ybarra, 245th GSAC, 2d Armored Division, Fort Hood.** W01 Ybarra was pilot of an OH-58A in flight at 200 feet agl. He noticed a decrease in engine noise and saw the N2 had dropped below 100 percent. Unable to maintain flight, W01 Ybarra lowered the collective to conserve power for touchdown. At about 10 feet agl, the rotor rpm light came on and the pilot applied pitch to slow his descent. All remaining pitch was applied for touchdown and the aircraft landed level on its skids. During the incident, N1 went below 90 percent, N2 dropped below 96 percent, and TOT rose to about 840° C. for 3 to 6 seconds. The compressor diffuser threads attaching points stripped out at scroll assembly, causing loss of power to engine. ■

Mishap briefs

packing on hydraulic line was improperly installed during maintenance.

Safety messages

• Safety-of-flight technical message concerning night vision goggle (NVG) operations (SOF-GEN-87-01, 280030Z Mar 87). Summary: Recent increasing mishap trends during NVG operations revealed that lack of equipment standards may be a contributing factor. The purpose of this message is to standardize NVG equipment presently in use by the field and to provide a reference to the proper and approved instructions for modification, maintenance, test and operation of all NVG-related equipment, specifically, the aircraft, the NVGs and the flight helmet. The proper training, planning, and operations with NVGs are of paramount importance and are undergoing full assessment as a separate issue from this message. AVSCOM is the lead command for aviation systems and is responsible for assuring standardization of aircraft NVG MWOs and integrated CECOM NVGs and TROSCOM helmets. Aircraft modifications will be addressed in a separate message. Contact: Lyell Myers, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight maintenance mandatory message concerning revision to inspection of eyebolt, P/N 7020902136-102, NSN 5306-01-102-8797, (UH-60-87-04, 242300Z Mar 87). Summary: The subject eyebolts are used for support of the maintenance crane, for air retrieval, for aircraft hoisting, and for tiedown during air transport. Problems with these eyebolts have been described in AVSCOM messages SOU-UH-60A-86-01, 312330Z Jan 86 and SOF-UH-60-86-19, 301500Z Oct 86. The purpose of this message is to rescind these previous messages and replace them with the following: 1) Aircraft effectivity is revised to restrict all UH-60A and EH-60A aircraft. Eyebolts originally installed on the production line on UH-60A aircraft prior to S/N 83-23908 and EH-60A aircraft prior to S/N 84-24017 were thought to be free from the material process errors. It has been determined that all eyebolts are now suspect. 2) Rescind guidance that new part numbered eyebolts be forthcoming in 120 days. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning inspection of AH-64A aircraft for electrical cable chafing (AH-64-87-07, 231430Z Mar 87). Summary: An AH-64A series aircraft experienced electrical arc damage due to improper routing of the No. 2 generator wire harness (W668). The wire harness had chafed against the nut and cotter pin of the longitudinal bellcrank (NSN 1560-01-154-7133) and the longitudinal push-pull rod assemblies (NSN 1680-01-155-1019). Purpose of this message is to ensure the inspection of the No. 2 generator wire harness routing in the area of the longitudinal bellcrank and transformer/rectifier for evidence of chafing and for proper routing/clamping. 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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Report of Army Aircraft Mishaps

A lack of experience

Two UH-1 aircraft were flying a service mission in loose trail formation over snow-covered terrain in light to moderate snowshowers. The copilot, who was at the controls of the trail aircraft, allowed the separation between the aircraft to exceed the desired distance. While he was attempting to regain the proper separation, he realized his rate of closure was too fast. He initiated an improper deceleration and an excessive rate of descent developed. Before the pilot could take corrective action, the aircraft had crashed into the ground, pivoting on its nose, and coming to rest upside down. The pilot, copilot, and two passengers got out of the aircraft unassisted. Their injuries were minor.

The copilot's execution of deceleration was not in accordance with Task 1021 of FC 1-211: Aircrew Training Manual. When he realized he was closing too rapidly on the lead aircraft, he began a 10- to 15-degree nose-high deceleration without properly coordinating cyclic and collective inputs to maintain altitude. As a result, the aircraft airspeed dissipated to near zero and a rate of descent of about 1,500 feet per minute developed. The nose of the aircraft pitched up slightly and the copilot lost the visual horizon. When he 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 and was totally destroyed. There was no prior warning to the crew and passengers before ground contact.

The reason the copilot improperly executed the maneuver was inadequate experience. He had performed this task too infrequently to maintain the high level of proficiency that would have been necessary under the climatic conditions present. In fact, he had not performed this particular task for a period of 5 months prior to the date of the accident.

The 32-year-old copilot had 7 years of aviation experience and had accumulated more than 1,000 hours of total flight time. He had flown 26 hours in the past 90 days. It had been about 2 weeks since his last flight in the snow, but he had been in the area for about 3 years and had experience flying in similar weather conditions. The copilot was not current in the UH-1 aircraft. He had less than 700 hours of pilot time and in accordance with AR 95-1 he would have had to fly at least once every 45 days to remain current in the aircraft. He had allowed 46 days to elapse without logging a flight, except for 0.2 hours which was not with an instructor pilot.

The 33-year-old PIC had 6 years' experience and 1,150 hours of flight time. He had flown 38 hours during the past 90 days. The PIC made an improper decision when he allowed the copilot to fly the mission instead of flying himself. He was also the unit operations officer and he should have been aware that his copilot did not fly regularly enough to maintain the high degree of proficiency necessary to perform formation flight in marginal weather conditions. However, he had flown with this copilot several times before without any problems and he had developed confidence in the copilot's overall capabilities as a pilot. In addition, the copilot was the PIC's unit commander and, while there was no command pressure, the command relationship could have been an unconscious factor in the PIC's decision to allow him to fly the aircraft.

Just before the mishap, the PIC, who was only too well aware of the numerous high-tension wires between the aircraft's location and its intended point of landing, had been looking at his map, checking the wires. When he looked up, the aircraft appeared to be descending below the wires and seemed to be under control, as if it were landing. When he saw the ground, they were about 15 to 20 feet agl. Before he could reach for the controls, the aircraft had hit the ground.

The PIC was occupying the left seat. Because forecast weather was considered to be marginal, the PIC should have been designated to fly from the pilot's station, in the event they encountered instrument meteorological conditions (IMC). Under these circumstances, the unit violated the Thurman Sends safety message number 051852Z Dec 83, which states that if the possibility of encountering IMC exists, the PIC will occupy the pilot's station. ■

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - During limited test flight to verify TEAC on aircraft with history of high HIT checks, engine experienced severe compressor stalls. After initial stall, pilot reduced power and planned shallow approach with running landing. As pilot increased torque at about 25 feet agl, engine began series of severe stalls which reducing power failed to affect. Pilot couldn't read his instruments and he reduced throttle to flight idle, continuing landing to runway where aircraft slid about 30 feet before coming to rest. Engine continued to stall until throttle was rolled full off. Cause pending teardown analysis.

UH-1 Class D mishap

H series - Aircraft made night tactical approach to lighted "Y" and hit a tree stump. Result was nearly $3,000 damage to sheet metal of aft rear skid crosstube.

UH-1 Class E mishaps

H series - Engine had power loss at 10,000 feet msl, N1 went to 40 percent, and rotor rpm decreased to 290. Pilot lowered collective, reduced throttle to engine idle and placed governor switch in emergency position. Egt rose to 670° as throttle was advanced, but stabilized when throttle was closed for 3 seconds. Engine was restarted at 6,000 feet msl and aircraft landed in emergency governor mode. Caused by failure of fuel control.

H series - Uncommanded release of slingload occurred at 1,400 feet msl. Suspect cargo hook failure.

UH-60 Class E mishaps

A series - During IFR training, PIC received cancellation of IFR handling. PIC began a descending right turn at 130 KIAS from an altitude of 5,000 feet msl. Aircraft began an uncommanded noseover until reaching 60-70 degrees. Airspeed increased to about 170 KIAS and aircraft lost 2,500 feet of altitude. PIC applied 50 percent aft cyclic without any initial effect on aircraft dive or buffeting. The copilot observed the stabilator gauge in the 20-degree down position, but stabilator control was still in auto mode. Before the copilot could take manual control of the stabilator, it programmed up by itself. The PIC regained control and made a 10-minute flight at 100 KIAS to home station, landing without any further problem.

A series - Stabilator failed three times during flight. Failures were 10 to 20 minutes apart and after resetting each time, control was regained. Caused by failure of No. 2 lateral accelerometer and pitch bias actuator.

A series - Stabilator failed four times during takeoff. Auto control reset corrected problem each time. Caused by defective No. 2 stabilator actuator.

Attack helicopters

AH-1 Class D mishaps

F series - After unmasking from firing position, aircraft moved forward so gunner could identify a target. Main rotor blade tips struck tree branches, resulting in about $1,000 damage.

F series - IP made terrain flight takeoff, cleared tree line to right front, and began slow right turn. Aircraft had leveled off at 20 to 25 KIAS when lower wire strike protection system struck three strands of high-voltage electrical cable. Rain and mist on aircraft's canopy contributed to failure of pilots to see wires in time to avoid them. Cost of damage to wires was about $7,500.

AH-1 Class E mishaps

E series - As throttle was rolled to full open during runup, crew heard loud pop from engine area and aircraft attempted to yaw to the left. Variable inlet guide vanes (VIGVs) were at full-open position when they should have been closed. Suspect faulty fuel control caused VIGVs to malfunction.

E series – As engine was run up from idle to full rpm, engine oil temperature was slightly below red line. Within a few seconds, oil temperature increased to 93° C. Oil cooler fan bearing seized, causing oil to overheat.

F series - During flight, pilot and gunner airspeed indicators went to zero. Caused by loose wire in pitot heater element.

F series - During pre-takeoff checks, N2 wouldn't go below 93 nor higher than 97 percent. Caused by failure of linear actuator.

AH-64 Class D mishap

A series - As aircraft came to hover for first takeoff of night mission, it pitched violently fore and aft. Vertical impact from pitching of aircraft caused tail strut to collapse, then trailing arms struck and damaged tail cone fairing. Cause is being investigated.

AH-64 Class E mishaps

A series - Aircraft was hovering. After firing one rocket, crew heard loud whop-whop noise and felt slight vibration which they thought was caused by wind. Range tower personnel also heard the noise and a whistling sound. When aircraft moved out of firing position and began forward airspeed, crew noticed increased vibration and abnormal flexing of a main rotor blade. Caused by blade skin separation.

A series - During flight, crew heard loud bang and felt intense rotor vibration. No. 1 main rotor blade debonded on outboard leading edge.

A series - During slow left turn at about 40 KIAS, 100 feet agl, crew felt slight shudder in airframe and master caution and high rpm lights came on. No. 2 engine torque was about 108 percent and collective was reduced. IP took controls and increased airspeed. NP and NR on No. 1 engine were 106 percent at the highest point. No. 2 engine shut down automatically before power lever could be retarded. Engine overspeed and subsequent shutdown could not be duplicated. Engine has had one other incident of overspeed.

A series - During hover, aircraft experienced five uncommanded yaws, resulting in a 30- to 50-degree change of heading. Digital automatic stabilization equipment was not disengaged.

Problem couldn't be duplicated.

A series - No. 2 engine fire handle illuminated during hover. When No. 2 engine was shut down, fire handle light went out and no fire was found. Maintenance cleaned fire detector connections.

A series - During hot refueling, CCR receptacle shutoff valve stuck in open position, causing large fuel leak. CCR poppet valve was replaced.

Cargo helicopters

CH-47 Class D mishap

C series - During takeoff from field site, left cabin window blew out.

CH-47 Class E mishaps

A series - During hover taxi for takeoff, No. 2 engine oil pressure dropped to 25 psi. Engine oil filter was clogged with what appeared to be rubber. After engine was drained and flushed three times, rubber still appeared in filter. Oil and rubber samples have been sent to depot for analysis.

C series - During approach at 80 KIAS, cyclic motored fore and aft 1 1/2 inches. Reprogrammed DPCT.

C series - During flight, copilot noticed large amount of hydraulic fluid leaking on companionway floor. Fluid was coming from No. 1 pitch SAS link. SAS link was replaced.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	1–15 Apr	0	0
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	33	27	Total to Date	16	19

Observation helicopters

OH-58 Class D mishap

D series - During NVG NOE flight, main rotor blades struck a tree, causing more than $900 damage to underside of all four main rotor blades.

OH-58 Class E mishaps

A series - Cyclic became stiff during hover taxi. After landing, cyclic was still stiff in right forward quadrant. Caused by forward and aft mag brake sticking.

C series - During hover, IP noticed control correlation was extremely exaggerated. Swashplate friction was out of adjustment.

D series - As aircraft hovered to park next to another OH-58, unsecured door on parked aircraft blew off.

Fixed wing

C-12 Class D mishaps

D series - Aircraft had leveled off at 4,000 feet msl after descent. Clouds were layered stratus and aircraft was IMC in light snow, light turbulence, and rime ice. OAT was minus 4° C. Crew saw bright blue flash and heard bang as lightning struck, damaging radome and wing pods. Thunderstorms were not forecast and ground weather radar had shown no conditions conducive to lightning

D series - Lightning strike caused undetermined amount of damage to radome, radar dish, bulkhead supporting radar, and right elevator. Aircraft was on IFR approach in moderate turbulence and light snow.

OV-1 Class E mishap

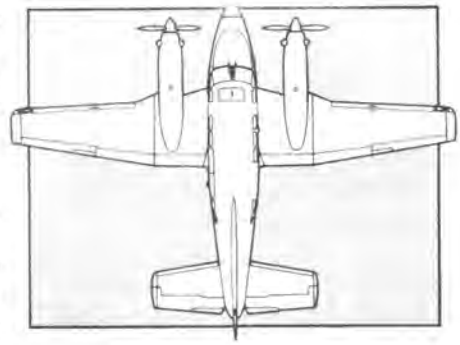
D series - When props were reduced to cruise setting during level-off, pilot saw two bright flashes from No. 1 engine and heard two pops. Suspect engine ingested small amount of ice, resulting in bleed band popping.

T-42 Class E mishap

A series - During aborted landing, prop tip apparently contacted runway. Pilot allowed final approach speed to exceed computed PPC speed and attempted touchdown with excessive speed before making go-around and proper landing.

U-8 Class E mishap

F series - During IFR flight at 10,000 feet msl, 160 KIAS, No. 2 engine began to surge. Rpm gauge showed fluctuations of approximately 25 rpm and all indications were that the prop governor wasn't holding rpm. After about 3 minutes, situation returned to normal. After landing, low-speed mag check indicated one cylinder plug was missing. Further inspection revealed No. 5 cylinder push-pull rod was bent and inboard valve lifter body of exhaust valve and No. 5 lifter body of intake valve were broken. There was also damage to cylinder wall skirts, Nos. 5 and 6 pistons, and internal damage to the crankcase.



U-21 Class D mishap

G series - Aircraft struck large bird during final approach, causing $1,000 damage to landing light lens cover, attaching bracket, and support stringers.

U-21 Class E mishap

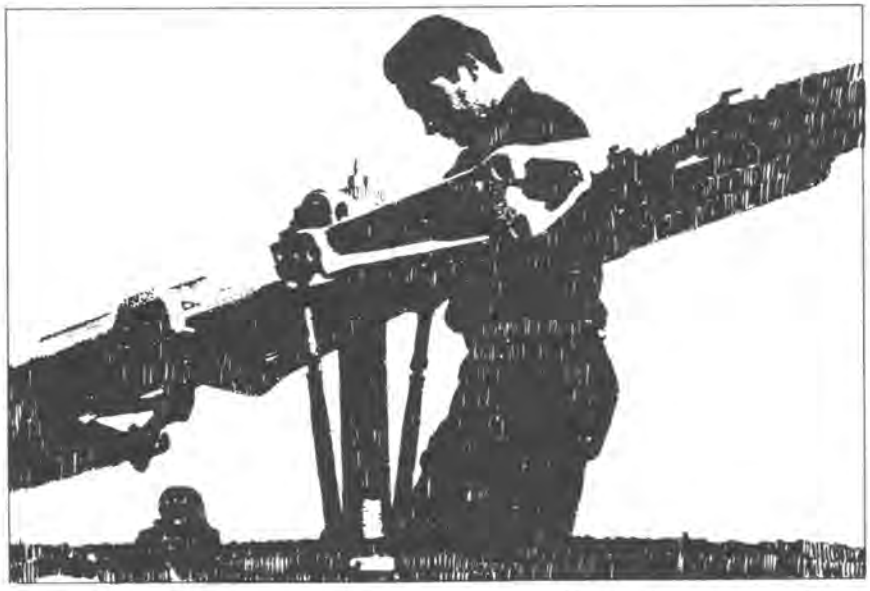
C series - During cruise check after level-off, fuel was seen siphoning from No. 2 engine nacelle tank fuel cap. Pilot failed to completely seat fuel cap.

Maintenance

UH-1 Class E mishaps

H series - During before-landing check, rpm was noted above 6600. IP reduced governor switch in attempt to set N2 at 6600 for landing and rpm continued to climb through 6700. Analyzing the problem as high-side governor failure, IP used manual throttle control to set rpm at 6400 and declared an emergency. Aircraft landed without exceeding limitations. Maintenance had reversed wires on linear actuator and when governor increase/decrease switch was decreased, engine rpm increased.

H series - During shutdown, crew chief saw steady stream of oil coming from bottom of aircraft. Transmission oil line hadn't been properly tightened, resulting in loss of about 2 quarts of oil.



Mishap briefs

AH-1 Class E mishaps

P series - During flight, master caution and 42-degree gearbox lights came on. Crew chief improperly installed cowling for 42-degree gearbox, causing wire to chafe and short out during flight.

S series - During high-speed flight, canopy top hinge popped open, causing about a 1-inch gap. Crew reduced airspeed and made unsuccessful attempt to close gap. Canopy was secured by using tourniquet from survival vest. Maintenance personnel improperly adjusted locking pin for canopy.

AH-64 Class D mishap

A series - During runup to MOC reinstallation of tail rotor hub assembly, pilot noticed some vibration from tail rotor. Aircraft was shut down and tail rotor blade weights were changed. When aircraft was again run up, there was excessive vibration. Crew chief had noticed tail wheel bouncing 6 to 8 inches during runup. Inspection showed stabilator transducer mount was torn around attachment to stabilator and top cap of vertical fin was torn around mounting screw holes from vertical vibration. After stabilator was removed, tail rotor hub assembly reinstalled, and a third runup, which also produced excessive vibration at engine idle, investigation showed maintenance personnel had not centered tail rotor hub assembly on the tail rotor fork assembly.

OH-58 Class D mishap

D series - During refueling stop, landing light was discovered missing and couldn't be found. During modification to AHIP requirements, light was removed from shaft for replacement with special fixture which is held by two Allen-head screws. Screws likely were installed without lock tight, allowing screws to back out and light to fall off. Apparently, there are other aircraft in the field whose landing lights are without lock tight. Action to correct the problem will be forthcoming.

OH-58 Class E mishap

C series - When pilot attempted shutdown, throttle wouldn't decrease past idle detent. Pilot completed shutdown by closing fuel shutoff valve. Inspection showed linkage to fuel control was disconnected. Retaining nut and washer were found on engine deck, but no cotter pin was found. Suspect that during installation of throttle linkage, cotter pin wasn't installed through the nut.

Safety messages

• Safety-of-flight operational message concerning restriction on firing area weapon system on AH-64A aircraft (AH-64-87-08, 312330Z Mar 87). Summary: During a firing operation, the 30mm weapon fired out of coincidence with the sight line. In normal switch position, the gun would track in azimuth but go full down in elevation, even with TADS locked on target. An investigation as to cause and corrective action has been initiated. This is a different problem to that cited in safety-of-flight operational message AH-64-86-18. Aircraft which may have had the fire control computer changed per message AH-64-86-18 are also suspect. Since it is not known whether this is an isolated problem, it is necessary to restrict all aircraft and cease and desist from firing the 30mm weapon. Contact: Dick Mooy, AUTOVON 693-3300, commercial 314-263-3300.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Failure to follow up

It was no big thing, just a tail rotor drive shaft cover that came open and flew off the aircraft. Certainly nothing to compare with a Class A accident, or even a B or C. Those are the accidents that should get attention, right? True, but the failure to follow up that caused this mishap could also cause one of the big ones. We have to treat every Class D and E as a potential A-C, and so do you.

The crew chief had performed the daily inspection the previous day, but he was distracted with a maintenance problem on another aircraft and he failed to secure the fasteners on the tail rotor drive shaft covers between the 42-and 90-degree gearboxes.

The pilot who performed the preflight inspection noticed the covers weren't fastened, but he thought another crew chief might still be doing maintenance. He made a mental note, however, to check with the crew chief after he finished the preflight.

After finishing the preflight, the same pilot was taking a fuel sample when a fuel drain stuck in the open position. By the time he and the crew chief got the drain closed, they were both soaked with fuel. After washing and changing clothes, the pilot had forgotten about the unsecured drive shaft covers and he took off in the UH-1V.

The aircraft was about 2,000 feet msl, at 90 KIAS, when the pilot felt a thump. He decelerated and checked control responses. When normal cruise flight was resumed, the crew felt vertical vibration and the IP took the controls and headed for the nearest airport under reduced power. The aircraft made a shallow approach and landed with no further problems.

The IP hadn't been involved in preflighting the aircraft, but the crew chief and the pilot were aware the drive shaft covers weren't fastened—they just failed to follow up. The crew chief should have written up "drive shaft covers unfastened" in the logbook before going to work on the other aircraft. The pilot should have used the checklist during his preflight inspection; and he should have found out why the drive shaft covers were unfastened, as soon as he discovered them, and made an entry in the logbook.

No big thing, only a lost drive shaft cowling, but next time the cowling might go through a rotor. Or it could be a drained gearbox that doesn't get written up. There just aren't any small things when it comes to safety. ■

Correction

The part number for a defective hydraulic line referred to in an AH-64A Class E PRAM, 11 Mar 87 *Flightfax*, should be P/N 7-311830102.

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
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Too late for recovery

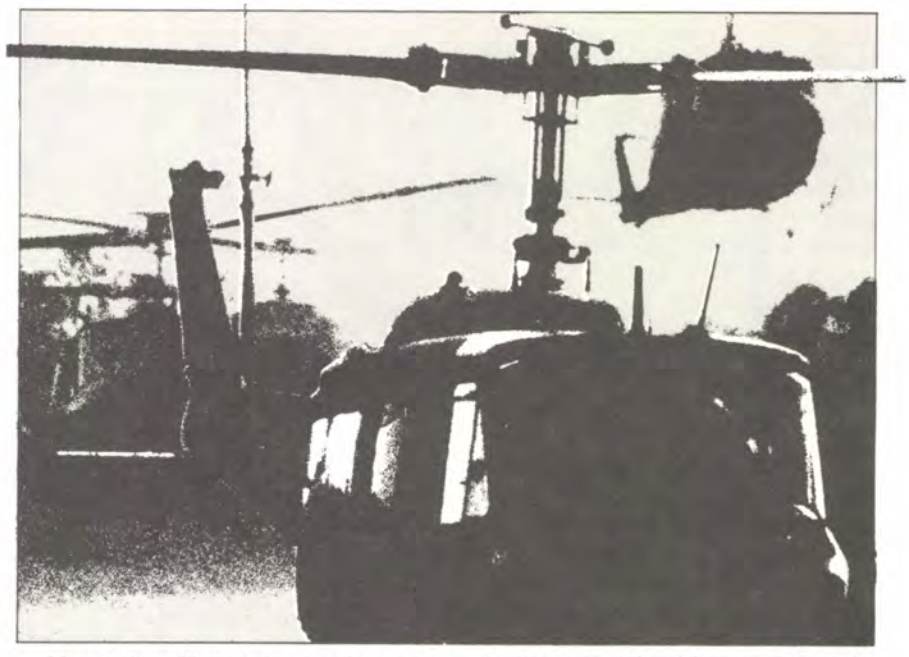
Because of a mixup, two aviation units in separate locations received a request for two UH-1Hs to provide orientation flights for senior ROTC cadets in conjunction with a 3-day field training exercise. The unit to which the mishap aircraft belonged first notified the supported unit that the mission was cancelled because of weather in the training area. However, while the UH-1 crews were getting in some local flying the weather unexpectedly cleared, and permission was given to go ahead with the support mission.

One aircraft proceeded to the supported unit's location to brief and organize personnel to be transported. The UH-1 which would later be involved in the mishap returned to the flight facility to pick up required documents and receive the mission briefing. While the pilot was being briefed, the copilot and crew chief refueled and prepared the aircraft for the mission.

When the first aircrew arrived in the training area, they found two more UH-1s from another unit were there also. Coordination was accomplished among the crews for all four aircraft to participate in the mission.

The mishap aircraft arrived in the training area shortly after noon. The cadets had already been given a safety briefing by the other aircraft crews and the necessary flight release forms and passenger manifests had been completed.

The 40-year-old PIC, who had 2,988 hours in rotary wing aircraft—1,772 in the UH-1H, flew the first load of cadets. His 31-year-old copilot, who had 1,254 rotary wing hours—861 in UH-1s, flew the next two loads, then the PIC resumed the controls for the fourth load.



After a short flight in the local area at low altitudes, and with the cargo doors open, the pilot began a cyclic climb to an altitude of 150 feet agl. He then entered a right descending turn, while looking to his right to maintain clearance from the other aircraft in the area. During attempted recovery from the descent, the pilot applied power, rolled the aircraft level, then raised the nose in a slight flare as the aircraft entered 60-foot hardwood trees on a heading of 140 degrees.

The aircraft received considerable damage from tree strikes and impacted the ground across a 20-degree left upslope on the edge of a small ravine, into which the aircraft rolled following impact. The aircraft came to rest on its right side just short of the ravine floor, resting on one of the trees it had knocked down.

Both pilots got out through the right cockpit door and crawled along the floor of the ravine under the aircraft's nose. They helped the three passengers seated on the right side of the aircraft to exit by the same path. The crew chief assisted the three passengers seated on the left side out the left cargo door opening. They reached ground level by walking aft on the tailboom. The pilot, the three right-side passengers, and one passenger on the left side were injured.

Search aircraft were launched within 10 minutes of the mishap. The copilot was unable to communicate with the search aircraft by using the AN/PRC-90 survival radio and attempts to attract attention with penlight flares were unsuccessful; however, a purple smoke grenade immediately attracted search

(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 - While making hot approach, copilot entered brownout and landed hard. Tail boom, main rotor blades, underside of fuselage, skids and crosstubes were damaged. 8727

UH-1 Class D mishaps

H series - When copilot encountered brownout during final approach, he allowed aircraft to yaw left at about 2 feet agl. Right rear skid was bent when it struck the ground, then WSPS tip was broken when aircraft lifted up in nose-low attitude. Copilot failed to anticipate brownout conditions.

H series - During approach, rotorwash blew door open on parked OH-58, breaking door hinges.

UH-1 Class E mishaps

H series - During power recovery from in-flight simulated engine failure with throttle full open, pilot started to apply collective. IP noticed N2 rpm was bleeding off and took controls, autorotating to the ground. After touchdown at flat pitch, maximum N2 rpm was 5400 with throttle full open. Rpm returned to normal after 13 minutes. Maintenance couldn't duplicate.

H series - During flight at 8,500 feet msl, crew noticed yaw motion accompanied by three rumbling noises from rear of aircraft. IP took controls, reduced power by beeping down governor to 6400 rpm and checked bleed air and deice. Egt was at 680° C. for less than 3 seconds. Maintenance couldn't duplicate.

H series - During aerial recon, pilot saw engine oil temperature at 110° C. Thermal bypass valve failed in open position, causing engine oil to bypass oil cooler.

UH-60 Class D mishap

A series - While slingloading M102, fourth leg of sling, which had been taped to another leg, came loose in flight, striking right tail boom fuselage and puncturing skin. Caused by improper rigging.

UH-60 Class E mishap

A series - Aircraft developed severe vibration in main rotor system during flight. Aircraft rotor system was out of track.

Attack helicopters

AH-1 Class D mishap

F series - Damage to leading edges of both main rotor blades was discovered during postflight inspection after tactical mission. Crew did not see blade strike or note any abnormal indications.

AH-1 Class E mishaps

F series - While hovering in firing position at about 15 feet agl on unimproved range, crew failed to see flare parachute before rotorwash caused it to be picked up into main rotor system.

P series - During landing, tgt spiked three times from 700° C. to 840° C. Caused by possible compressor stall. Aircraft was being operated in blowing dust and sand.

S series - MTP was conducting hover checks. During dual system power cylinder check, No. 1 hydraulic caution light came on and tail rotor pedals became stiff. No. 1 hydraulic pressure line had burst at hydraulic pump.

AH-64 Class E mishap

A series - After APU start, hydraulic fluid was found venting from utility hydraulic heat exchanger exhaust port. Caused by failure of utility hydraulic heat exchanger.

Cargo helicopters

CH-47 Class B mishap

B series - While crew was attempting to make a precautionary landing, aircraft struck power lines. Two main rotor blades were damaged and windscreen was broken. 8728

CH-47 Class E mishap

C series - Ten minutes after takeoff, No. 2 engine N1 decreased to 66 rpm and torque split. Emergency engine trim was used to match torque and aircraft landed. Caused by dirty cannon plug to No. 2 engine N2 actuator.

CH-54 Class E mishap

A series - Aircraft was VFR at 8,000 feet msl over clouds. Crew noted No. 1 engine oil pressure was 40 psi, below minimum for flight. With No. 1 engine trimmed to low-power setting, aircraft descended and landed. Crew chief replaced worn engine oil-pressure transmitter.

Observation helicopters

OH-58 Class D mishap

C series - During NOE NVG flight, pilot felt slight bump in antitorque pedals. Postflight inspection showed tail rotor blades had struck vegetation, causing more than $8,600 damage.

OH-58 Class E mishaps

C series - Aircraft was part of two-aircraft flight. The AH-1 in front of the OH-58 made a tight 180-degree turn and headed back toward the OH-58. The OH-58 pilot responded with a hard-right turn and increased collective to tighten turn and avoid rising terrain. During turn, pilot saw torque pass through 100 percent and reduced collective, but torque reached 105 percent for 3 seconds. AH-1 pilot failed to communicate his intentions to OH-58 pilot and OH-58 pilot failed to allow adequate clearance between aircraft.

C series - Aircraft had just reached 7,500 feet msl during instrument training flight when pilot noticed rpm at 102. Attempt to use decrease switch was unsuccessful. Rpm dropped to 100 when throttle was retarded, and aircraft landed. Wire on linear actuator came off in flight and actuator went to full increase.

Fixed wing

OV-1 Class E mishap

D series - During No. 1 engine start, fuel was seen pouring from lower engine cowl. Caused by engine drain valve failure.

SD-3-30 Class E mishap

No. 1 engine fire warning system came on during training flight. Internal malfunction of engine fire detection loop caused fire warning system to activate.

U-8 Class E mishap

F series - After takeoff with gear handle in up position, right main gear indicated down. After recycling of gear handle, right main gear still indicated down and aircraft landed. Landing gear switch malfunctioned.

U-21 Class E mishap

A series - During taxi for takeoff, right generator-out light came on and generator couldn't be brought back on line. Caused by corrosion on fuse holder block of right generator.

Maintenance

OV-1 Class E mishap

D series - When crew extended landing gear during VFR approach, nose gear indicated unsafe. Tower reported nose gear appeared to be unlocked and after recycling, gear indicator still showed unsafe. Uneventful landing was made to foamed runway. Nose gear lock system appeared not to have been lubricated after service, causing lock to hang up.

U-21 Class E mishap

A series - When landing gear control switch was raised during takeoff, both landing gear warning lights remained on. When landing gear control switch was placed in down position, lights went out. Mounting bracket for landing-gear-up switch was bent, causing erroneous cockpit indications. Suspect bracket was bent during rigging of landing gear.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	1-22 Apr	0	0
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	33	27	Total to Date	16	19

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

Too late for recovery

aircraft to their position in the dense forest. One aircraft landed to provide immediate assistance while another brought in medical personnel to help stabilize and evacuate the injured.

The accident resulted from the pilot's failure to monitor his altitude and rate of descent while in a descending right turn of 45 to 60 degrees bank, from 100 feet above the highest obstacle. He allowed the rate of descent to exceed the maximum recovery rate because he had channelized his attention on another aircraft. The pilot's improper division of attention was a direct result of overconfidence in his ability to complete the turn. He had completed several similar maneuvers during this flight, but none were through a gusty downwind condition at such a low altitude and steep angle of bank while having his attention channelized on another aircraft. ■

Mishap classification criteria

A call from a safety officer outside of Department of the Army has reminded us that some of our readers might not be familiar with Army aircraft mishap criteria.

☐ A Class A aircraft mishap is a mishap in which the resulting total cost of property damage and personnel injuries is $500,000 or greater; or an Army aircraft is destroyed; or an injury/occupational illness results in a fatality or permanent total disability.

☐ A Class B aircraft mishap is a mishap in which the resulting total cost of property damage and personnel injuries is $100,000 or more, but less than $500,000 or any injury/occupational illness results in permanent partial disability or hospitalization of five or more personnel.

☐ A Class C aircraft mishap is a mishap in which the resulting total cost of property damage and personnel injuries is $10,000 or more, but less than $100,000; or an injury/occupational illness results in a lost workday case with days away from work.

☐ A Class D aircraft mishap is a mishap in which the resulting total cost of property damage and personnel injuries is less than $10,000; or an injury/occupational illness resulted in a lost workday case with days of restricted work activity or a nonfatal case without lost workdays.

☐ A Class E aircraft mishap is an event with no damage cost and no injury or occupational illness, or injury requiring only first aid, or other circumstances resulting in, for example, forced landing, precautionary landing, human factors event.

DA Form 2397 series will be submitted on all Class A, B, and C aircraft mishaps. A preliminary report of aircraft mishap (PRAM) is required on all aviation mishaps in accordance with AR 385-40, paragraph 5-1.

If you have questions or comments concerning aircraft mishap classifications, call Mr. Bob Williamson, AUTOVON 558-6385/3819. ■

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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 - Cross tubes broke upon touchdown from hovering autorotation. Investigation continues.

UH-1 Class E mishaps

H series - Master caution and transmission low pressure lights came on during flight. Caused by failure of quick disconnect.

V series - During climbout from practice missed approach, engine chip detector light came on. Numerous pieces of brass and steel were found in engine lubricating system, requiring engine change.

UH-60 Class D mishaps

A series - Damage to No. 2 tail rotor drive shaft cowling was found during postflight. Aircrew failed to ensure cowling was fastened.

A series - While slingloading howitzer at night, crew made successful hookup and uneventful flight to destination. Crew chief felt howitzer strike the ground twice while aircraft was still moving at about 25 KIAS. When load was released, the howitzer dug in and rolled over, breaking the sight mount. Self-emplacing stakes on howitzer hadn't been retracted during rigging by ground unit. When it touched the ground, the stakes dug in and caused the howitzer to roll over.

A series - During landing to field site, tail wheel landed on corner of PSP pad. The PSP pad flipped up into underside of right stabilator, puncturing the sheet metal. PSP pad wasn't properly secured.

Attack helicopters

AH-1 Class A mishap

A Series - Engine failed during takeoff and aircraft was destroyed when it landed in trees. Crew received minor injuries. 8729

AH-1 Class D mishap

F series - Aircrew had been conducting local area recon during field exercise. During postflight, pilots found damage to tail rotor. Suspect damage was caused by flying debris.

AH-1 Class E mishaps

E series - Aircraft had completed approach to landing site in training area and was being repositioned when alternator and rectifier lights came on. Caused by alternator bearing failure.

F series - Compressor stall occurred during NOE flight. Caused by malfunction of engine fuel control.

F series - With aircraft at flight idle during shutdown, engine oil pressure light came on and engine oil pressure gauge read zero. About 10 seconds later, engine oil chip detector light came on. Engine oil pump drive shaft in N1 gearbox sheared.

F series - During transition from terrain flight, crew heard loud squeal from hydraulic pump and No. 2 hydraulic segment light came on. Caused by faulty roll SCAS actuator.

F series - While conducting local area recon during field exercise, crew felt vibration in tail rotor pedals. Caused by worn rod end bearing in tail rotor pitch change link.

S series - When aircraft was picked

(continued on next page) ►

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	1–29 Apr	2	1
	May	1	0			
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	33	27	Total to Date	18	20

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Mishap briefs

up to hover, collective was binding. Caused by faulty servo assembly.

S series - Master caution and transmission bypass lights came on while aircraft was at a slow in-ground-effect forward hover. Transmission temperature rose to 102° C. Pressure remained steady at 58 psi. Suspected cause was trash in new transmission.

AH-64 Class E mishaps

A series - During flight at 125 feet agl, 75 KIAS, No. 2 engine fuel psi light came on. No. 2 engine failed before pilot could complete emergency procedures. Approximately 5 seconds elapsed between warning light and engine failure.

A series - During postflight, 90-degree gearbox input seal was found to be leaking grease and both nose gearboxes were low on oil. Tail rotor gearbox input seal was misaligned. When input seal failed, gearbox overheated. Suspect gearbox input seal was improperly installed at factory.

Cargo helicopters

CH-47 Class D mishaps

C series - During NVG slingload operations, pilot allowed aircraft to drift rearward, causing M101A howitzer to tip over, damaging howitzer's sighting mechanism.

C series - Transmission chip detector light came on during runup. Numerous metal chips were found on filter and transmission was replaced.

CH-54 Class E mishap

A series - Aircraft was downwind for landing when crew smelled strong odor of fuel in cockpit. As aircraft landed, fuel began pouring from fuselage at left front load leveler. Caused by fuel leak in forward fuel tank connector.

Observation helicopters

OH-58 Class D mishap

A series - During takeoff, unsecured main rotor tiedown was blown through the tail rotor system, damaging tail rotor blade and hub assembly. Fire guard placed tiedown over aircraft's tail cone and forgot it was there.

OH-58 Class E mishaps

A series - As throttle was rolled to full-open position prior to takeoff, N2 rpm went to 108 percent. When increase/decrease switch was placed in full decrease position, rpm stayed at 104 percent. Overspeed was caused by a cracked PR line.

A series - During flight at 700 feet agl, engine-out light and audio came on. Cross check of instruments showed no abnormal indications except N1 tachometer read zero. Wire had pulled free from cannon plug.

A series - Aircraft was 2,500 feet agl when low rpm audio and engine-out light came on. Cross check of instruments showed no indications of engine failure but N1 tachometer rapidly dropped to zero. Caused by broken shaft on tachometer generator.

A series - Engine chip detector light came on during flight. Engine and transmission will be replaced due to high metal content of oil. Exact cause unknown, suspect accessory gearbox.

C series - During low-level flight training, pilot noted that when he relaxed his grip on cyclic, it moved of its own volition to the front left quadrant. Caused by faulty cyclic servo.

C series - During AAPART evaluation, pilot being evaluated was attempting to land on a 5-degree slope. He stabilized the aircraft into the wind, perpendicular to the slope, and lowered collective until left skid touched down. He then rapidly reduced collective causing right skid to hit hard and resulting in spike knock. Caused by pilot reducing collective too rapidly.

Fixed wing

OV-1 Class D mishap

D series - During flight at 150 KIAS, pilot discovered his oxygen mask mike cord was stuck in the side hatch securing mechanism where the hook engaged the eyelet. While attempting to free mike cord, side entrance hatch was inadvertently released, allowing hatch to open.

OV-1 Class E mishap

D series - During flight at 16,000 feet msl, pilot and observer felt unusual vibration, not associated with turbulence, followed by flames coming from No. 2 engine exhaust. Observer reported engine on fire. Pilot disengaged autopilot and slowly reduced power on right engine. Vibrations and evidence of fire did not recur, even when power was slowly increased to 25 percent torque. Aircraft made uneventful landing with No. 2 engine at 25 percent torque. Suspect bleedband popping.

T-42 Class D mishap

A series - When crew raised gear during missed approach on practice ILS, they could hear loud grinding noise as gear went up. When gear was lowered they heard the same noise, but gear went down and locked and an uneventful landing was made. During postflight, left main gear door was found bent and hanging down at a 45-degree angle. Pin in retract rod had sheared as landing gear was raised. Inboard gear door was bent when it caught on landing gear and, because door was out of alignment at hinge point, bolt on hinge caught on side-hinge bracket and broke.

U-8 Class E mishap

F series - After takeoff, right main gear indicated down with gear handle in up position. Next day, when landing gear was lowered, right main gear down and lock switch failed, giving gear in-transit indication. On the third day, down and lock switch on right main gear was replaced and checked on the ground. When right main gear handle was placed in up position after takeoff, gear indication showed it was in down position. During flight, switch plunger stuck in down and locked position.

Maintenance

UH-1 Class E mishap

M series - Master caution and engine chip lights came on and torquemeter failed during IFR flight in IMC. During intermediate maintenance, torquemeter was mismatched to incompatible torque sending unit transmitter.

Safety messages

• Safety-of-flight operational message concerning stabilator operational procedures on UH-60A/EH-60A series aircraft (UH-60-87-05, 112000Z Apr 87). Summary: There have been reported incidents of uncommanded stabilator movement without any stabilator malfunction indication. A recent incident resulted in an uncommanded pitch-down maneuver with associated aircraft buffeting/vibration. The stabilator system remained in the automatic mode and did not revert to manual operation throughout the incident. There were no audio warnings or caution light illumination during the incident. The crew did not take manual control of the stabilator system. Effective immediately, the following procedures apply. 1) Any indication of an uncommanded stabilator operation (whether accompanied by a stabilator malfunction indication, buffeting/vibration or not) shall be treated as a "failure to regain automatic control" (paragraph 9-78 of TM 55-1520-237-10). The crew should immediately increase collective pitch and use the "manual slew switch" to adjust the stabilator to zero degrees if above 40 KIAS or full-down when airspeed is less than 40 KIAS and fly at or below placard limits. Land as soon as practicable. 2) At airspeeds above 80 KIAS, all UH/EH-60 aircraft are restricted to a minimum of 3,000 feet agl. Place circle red "X" restriction in aircraft log book form 2408-13. At operations below 80 KIAS there are no altitude restrictions. 3) Before next flight, all flight crews will be briefed on this procedure and records kept to ensure all are aware of the operational procedures. This procedure is in effect until further notice. Any uncommanded stabilator incident as described above will be telephonically reported to the technical POC, Mike Hoffman, AUTOVON 693-1687, commercial 314-263-1687. During off-duty hours, call the AVSCOM COC, AUTOVON 693-2066, commercial 314-263-2066. Aircraft will not be cleared for further flight until released by AVSCOM. The incident shall be promptly reported by a PRAM. All other routine stabilator system maintenance should be released for flight by the unit commander or his designated representative. Contact: Lyell Myers, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight maintenance mandatory message concerning removal of copilot/gunner boarding step on AH-64 series aircraft (AH-64-87-09, 161545Z Apr 87). Summary: There have been a significant number of reports involving cracking of the copilot/gunner (CPG) boarding step support. The purpose of this message is to direct disablement of the CPG step until newly-configured units are available. A failure to disable the step in the interim could result in a failed support bracket and injury to personnel. The step will be made usable in the future by ECP/MWO. Contact: Leo Smith, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight maintenance mandatory message concerning inspection of aft engine mount pins on AH-64 series aircraft (AH-64-87-10, 162030Z Apr 87). Summary: There have been several cases of the primary aft engine mount pin (NSN 5340-01-159-0440) becoming disengaged from the support bracket. In some cases, the pin may rotate in the mount, causing the lanyard to wrap around the pin and release the locking mechanism. Contact: Leo Smith, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight technical message concerning one-time inspection and installation of elevator trim tab system modification on all models of C-12 and RC-12 aircraft (C-12-87-02, 162200Z Apr 87). Summary: Last year, the FAA issued airworthiness directive (AD) 86-20-03 for all C-12 models to preclude elevator trim binding. Beech issued instructions to install cable guards in the cockpit pedestal drum assembly (forward cable guard) on all models and on the electric trim actuators (aft cable guard) P/N 33-524023 or P/N 50-524496 (Sperry autopilots) on the UC-12B. Subsequent to this AD, a similar commercial aircraft with the cable guards installed experienced a frozen trim control during flight. After investigation, the cause was determined to be moisture accumulation in the aft cable guard which froze at altitude. The FAA then issued emergency AD 87-04-24 to modify the aft cable guards by drilling drain holes. Beech has modified their kits to include parts with drain holes and a cable drum cover. The AD 87-04-24 and Beech service instruction C-12-0112 increased the number of C-12s requiring the aft cable guard modification to include C-12D, RC-12H, UC-12B, UC-12F, and C-12F aircraft with Sperry autopilots. This message directs compliance with or inspection to assure compliance with FAA emergency AD 87-04-24. Contact: Roger Heidenreich, AUTOVON 693-9089, commercial 314-263-9089.

• Aviation life support equipment (ALSE) advisory message concerning validation of maintenance training for the Aviation Life Support Equipment Supervisor Course (ALSF-87-12, 132000Z Apr 87).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

ALSS-GRAM

Deficient equipment

An ALSE user recently discovered a problem with the cold weather survival vacuum-packed sleeping bag. One of the defectively-packed bags was sent to us and we are evaluating it now and will make recommendations on how to solve the problem.

When you find ALSE isn't performing as it was designed to do and/or there are apparent deficiencies in the equipment, send in your EIRs and be sure to send us a copy. We may also ask you to send a sample of the equipment to us so that our experts can take a look at it. Our goal is for you to have the ALSE you need at the most affordable cost. If the ALSE isn't performing properly, we need to get the problem or deficiency resolved.

Desert survival course

A training course on how to survive in a desert environment was conducted last September at Yuma Army Proving Ground, AZ. One day of classroom instruction covered basic first aid, signals, desert rules, water procurement, shelters, navigation, and aircraft vectoring. A practical exercise was conducted over 3 days and 2 nights in a mountainous area of Washington State. Three Air Force survival instructors from Fairchild AFB, WA, assisted Yuma search and rescue personnel in conducting the training and a Marine Corps Air Station Search and Rescue Unit provided a rescue helicopter and crew to demonstrate extraction devices and rescue techniques. This training is an example of what can be accomplished when our military services work together. You might find the following points of contact useful:

MAJ Powell, S3, SAR Bn, YMCAS, AUTOVON 899-2207.
CPT Enterline, Cdr, YMCAS, SAR Det, AUTOVON 899-2896.
CW3 Phelps, Laguna AAF, AUTOVON 899-2217.
MSG Rashmission and MSG Godabout, YMCAS, Operations NCOIC, SAR, AUTOVON 899-3558.
Lt Col Hanger and CMSgt Odem, Fairchild AFB, WA, AUTOVON 352-2956/57.
CMSgt Jensen/Sgt Pactz, Randolph AFB, TX, AUTOVON, 487-4070.

Deputy for Aviation Life Support Equipment
AUTOVON 693-3215, Commercial 314-263-3215

Title	Name	Area of Responsibility
AMC Product Manager		AMCPM-ALSE
Deputy AMC Product Manager	A.B.C. Davis, Jr.	Chief, Logistics/ Readiness
Logistics/Readiness	Harlyn Hubbs	Senior Logistics/ Readiness
Logistics/Readiness	Jim Dittmer	Mission/ Environmental/ Equip
Logistics/Readiness	Boone Hopkins	Egress/Survival/ Rescue Equipment
ALSE Maint Specialist/ Technican	Jim Angelos	ALSE Maint/Tng/

Fire extinguishers and first-aid kits

Comments have been overheard about why we don't save space and weight by getting rid of fire extinguishers and first-aid kits on aircraft.

If there really are nonbelievers out there, we recommend you read "What's Your Training Worth?" in the 20 Aug 86 issue of *Flightfax*. Had it not been for the fire extinguisher and a pilot who was trained to use it, the observer, who was trapped in the aircraft, might not be around today. Fire extinguishers and first-aid kits are there to help you survive. We hope you'll never need them, but just in case you do, they'll be there.

ALSE career field MOSs

How would you like to fly with a PRC-90 survival radio that is corroded and might not work when you need it? We need people who are fully qualified to inspect, maintain, and repair ALSE equipment because when an accident happens, your ALSE can be the difference in whether or not you survive. We think that's reason enough to keep pushing for career field MOSs in ALSE.

We also need fully qualified ALSE people on accident investigation teams; they can do much to help us identify problems with ALSE and prevent their recurrence.

Helmets for passengers

Since September of 1982, SPH-4 helmets have been authorized for passengers in observation helicopters. Because of the number of questions received, we quote from CTA 50-900: "K34252 helmet flyers: glass fiber crash-type plastic lining OG-106 (NOTE 27, 28, 29, 30, and 76). Per individual on flying status and passenger seat in observation aircraft; civilian pilot, civilian test pilot and instructor; Allied student attending flying course; ARNG/USAR technician required by the technician position description to perform aerial flight." Also see AR 95-1, paragraph 2-5, regarding personnel authorized to fly as passengers in Army aircraft.

Nonaviation personnel participating in missions should be provided with protective headgear. If the passenger is required to communicate with the pilot or others aboard the aircraft, he should be issued the SPH-4 helmet. The helmet can be fitted by one of the ALSE technicians well enough so that it will not be lost during a crash.

ALSE Pamphlet

The U.S. Army Aviation Life Support System Pamphlet, DRCPO-ALSE, issued in January 1984 will be undergoing update in the near future. This pamphlet contains a wealth of information that can still be used as is. ALSE users can get the pamphlet by contacting Regina Fitzgerald, AUTOVON 693-3215/3817, or by writing AMCPM-ALSE-L, 4300 Goodfellow Boulevard, Building 105, 2d Floor, Post G-37, St. Louis, MO 63120-1798. You will also be placed on the mailing list for future publications.

Personnel change

Jim Angelos has replaced SFC Edward Bruck in ALSE maintenance and training. His AUTOVON number is 693-3889.

Electronic mail

To speed up important communications, we have installed an electronic mail (E-Mail) unit. The address is AMCPM.ALSE @ STL-HOST 1. ARPA. Please add the name of the person you want the communication to go to. If you have E-Mail capability, please send us your address.

Thanks for the support

We sincerely appreciate your letters and telephone calls about problems you're having with ALSE equipment. We also appreciate the positive things some of you report to us about the equipment. We will continue to provide you with a written reply, and we will publish information on this critical area in *Flightfax* and *Army Aviation Digest*. If you have information you think would benefit other ALSE users, send it to: AMCPM-ALSE-L, ATTN: Boone Hopkins or Harlyn Hubbs, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. ■

ALSS-GRAM 5 29 April 1987

Prepared by the Deputy AMC Product Management Office, Aviation Life Support Equipment, 4300 Goodfellow Blvd, St. Louis, MO 63120-1798, AUTOVON 693-3215, commercial 314-263-3215. Information published generally precedes normal staffing and distribution of Army official policy and is intended as advance information to enhance the critical area of ALSE.

A.B.C. Davis, Jr.
Deputy AMC Product Manager
Aviation Life Support Equipment

Aircrew duty position codes

AR 95-1: General Provisions and Flight Regulations, dated 18 Dec 86, changed the duty position codes for logging flying time on the DA Form 2408-12.

These duty position codes are not to be used for preliminary reports of aircraft mishaps (PRAM) and accident reports. The duty position codes found in DA Pam 385-95: Aircraft Accident Investigation and Reporting, pages 8 and 9, paragraph 22, should be used for PRAM and accident reporting (DA Form 2397 series).

USASC POC: Mr. Don Mynard, Directorate of Information Management, AUTOVON 558-5286

Shortfax

Close calls

While at a 3-foot hover between two other aircraft on a parking pad, the crew of a UH-1H felt a violent jolt followed by an immediate yaw to the right of about 45 degrees. The maintenance test pilot (MTP), who was at the controls, began applying left pedal to correct for the yaw, but even with full left pedal applied the aircraft continued to yaw. When the UH-1 began a slow right turn, the MTP decided to lower the collective. The aircraft settled to within a foot of the ground, then came to rest approximately 60 degrees to the right of its original parked heading. The main body of the helicopter was in the parking space.

A mechanic had installed an engine mount bearing on the tail rotor control rod instead of the tail rotor crosshead bearing recommended by the -23 manual. The technical inspector failed to catch the mechanic's mistake.

The crew of a UH-60A was conducting slingload training, using a 500-gallon fuel bladder filled with water. During the second sortie, the bladder fell. The crew felt a slight bump, followed by a hard jolt and a bang. The crew chief, who was looking through the cargo hole, saw the load fall and told the pilots.

The aircraft returned to the airfield, and during postflight inspection a large hole was found in the bottom of the aircraft. The hole was caused by the sling springing back and striking the aircraft after the load was dropped.

Rigging of the 500-gallon bladder hadn't been checked for the second leg of the flight, and the load was probably rigged improperly. When the load was put down after the first sortie, the free end of the chain, which normally hooks into the clevis, apparently slid up onto the safety keeper. When the load was rehooked, the clevis remained cocked to one side and the full 4,500-pound weight of the bladder was resting on the keeper. A few minutes into the second leg of flight, the keeper broke and all the weight went to the remaining leg, causing the chain to snap. That caused the sling to spring back and hit the bottom of the aircraft, narrowly missing the crew chief's face as he looked through the cargo hook hole. ■

Attaboy

The IP in the following incident deserves special recognition for his ability to react quickly and skillfully to avoid what could have become an accident.

Mr. James V. Raymond, Pan Am Support Services, Inc., U.S. Army Aviation Center, Fort Rucker, was IP on a TH-55A at about 1,000 feet agl en route to a confined area. The helicopter's engine surged twice and Mr. Raymond increased rpm to 2900, but it dropped back to 2700. He then lowered the collective pitch in order to start an approach into the confined area. As he did so, the engine rpm dropped to zero.

Mr. Raymond autorotated the aircraft into the confined area. It came to rest upright on a 5- to 7-degree slope with no damage to the aircraft or injury to the crew.

Maintenance personnel found the engine failure was caused by an out-of-rig fuel control cable. ■

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.

A. E. Hervey, Jr.
Colonel, Aviation
Commander, Army Safety Center

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Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
AWARENESS • ACTION
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IN TRAINING AND LIVING

A look at NVG Class A mishaps

Mr. David A. Rosenthal, author of this article, is an electronics engineer involved in research and development for the U.S. Navy at the China Lake Naval Weapons Center. He is also a CW4 Army aviator assigned to the 126th Medical Company (Air Ambulance), California Army National Guard.

To determine the possible impact of noncompliance with the natural illumination recommendations of Field Circular 1-219, data from Army Class A aviation mishaps were correlated with the actual natural illumination (not including cloud cover) existing at the time the mishaps occurred.

Only accidents which occurred during use of night vision goggles (NVG) or pilot night vision system/target acquisition and designation system (PNVS/TADS) were examined. Included were accidents occurring between November 1980 and 14 April 1987.

From the Class A mishaps examined, a total of 23 events were identified (an event being defined as an accident occurring at a given place and time and sometimes involving more than one aircraft). A total of 32 fatalities resulted from the 23 Class A mishaps examined. The FC 1-219 criteria used were the recommendations that the moon be at least 23 percent illuminated and at least 30 degrees above the horizon during conduct of training using NVG/PNVS equipment.

One of the 23 Class A mishaps was eliminated from the analysis because it occurred during twilight when the sun was only 7 degrees below the horizon. Three of the remaining 22 events occurred within the FC 1-219 criteria, leaving a total of 19 occurring outside the criteria.

Of the 32 fatalities, one occurred as a result of the twilight accident and three as a result of the mishaps happening within the FC 1-219 natural illumination recommendations. The remaining 28 fatalities resulted from operations conducted outside FC 1-219 criteria.

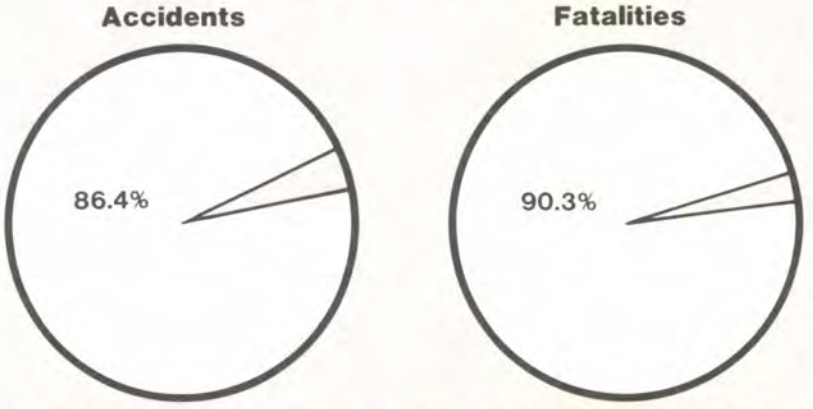
Computations show that 86.4 percent of the NVG-related Class A mishaps and 90.3 percent of the fatalities associated with these accidents occurred during times outside the natural illumination conditions recommended by FC 1-219.

These natural illumination criteria were established based upon both performance limitations of the image intensification capabilities of the NVG equipment and human factors. Because times are limited when the moon is more than 23 percent illuminated and more than 30 degrees above the horizon, this imposes restrictions on when NVG training and operations may be conducted.

Under illumination conditions which are less than the FC 1-219 criteria, NVG electronics are operating very close to their maximum sensitivity. Low light levels and electronic noise produced by the system result in an image of far lower quality than would be possible under illumination conditions recommended in FC 1-219. During flight, a combination of degraded NVG imagery and rapidly changing conditions can leave a pilot too little reaction time after becoming aware that a hazardous situation is developing.

(continued on back page)

Total Class A
Night Vision Device Related Accidents (23)
November 80 - 14 April 1987



Charts represent the percentages of Class A accidents and fatalities that occurred when moon illumination was less than 23% and moon angle was less than 30° above horizon.

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - Aircraft landed in confined area to pick up troops. Copilot warned pilot of trees close to right side of aircraft; pilot checked clearance and acknowledged location of trees. During hover, ground guide motioned aircraft to the right. Pilot moved aircraft to the right and main rotor blade struck trees, causing skin separation and loss of tip cap on one blade.

H series - During flight with pilot under the hood, IP initiated simulated forced landing. Pilot didn't trim aircraft and aircraft assumed a nose-low attitude. IP was late with corrective action. During postflight inspection, crack was found in skin of vertical fin.

UH-60 Class E mishaps

A series - During equipment check on cargo hook, prior to slingload mission, copilot placed emergency release switch in normal position before checklist callout. Emergency release was inadvertently activated.

A series - During flight, master caution, pitch bias actuator, flightpath stabilization, and trim lights came on and wouldn't reset. Caused by failure of stability augmentation system/flightpath stabilization computer.

A series - With engines and rotors at 100 percent rpm during runup, crew felt severe vibrations coming from rotor system. No vibration was noted in flight controls. Vibrations stopped when engines were reduced to idle, but when attempt was made to return engine to 100 percent, vibrations returned. Roll rate gyro failed, causing uncommanded roll inputs to the stability augmentation system.

A series - When No. 2 engine was started, crew heard rumble from rear of aircraft and tgt indicated 900° C. Engine was shut down. Suspect 15-knot tailwind caused engine exhaust to reenter tail pipe, causing rise in tgt after start was completed.

Attack helicopters

AH-1 Class A mishap

S series - The aircraft was departing a FARP after refueling and rearming when the engine lost power. The aircraft struck trees while attempting to land. 8731

AH-1 Class C mishap

S series - Master caution and transmission oil hot lights came on during NVG terrain flight. Pilot noted transmission temperature at 110° C. and engine oil temperature at 150° C. Engine oil temperature remained above 100° for 23 minutes after shutdown. Suspect oil cooler fan failed. Mishap is under investigation.

AH-1 Class D mishap

S series - During NOE flight, crew felt thump and landed aircraft. Outboard pylon fairing and one sway brace were damaged by impact with cactus.

AH-1 Class E mishaps

F series - When engine reached 100 percent rpm during runup, engine oil pressure read 101 psi. Engine oil pump was out of adjustment.

P series - Pilot noticed engine oil temperature rising slowly during runup. Pilot shut aircraft down as temperature reached 93° C. Caused by failure of engine oil cooler fan upper bearing pack.

AH-64 Class E mishaps

A series - During flight, vibration

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	1	0	1-6 May	1	0
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	33	27	Total to Date	19	20

gearbox (vib grbx) caution light came on and aircraft landed. While operating on the ground at flat pitch and full operating rpm, crew felt moderate high-frequency vibration in the airframe and slight high-frequency vibration in the antitorque pedals. Intermediate gearbox was replaced.

A series - Master caution and augmentation stabilization equipment lights came on during flight. Digital augmentation stabilization equipment switches came off line and heading and attitude reference system went into free inertia. Cause unknown.

A series - Aircraft was at a hover while conducting gunnery training. After two 30mm bursts were fired at a target 800 meters away, no impacts could be seen around target. Crew requested assistance from control tower personnel who reported gun was pointing down toward the ground. After aircraft moved, impact from rounds could be seen on ground. Fire control computer failed, allowing gun to fire straight down instead of along selected line of sight.

A series - After landing, oil psi accessory pump caution light came on and during postflight, oil was seen dripping from behind aft storage compartment. The shaft-driven compressor (SDC) grooved clamp was broken, causing the SDC to work loose, allowing oil to pour out of the main transmission accessory gearbox.

A series - During hot refueling with engine No. 2 shut down, No. 1 engine shut down for no apparent reason. There had been no indications of impending engine failure, but the pilot reported that during engine overspeed check, when the aircraft was first run up, No. 1 engine NG dropped to 42 percent. Cause of engine failure unknown.

A series - During NOE flight, oil low primary hydraulic and digital automatic stabilization equipment (DASE) segment lights came on and DASE disengaged. Maintenance replaced hydraulic line.

A series - Pilot night vision sensor (PNVS) message in helmet display unit indicated integrated helmet and display sight system (IHADSS) line of sight was invalid. Pilot performed coincidence check and PNVS turret did not move in conjunction with pilot's IHADSS movements. When pilot used different IHADSS helmet, PNVS system worked normally. Suspect problem with pilot's IHADSS was due to infrared detector failure.

A series - Pilot's station intercom system failed in flight. IP, flying from pilot station, could not transmit interflight station or from aircraft to external receiver. Copilot's intercom functioned. Suspect malfunction in wiring harness. Incident is still being investigated.

A series - As aircraft was being run up, No. 2 engine lockout procedure was executed. Engine did not respond for about 4 seconds. Power lever was brought to idle position, then advanced to fly position. NP/NR stabilized at 100 percent and a few seconds later the engine rapidly accelerated. Aircraft had previous problems during lockout procedures. Fuel control was replaced.

Cargo helicopters

CH-47 Class E mishaps

B series - During flight at 2,500 feet msl, 125 KIAS, No. 1 engine failed, followed by engine chip light. Caused by failure of fuel control.

C series - Flight engineer noticed hydraulic leak around utility hydraulic pump. When he checked the utility hydraulic accumulators, he found the rod extension had gone down about 4 inches in 5 minutes. Before aircraft could reach airfield (where ceiling was 400 feet) utility hydraulic pressure began fluctuating and crew heard loud noises from utility hydraulic system. When aircraft reached 200 feet agl, pilot could see the ground and he made an uneventful landing in a field 1 mile short of runway. Caused by failure of packing on return line at utility hydraulic pump.

C series - During flight, No. 2 engine transmission oil pressure began fluctuating about 10 psi. Caused by failure of oil pressure transducer.

Observation helicopters

OH-58 Class C mishap

C series - During flight at about 500 feet agl, 80 KIAS, pilot put aircraft in 30-degree banking left turn with collective in a near full-down position. Pilot heard rotor noise increase and noticed rotor tachometer at upper limits. Pilot increased collective to load rotor system and main rotor and engine tachometer peaked at 112 percent for less than 2 seconds. Damage amounted to more than $24,000. Investigation is being conducted.

OH-58 Class E mishaps

A series - At 8,000 feet pressure altitude, 60 KIAS, collective was lowered to full down and throttle reduced to engine idle. Master caution

and engine-out lights came on and N1 and N2 went to zero. A successful attempt was made to restart engine and full power was regained at 6,800 feet pressure altitude.

A series - When fuel sample was taken during preflight inspection, fuel drain port wouldn't close tightly, allowing a continuous leak of fuel. Fuel tank poppet wouldn't seal due to worn O-ring in poppet assembly.

C series - After aircraft was run up to 100 percent rpm, generator caution light came on. Pilot found altitude/vibration circuit breaker had popped. Caution light went out when circuit breaker was reset, but when pilot attempted to increase collective, generator caution light came on. Caused by failure of voltage regulator.

C series - Generator caution light remained on and ammeter gave a zero indication when generator switch was turned on during runup. Generator was reset three times and stayed on line a couple of minutes each time. Caused by failure of dc generator.

C series - During runup, fuel filter light came on and N1 and N2 started to wind down. Copilot, who was in right seat, rolled throttle off. When crew chief washed aircraft the day before, he flushed drain lines with a hose and also put the hose to the fuel tank vent because he failed to understand the significance of the fuel tank vent. Fuel sample taken prior to start was all right; however, fuel sample taken after start proved to be almost all water.

Fixed wing

C-7 Class E mishap

A series - About 20 minutes after takeoff, aircraft was at 6,000 feet msl. Left engine backfired and began running somewhat rough. Visual check revealed smoke coming from engine and about a minute later, oil quantity light came on followed by decreasing oil pressure. Engine was secured and aircraft made an uneventful landing. Cause is unknown.

C-12 Class E mishaps

D series - No. 2 engine fire light came on during descent. Ice had accumulated on aft lower fire sensor and when it thawed during descent, sensor shorted out.

F series - During climb to flight level 230, following takeoff, crew noticed fuel imbalance was being caused by right main tank fuel being transferred into right auxiliary fuel tank. As aircraft passed FL 180, nacelle low light came on. After landing, fuel line to jet pump in right auxiliary tank was found disconnected, allowing fuel to be pumped overboard through vent system. Apparently, when fuel line was installed at factory it was not tightened properly. After line was tightened and tanks were refilled, all systems worked normally.

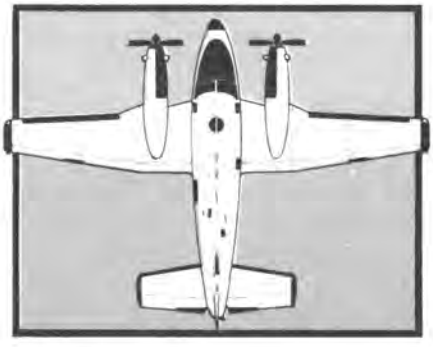
OV-1 Class E mishaps

D series - Aircraft was on limited maintenance test flight for No. 1 engine. During return to airfield, aircraft was in a normal descent at 9,500 feet msl, 200 KIAS, when it began a mild lateral control flutter which increased in intensity to erratic half-travel control movements. Pilot reduced airspeed below 200 KIAS. During approach, pilot received in-transit indication on right main gear. Gear was recycled twice without change in gear-down indications. Pilot pulled emergency gear

handle and made normal landing. Flutter was caused by excessively worn bearings on right aileron spring tab assembly which caused spring tab control surface to become unstable at speeds greater than 200 knots. Erroneous in-transit gear indication was caused by faulty right main gear downlock switch.

D series - During before-landing check, hydraulic pressure on Nos. 1 and 2 systems went to zero. Gear indicators showed all three gears down and locked and aircraft made uneventful landing. During maintenance inspection, failed safety relief valve was found.

D series - No. 2 engine developed only 73 percent torque during takeoff. No. 1 engine developed 83 percent torque. PPC predicted 80 percent torque. Torque system was out of adjustment.



U-21 Class E mishaps

A series - During before-takeoff check, No. 1 generator output started surging. Cockpit lights flickered and voltmeter was pegging out. Power stabilized when No. 1 generator was turned off. N1 was set too low.

A series - During after-takeoff check, fuel was seen leaking from No. 2 right nacelle fuel cap. After landing, cap was reseated.

H series - During flight at 18,000 feet msl, crew smelled fuel vapors. Loose fuel pressure fitting for heater allowed fuel to leak into nose wheel compartment.

H series - During climbout, pilot saw excessive oil saturation along entire nacelle and inboard section of right wing. Caused by failure of prop seal. Oil loss had exceeded acceptable limits and prop was changed.

H series - During flight, left primary pitch light came on and left prop rpm dropped to 1400. Primary governor breaker was pulled and rpm returned to

Mishap briefs

1900. Primary governor shaft sheared internally, causing loss of rpm on left prop.

Maintenance

UH-1 Class E mishap

H series - Aircraft was at 50 feet agl during takeoff when master caution and transmission lights came on and both pilots noticed transmission pressure falling below 20 psi. Aircraft made immediate powered approach and landed. Transmission pressure had fallen to 5 psi by the time aircraft was shut down. Transmission oil cooler split at seams and external transmission oil filter housing split due to excessive pressure caused by the return line quick disconnect not being tight.

UH-60 Class E mishap

A series - After offloading from C-5 Galaxy, helicopter's upper anticollision light was reinstalled. Aircraft received technical inspection, preflight, and was test flown without incident; however, during deployment, anticollision light fell off. Anticollision light was incorrectly installed and problem was not found during inspections.

AH-1 Class E mishap

F series - During runup, battery was not strong enough to start aircraft. Maintenance personnel elected to start aircraft with extra battery and crew chief failed to disconnect extra battery cable when extra battery was removed after start. Cable was left between tail rotor hydraulic line and aircraft frame. Aircraft battery switch was in start position, causing power to reverse through cable to battery. Electrical arc from hot cable to tail rotor hydraulic line caused flash fire, burning hole in hydraulic line.

AH-64 Class E mishap

A series - Master caution and battery hot lights came on during hover. Suspect battery was improperly serviced, causing hot battery.

CH-47 Class E mishap

B series - During normal shutdown, crewmember noticed fluid leaking near No. 1 engine. Caused by frayed fuel line. Fuel line had chafed against engine oil drain line.

OH-58 Class E mishap

C series - During landing, crew noticed fuel odor and after landing, leak

from fuel filter was found. Packing was crimped when fuel filter was installed.

C-12 Class E mishap

D series - During climb check, crew noticed left engine top cowling was loose. IP shut down engine to avoid possible damage to cowl or prop and aircraft made uneventful landing. Maintenance personnel failed to properly secure left rear latch on top forward cowling.

Safety messages

• Safety-of-flight technical message concerning one-time and recurring inspections of oil cooler splines on H-60 series Black Hawk aircraft (UH-60A-87-06, 040300Z May 87). Summary: A recent Class B category mishap occurred due to failure of the oil cooler output spline coupling in a U.S. Army H-60. The mishap occurred in flight with a successful landing being made which resulted in no injuries and some aircraft damage. In view of prior oil cooler failures, additional precautionary measures are needed at this time. This will require inspection of the oil cooler assembly before the next flight. Oil coolers with less than 600 hours have been more susceptible to failure. Those with 600 hours or more will not require as comprehensive an inspection. Improved recurring inspection procedures have been developed to preclude future undetected wear of the oil cooler spline. Inspection teams will conduct one-time inspections and will train unit personnel in recurring inspection procedures. Contact: Robert Lawyer, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight maintenance mandatory message concerning reduction in retirement life of the third stage turbine wheel on T63-A-720/250-C20 engines on OH-58/H-6 aircraft (OH-58-87-03 and OH-6-87-02, 211800Z Apr 87. Summary: There have been failures of the third stage turbine wheels in the commercial equivalent of the T63-A-720 engine. The third stage turbine wheels with blade shrouds with full or partial slots have had partial blade and/or shroud separation. A new style wheel without slots has been incorporated into engines during overhaul for some time. The purpose of this message is to remove the slotted wheels from service in a timely manner and to immediately remove any with 1,800 hours or more. Contact: Roger Heidenreich, AUTOVON 693-9089, commercial 314-263-9089.

• Maintenance information message concerning steel tail rotor grips on UH-1 aircraft (MIM-UH-1-87-XSOF-03, 301815Z Apr 87).

• Maintenance information message concerning vibration tests after field installation of helical torquemeter gear on OH-58A and OH-6A aircraft (MIM-OH-58A-87-XSOF-01 and MIM-OH-6A-87-XSOF-01, 301830Z Apr 87).

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

A look at NVG Class A mishaps

As recently as 1984, special infrared-transmissive optical filters have been fitted to aircraft landing and searchlights. The purpose of equipping aircraft lights with these filters is to provide artificial lighting to mitigate the lack of natural illumination when NVG operations are conducted outside the FC 1-219 criteria. For many situations, this represents a substantial enhancement of flight safety, e.g., confined area hovering and low-altitude operations in unsurveyed areas. In many other applications, however, this artificial lighting scheme may introduce even greater hazards than those it is intended to eliminate.

The night vision systems in use today possess circuitry which acts to maintain a constant image brightness as the ambient light level changes. In dark night situations where infrared filters are in use, the wavelength content of the artificial light detected by the night vision equipment is well within its spectral sensitivity range. Artificially illuminated areas are literally "flooded" with the same type of light the night vision equipment is designed to detect.

The result is the NVG brightness-control circuitry acting to reduce the system light sensitivity to maintain a high-quality image within the region illuminated by the light. Because on a dark night, this artificially illuminated region is substantially brighter than its surroundings, images of dark regions outside the beam are further darkened by the brightness-control circuitry acting to optimize the overall image. This can result in a kind of "tunnel vision" where vision is limited by the edge of the artificial light beam. Under these conditions, peripheral cues are greatly diminished or no longer exist.

People who are experienced in NVG operations where this artifical lighting scheme is used will readily agree that it is a distinctly different situation than where natural lighting provides both direct and scattered illumination. Reduction of peripheral information alone introduces a substantial hazard to flight operations; further risks are introduced during the time it takes for the pilot and NVG equipment to transition from looking at a relatively high-quality, artificially illuminated image to the noisy, low-quality image seen when the pilot looks outside the area covered by the beam or when the lights are turned off.

At the present time, NVG operations take place regardless of natural illumination conditions. When FC 1-219 criteria are not met, the current procedure appears to be use of infrared filters to compensate for the difference. Given night vision equipment operating characteristics and limitations as well as the human factors involved, the simple addition of infrared filters may or may not deliver the compensation sought. Moreover, in light of the Class A statistics cited, the tradeoffs involved in NVG operations—with or without filters—outside the FC 1-219 criteria appear to indicate a clear need for further investigation.

A tendency exists within the Army to present well-defined and specific solutions to every situation. In this area, however, clear-cut answers definitely do not exist, and the production of aviators who believe they do represents a serious threat not only to them but to the people flying with them. ■

U.S. ARMY SAFETY CENTER

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DEPARTMENT OF THE ARMY
United States
Army Safety Center
Fort Rucker, Alabama 36362-5363

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Volume 15 □ Number 31
13 May 1987

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Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
AWARENESS • ACTION
SAFE ARMY NOW
IN TRAINING AND LIVING

I have seen the enemy, and I am he

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The mission was to provide air cavalry support to tactical units during a field training exercise (FTX). The company was also to complete an Army Training and Evaluation Program (ARTEP) during the FTX. The PIC of the AH-1S would function as unit trainer (UT) during the mission.

The crew received their mission briefing at 0445. Because it was not yet daylight, they performed the preflight using flashlights. Another preflight and a maintenance operational check had been completed the day before. Mission planning and crew duties/coordination briefs were finished, equipment secured, engine start and runup were completed, and the aircraft took off at 0550.

The unit aircraft were organized into a multiple aircraft flight. The mishap aircraft refueled at a forward assembly area and took off again for the supported unit's tactical CP area. There, the PIC received an operation order to support two observation aircraft on a scout mission. With the pilot on the controls from the rear seat, and the PIC occupying the front seat, they began flying nap of the earth and contour, providing cover for the scout observation aircraft.

After about 25 minutes, the unit commander, who was in one of the observation aircraft, spotted what he thought might be "enemy" tanks traveling along a mountain road ahead. He directed the AH-1 to move forward to a firing position about 100 meters to the left and 10 meters to the rear of the observation helicopter. The area was sparsely covered with 25- to 30-foot scrub oak trees and underbrush. The pilot took up a firing position between the scattered trees, with the aircraft's main rotor at about treetop height.

The PIC told the pilot he would be on the telescopic sight unit. He positively identified the tanks as aggressor and informed the company commander who directed the AH-1 to engage the target. The PIC began target tracking and simulated missile firing. After several tracking and missile firing simulations, he told the pilot they needed to reposition to the left, to a different firing position. Suddenly, both pilots heard a noise and felt severe vibrations in the rear of the aircraft as the AH-1 began an uncommanded right turn. The PIC got on the controls and applied full left pedal, with no response. The aircraft began spinning to the right in a nose-low, left-side-low attitude.

The tail rotor blades struck a tree that had been to the rear of the aircraft during the target engagement and the aircraft "wallowed around." The main rotor blades severed several limbs from the tree, causing extensive main rotor damage. The pilots reduced the throttle to flight idle and applied collective pitch. During the spin, the tail boom struck the tree, breaking the tail boom just aft of the horizontal stabilizers. The aircraft remained upright as it hit the ground, breaking the forward cross tube. Although the aircraft received more than $323,000 in damage, the two pilots were uninjured.

The 33-year-old pilot had 35 hours of civilian fixed wing experience and 324 rotary wing hours as a military pilot. He had 147.5 hours in the AH-1, with 96.5 hours in the AH-1S. His records showed no flight violations or any direct involvement in an aircraft accident, however, his records did include a comment that he not be considered PIC on tactical missions. His flying duties were primarily maintenance test flights and a training evaluation for maintenance test pilot noted that "he tends to focus inside the aircraft more than necessary." During his Army Aviator Proficiency and Readiness Test standardization flight, completed 6 days before the accident, he had been found "marginally proficient for tactical maneuvers." He had no recent experience in tactical flying operations and his most recent tactical gunnery operation flying had been conducted almost 14 months prior to the mishap flight.

The 25-year-old PIC had 553 rotary wing hours, 395 of them in the AH-1S. He had been the UT for tactical training for about 5 months.

The pilot of this AH-1S channelized his attention on a distant target and did not maintain awareness of his aircraft's position. As a consequence, he failed to maintain a stationary hover and did not detect the aircraft's rearward movement until the tail rotor struck a tree. ■

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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 - Student pilot applied excessive cushioning pitch during hovering autorotation. IP came on the controls and attempted to arrest ascent of aircraft. Simultaneously, student applied additional cushioning pitch and aircraft came to a high hover. IP attempted a power recovery and aircraft spun 360 degrees, landing hard due to low rotor rpm. Damage to skids, lower wire cutter, cargo hook, and sheet metal aft of left rear crosstube attaching point amounted to about $3,000.

H series - Aircraft had total hydraulic failure during takeoff. Broken hydraulic fitting resulted in loss of hydraulic fluid.

UH-1 Class E mishaps

H series - Aircraft experienced compressor stall during landing. Caused by failure of P1 bellows diaphragm in fuel control.

H series - During crosswind turn, shortly after takeoff, slingload consisting of 55-gallon drum filled with concrete was jettisoned into swampy area. Suspect electrical malfunction of cargo hook.

UH-60 Class B mishap

A series - Aircraft experienced loss of directional control and landed hard. Damage to stabilators, tail wheel, and tail paddles resulted. 8732

UH-60 Class E mishaps

A series - Aircraft was on slow VMC approach into a field site with headwind of 26 knots. As airspeed passed through 35 to 40 knots, stabilator failed. Stabilator failed a second time as airspeed decreased through 35 to 45 knots during a slow right turn on approach to FARP. Automatic control was regained after each failure. Caused by stabilator amplifier bias out of adjustment.

A series - During pickup to hover, crew could feel and hear pounding sensation in flight controls. Caused by cracked anti-flap bracket.

A series - Aircraft was chalk two in flight of five. When aircraft was brought to a hover for power check and line up for takeoff, copilot noticed vibration. PIC took controls and faced aircraft into the wind, which was at 25 knots gusting to 35 knots. Shaking subsided and was attributed to wind and rotorwash of other aircraft. During takeoff, however, PIC determined something was wrong, broke out of formation, and landed. Postflight inspection revealed two cracked anti-flap stop supports. Two of the main rotor blade anti-flap stops failed to retract during runup. Anti-flap bushing slipped out of position, causing binding in anti-flap cam assembly. Ensuing pounding cracked both anti-flap support assemblies.

A series - Stabilator failed without warning while aircraft was at 12-foot hover. Caused by defective No. 2 stabilator actuator.

A series - IP was demonstrating heading hold mode in automatic flight control system. No. 1 engine egt exceeded 950° C., torque increased to 108 percent, and No. 1 engine failed. Suspect compressor impeller failure.

Attack helicopters

AH-1 Class E mishaps

E series - Fire light came on during flight. Cannon plug had backed off. Loose plug wasn't detected during daily or preflight inspections.

E series - During landing at a FARP, crew heard loud rumbling noise from tail rotor drive shaft. No. 1 hanger bearing had disintegrated.

F series - While aircraft was hovering into parking, tail rotor pedals couldn't be moved forward of neutral position. MTP made uneventful running landing. Flashlight had been left by unknown person in aft fuel cell compartment beneath the tail rotor SCAS servo actuator.

F series - Prior to takeoff, leak was found in fuel line to fuel control. Caused by cracked O-ring.

F series - Master caution and transmission oil bypass lights came on during flight. Caused by failure of transmission oil bypass switch.

F series - During landing at field site, crew heard three loud bangs from rear of aircraft. Tgt rose from 800° to 880° C. and rpm declined slightly. Inlet variable guide vanes were out of adjustment. Aircraft was being operated in extremely sandy and dusty conditions, at pressure altitudes ranging from 1,800 to 3,700 feet, in temperatures up to 35° C.

S series - Crew felt and heard medium-frequency vibration during descent for

landing. After landing in a field, copilot found smoke coming from pylon around the mast and discovered the swashplate boot was burning. Caused by failure of scissors and sleeve bearing.

S series - Generator failed during instrument approach and couldn't be brought back on line. Caused by failure of generator field relay.

AH-64 Class D mishaps

A series - During taxi after maintenance test flight, ground personnel saw loose panel on aircraft. Left fuselage panel (L-200) had come loose, damaging panel and No. 1 nose gearbox drive shaft coupling. Pilot failed to ensure panel was properly secured before flight.

A series - While aircraft was being taxied from parking area for formation takeoff, pilots were told aft tail rotor drive shaft cover had come open. Hole and two cracks were found in cover. Both crewmembers had failed to detect loose cover during walkaround inspection before takeoff. Dzus fasteners may have been pushed in but not secured, giving appearance of being fastened.

AH-64 Class E mishaps

A series - During before-takeoff check, crew was distracted by radio calls and failed to notice No. 1 power lever had been left in idle position. Aircraft departed rearm pad with one engine at flight idle and torque momentarily hit 133 percent.

A series - While lined up for formation takeoff, crew smelled burning odor followed by high-pitched squeal. Thirty seconds later, master caution and shaft-driven compressor lights came on. Caused by failure of shaft-driven compressor.

A series - During refueling with No. 2 engine shut down, No. 1 engine failed. Fuel crossfeed was in normal position and fuel boost was off. Maintenance could not duplicate. Two days later, again during refueling with No. 2 engine shut down, No. 1 engine failed shortly after refueler opened refuel valve switch. Fuel crossfeed was in aft position and fuel boost was on. Maintenance still could not duplicate.

A series - While performing simulated engine failure at 400-foot OGE hover, IP started to reduce No. 2 power lever. Before power lever reached idle position, No. 2 engine failed. IP made single-engine flyout and roll-on landing. During test flight, tgt, NG, and torque would rapidly fluctuate, digital automatic stabilization equipment (DASE) would drop off line, and then No. 2 engine would fail. DASE was replaced and aircraft was test flown for more than an hour. Engine problem couldn't be duplicated.

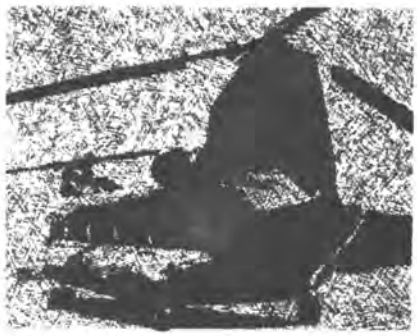
A series - Collapsed tail wheel strut was found during postflight. Crew had been performing roll-on landings. Tail wheel may have caught edge of runway threshold, causing strut to collapse.

A series - No. 2 engine was shut down for hot refueling. Attempts to restart engine were unsuccessful. No. 2 engine air starter was replaced.

A series - During flight, crew smelled odor like engine oil coming from environmental control unit. Axial vane fan in cooling system was replaced.

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	1	0	1–13 May	1	0
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	33	27	Total to Date	19	20



Cargo helicopters

CH-47 Class D mishap

D series - As aircraft neared the ground during upslope landing, crew heard slight popping sound. VHF navigation antenna was broken when pilot overcontrolled aircraft during final stages of landing. Damage amounted to about $2,300.

CH-47 Class E mishaps

C series - During HIT check, FE felt high-frequency vibration on left side of interior cabin in vicinity of No. 1 engine. No. 1 engine transmission showed wear and high metal content in oil. Transmission was replaced.

(continued on back page)

Preparing PRAMs

The following data elements (in bold type) are required on all PRAMs submitted on Class A through E mishaps. Sample entries are printed in light face type to show you how a PRAM should be prepared. A worksheet for preparing PRAMs is on pages 6 and 7. Tear it out, have it reproduced, and use it when you have to report an aircraft mishap. (See AR 385-40, effective 1 May 1987, for further information.)

1. a. **Date (YYMMDD)** 870530
   b. **Time (local)** 1000 CDT
   c. **Aircraft serial number** 71-12345
   d. **Mishap classification** A

2. **Events (see appendix G of DA Pam 385-95) (3 max.):**

3. **Period of day: Dawn 1 ☐ Day 2 ☒ Dusk 3 ☐ Night 4 ☐**

4. **On post/on airfield 1 ☐**
   On post/not on airfield 2 ☐
   On other/service airfield 3 ☐
   On civilian airfield 4 ☐
   Off post/not on airfield 5 ☒

5. **Name of nearest military facility** Sand AAF

6. **State or country** CA

7. **Number of aircraft involved** 1

8. a. **Aircraft mission, type, design, series** UH-1H
   Organization aircraft assigned:
   b. **UIC** WOAAAC
   c. **Station code (DA Pam 525-12/13)** 06256
   d. **Unit identification** C Co, 2d CAB
   e. **Home station** Fort Sand, CA

9. **Organization most responsible for mishap (if same as para 8, leave blank):**
   a. **UIC**
   b. **Station code**
   c. **Unit identification**
   d. **Home station**

10. a. **Total loss** No (**TB 42-0002-3**)
   Estimated cost (see DA Pam 385-95, para 8-5b(10)) for owner codes:
   b. **Acft damage (parts and labor) $180,000**
   c. **Owner** A
   d. **Repair: Manhours** 950
   Other damage:
   e. **Mil $** None
   f. **Civ $** None
   g. **Tot inj cost $** 330,000
   h. **Tot all cost $** 510,000

11. **Brief description of damage/injury** Pilot fatal, no other injuries; major damage to aircraft structure, fuselage, tailboom, transmission, main and tail rotor blades and drive components

12. **Fire: None____ Inflight____ Post crash_X_ Other____**

13. a. **Clearance: VFR_X_ IFR____ None____**
   b. **Destination** local
   c. **Mission code (see DA Pam 385-95, para 8-5b(18))** T
   d. **Aircraft ☒ was ☐ was not performing**
   1) **☒ Authorized ☐ Unauthorized**
   2) **☒ Supervised ☐ Unsupervised**
   3) **☐ Terrain ☐ Low level ☐ Contour ☐ NOE**
   4) **Day NVG_X_ Night NVG____ Type NVG** ANPVS-5A
   5) **FTX** Yes **Name** Bayonet
   6) **MILES equipped** Yes **MILES used** Yes
   7) **WSPS equipped** Yes **Size wire____ Wire cut____**
   8) **External loads involved** No

   Phase of operation codes (see DA Pam 385-95, para 8-5b(21)):
   e. 1) **At emergency** G 2) **At termination** K

   f. **Duration of flight (hours and tenths)** 02.8
   Example: 2 hours 45 minutes = 02.8

14. **Report if known at emergency:**
   a. **Airspeed** 90 b. **AGL** 500
   c. **Density altitude** +2,000
   d. **Gross weight** 7,065

15. **All crewmembers or ground personnel (mechanics/supervisors) who had a role or were injured, including mission briefer**

a. **Name (last, first, MI)** Sullivant, Donald W.

b. **SSAN** 123-456-6789

c. **Occ** Yes

d. **Grd** W2

e. **Duty** P

f. **Sex** F

g. **Deg inj** A

h. **UIC** WOAAAC

i. **Role** D

(Furnish same information for each person)

Legend: c. **Occupant Y=Yes N=No;** g. **Degree of injury (see DA Pam 385-95);** i. **Role codes D=Definite, S=Suspected, N=None, U=Unknown**

16. **Describe how mishap occurred. Begin with first indication of problem. Include crew reactions, any abnormal control reactions, and describe termination of problem (landing, further damage, etc.) including any ejection or bailout.** Aircraft was in cruise flight when a loud bang was heard aft, with right yaw and left roll. During powered descent, the aircraft began to spin to the right. The pilot initiated an autorotation and the aircraft sustained major damage as it descended vertically through the trees and came to rest on its left side. Post crash fire put out by CE.

For each cause factor in 17, 18, or 19, tell what caused or permitted the accident to happen and what corrective action should be taken. If information is not known within 5 duty days of mishap, provide via supplemental report as soon as known.

17. **Describe human factors (only if DA Form 2397 is not required)**

a. **Task error**

b. **How it contributed**

c. **Corrective action taken**

18. **Describe environmental factors (DA Form 2397 not required)**

a. **Each environmental cause**

b. **How it contributed**

c. **Corrective action taken**

19. **Describe materiel/maintenance/design factors.**

a. **Does part number match that listed in TM? Yes____ No____ Unk____**

For each failure or malfunction above, identify the following: (Component information is requested only for engines and main transmissions. Complete part information is requested on the actual part that failed through fair wear and tear, maintenance error, or design.)

		Component		Part
Nomenclature	b.	Rotor & XMSM	q.	42° gearbox
Mission, design, series	c.			
Part number	d.		r.	20404000337
NSN	e.		s.	1615009182676
Functional group	f.	04	t.	0406
MFG code	g.		u.	97499
Serial number	h.		v.	APC-12345
Publication from which nomenclature obtained	i.		w.	55152021023P1
Number of overhauls	j.		x.	1
Last overhaul (YYMMDD)	k.		y.	840912
Total hours	l.		z.	2205
Hours since overhaul	m.		aa.	1181
Hours since last installed	n.		bb.	550
Last overhaul facility	o.		cc.	CCAD
QDR number if applicable	p.		dd.	4KFFFF840001

20. **Flammable fuel spillage** N If yes, explain in Block 16.

21. **(Reserved for future instructions)**

22. **Supplemental PRAM due** N **Projected date of suppl PRAM** ____

23. **For additional information, contact**

Name CW3 Preventer **Address** C/2d CAB, Ft Sand 94111

Duty ASO **Telephone number** AV 635-5222

WORKSHEET FOR PREPARING PRELIMINARY REPORT OF AIRCRAFT MISHAP (PRAM)

1. a. Date (YYMMDD) _____ b. Time (local) _____
   c. Aircraft serial number _____ d. Mishap classification _____
2. Events (see appendix G of DA Pam 385-95) (3 max.):
3. Period of day: Dawn 1 ☐ Day 2 ☐ Dusk 3 ☐ Night 4 ☐
4. On post/on airfield 1 ☐
   On post/not on airfield 2 ☐
   On other/service airfield 3 ☐
   On civilian airfield 4 ☐
   Off post/not on airfield 5 ☐
5. Name of nearest military facility _____
6. State or country _____
7. Number of aircraft involved _____
8. a. Aircraft mission, type, design, series _____
   Organization aircraft assigned:
   b. UIC _____
   c. Station code (DA Pam 525-12/13) _____
   d. Unit identification _____
   e. Home station _____
9. Organization most responsible for mishap (if same as para 8, leave blank):
   a. UIC _____
   b. Station code _____
   c. Unit identification _____
   d. Home station _____
10. a. Total loss Yes ____ No ____ (TB 42-0002-3)
    Estimated cost (see DA Pam 385-95, para 8-5b(10)) for owner codes:
    b. Acft damage (parts and labor) $____
    c. Owner _____ d. Repair: Manhours ____
    Other damage:
    e. Mil $____
    f. Civ $____
    g. Tot inj cost $____
    h. Tot all cost $____
11. Brief description of damage/injury:

    _____

    _____

    _____
12. Fire: None____ Inflight____ Post crash____ Other____
13. a. Clearance: VFR____ IFR____ None____
    b. Destination _____
    c. Mission code (see DA Pam 385-95, para 8-5b(18)) _____
    d. Aircraft ☐ was ☐ was not performing
       1) ☐ Authorized ☐ Unauthorized
       2) ☐ Supervised ☐ Unsupervised
       3) ☐ Terrain ☐ Low Level ☐ Contour ☐ NOE
       4) Day NVG____ Night NVG____ Type NVG ____
       5) FTX ____ Name _____
       6) MILES equipped ____ MILES used ____
       7) WSPS equipped ____ Size wire ____ Wire cut ____
       8) External loads involved _____
    Phase of operation codes (see DA Pam 385-95, para 8-5b(21)):
    e. 1) At emergency _____ 2) At termination _____
    f. Duration of flight (hours and tenths) _____
       Example: 2 hours 45 minutes = 02.8
14. Report if known at emergency: a. Airspeed ____ b. AGL _____ c. Density altitude ____ d. Gross weight ____

15. All crewmembers or ground personnel (mechanics/supervisors) who had a role or were injured, including mission briefer

a. Name	b. SSAN	c. Occ	d. Grd	e. Duty	f. Sex	g. Deg inj	h. UIC	i. Role

Legend: c. Occupant Y=Yes N=No; g. Degree of injury (see DA Pam 385-95); i. Role codes D=Definite, S=Suspected, N=None, U=Unknown

16. Describe how mishap occurred. Begin with first indication of problem. Include crew reactions, any abnormal control reactions, and describe termination of problem (landing, further damage, etc.) including any ejection or bailout.

_____

_____

_____

_____

For each cause factor in 17, 18, or 19, tell what caused or permitted the accident to happen and what corrective action should be taken. If information is not known within 5 duty days of mishap, provide via supplemental report as soon as known.

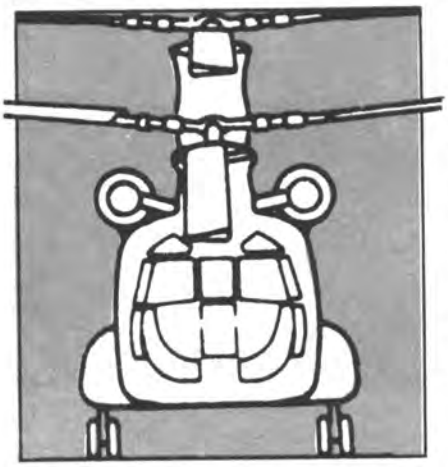
17. Describe human factors (only if DA Form 2397 is not required).
    a. Task error
    b. How it contributed
    c. Corrective action taken
18. Describe environmental factors (DA Form 2397 not required).
    a. Each environmental cause
    b. How it contributed
    c. Corrective action taken
19. Describe materiel/maintenance/design factors.
    a. Does part number match that listed in TM? Yes____ No____ Unk____

For each failure or malfunction above, identify the following: (Component information is requested only for engines and main transmissions. Complete part information is requested on the actual part that failed through fair wear and tear, maintenance error, or design.)

		Component		Part
Nomenclature	b.	_____	q.	_____
Mission, design, series	c.	_____		
Part number	d.	_____	r.	_____
NSN	e.	_____	s.	_____
Functional group	f.	_____	t.	_____
MFG code	g.	_____	u.	_____
Serial number	h.	_____	v.	_____
Publication from which nomenclature obtained	i.	_____	w.	_____
Number of overhauls	j.	_____	x.	_____
Last overhaul (YYMMDD)	k.	_____	y.	_____
Total hours	l.	_____	z.	_____
Hours since overhaul	m.	_____	aa.	_____
Hours since last installed	n.	_____	bb.	_____
Last overhaul facility	o.	_____	cc.	_____
QDR number if applicable	p.	_____	dd.	_____

20. Flammable fuel spillage _____ If yes, explain in Block 16.
21. (Reserved for future instructions)
22. Supplemental PRAM due ____ Projected date of suppl PRAM ____
23. For additional information, contact
    Name _____ Address _____
    Duty _____ Telephone number _____

Mishap briefs



D series - After engine start, CE saw sparks coming from engine. Stator vane failed, causing FOD to engine.

Observation helicopters

OH-6 Class C mishap

A series - Postflight inspection of tail rotor blades revealed signs of blade strike. There had been no indications of a strike during flight.

OH-6 Class D mishap

E series - During postflight inspection, dent was found in leading edge of one tail rotor blade. Metal fatigue and vibration caused strobe light bracket to break off and fall into blade during flight. Aircraft are being refitted with new type bracket.

OH-6 Class E mishap

A series - During flight, fuel filter light came on for about 10 seconds. About 1 minute later, fuel filter light flashed then stayed on. While pilot was on radio declaring precautionary landing, aircraft yawed left and nose tucked. During autorotation, pilot noted N1 decreasing below 70 percent. N2 and rotor rpm were also decreasing. Engine-out light came on and aircraft yawed right and all gauges showed increases. Aircraft landed in autorotational profile, but with full power.

OH-58 Class C mishap

A series - IP initiated forced landing at 700 feet agl, 65 KIAS, by closing throttle to flight idle. IP failed to follow established procedures in conducting simulated forced landing by allowing the aircraft to descend below recovery altitude. Hard landing caused damage to aircraft exterior skin below oil cooler and buckled ribs below oil cooler area.

OH-58 Class E mishaps

A series - While strapping passenger in, pilot noticed smoke coming from engine compartment. Engine oil orifice safety wire had broken, allowing oil to spray on engine and causing smoke.

C series - In order to maintain observation of screen line, pilot maneuvered tail of aircraft into wind at 20 KIAS, 15 feet agl, causing loss of tail rotor effectiveness. Nose tucked down and right, and pilot applied power to stop sink rate. Torque rose to 107 percent for 1 to 2 seconds.

Fixed wing

U-8 Class E mishap

F series - Gear wouldn't extend during landing and gear indicator showed three up. Pilot executed missed approach and returned to home base. Gear circuit breaker was reset and gear extended. Loss of continuity within landing gear circuit breakers caused gear to fail to extend down and lock.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

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Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
AWARENESS • ACTION
SAFE ARMY NOW
IN TRAINING AND LIVING

Feathered friend or foe?

Birds and helicopters are more compatible than birds and jet aircraft, however, just to keep our attention, now and again one of our feathered friends absolutely refuses to give up airspace. When they do, the bird usually comes out second best, but the aircraft doesn't always come out unscathed either.

The crew of a UH-1 were in contour flight at about 50 feet agl, 90 KIAS. The helicopter crossed a saddleback ridge and encountered three orbiting vultures. Two of the birds immediately in front of the aircraft turned and flew past, but the third vulture, about 500 feet above the Huey, folded his wings and dove straight at the helicopter. The surprised IP made a left turn, attempting to avoid the strike. The aircraft shuddered, and the crew thought they had a near miss until postflight inspection revealed a damaged vertical fin. That sure beats having a vulture land in your lap, however, and that brings us to our next point.

Probably the most important thing for an Army aviator to remember when it comes to bird strikes is to keep your helmet visor down. Even a helicopter flies fast enough for an occasional large bird to penetrate into the cockpit. One thing you don't need is a face full of plexiglass splinters from a shattered windscreen.

Birds are usually found at about the same altitudes as helicopters; although some of them must wear oxygen masks because there have been strikes recorded as high as 33,000 feet. However, most birds fly below 5,000 feet and the times of greatest risks are during takeoff and landing or when you're climbing or descending. That's also the time you're busiest flying the aircraft.

Not only do you have to scan outside the aircraft for birds, there are other hazards out there; other aircraft, wires, and trees to name a few. Channelizing your attention inside the cockpit can be extremely hazardous.

Of course, four eyes or more on the lookout are better than two, but that brings up things like crew communication. You have to be sure crewmembers aren't all focusing on the same thing. For you strong silent types, that means you have to talk. "Do you see the wires ahead to my right?" may not sound like snappy dialogue, but it is dangerous to assume the pilot sees something just because you do. Until somebody finds a way to equip aviators with extrasensory perception, you'll just have to keep talking to each other.

Impact force depends on the size of the bird and the speed of your aircraft. The faster your aircraft is moving and the larger the bird is, the greater the impact force. A 4-pound duck struck by an aircraft traveling at 535 KIAS turns into a 12,800-pound monster with an impact force of 115,200 pounds. That probably explains why jet pilots tend to make few jokes about bird strikes. Even a 2-pound seagull struck by an aircraft flying at 180 KIAS has an impact of 8,000 pounds; depending on which part of the aircraft it strikes, that can mean a nasty bit of damage.

So, it looks like about twice a year you're going to get a reminder about bird strikes. There's a good reason for that—bird migration. Spring is the time of year migrating birds are heading north to their nesting grounds, with the heaviest concentrations in April and May. The four major migration routes, or flyways, are:

- The Atlantic route, extending from Lake Erie, southeast to Chesapeake Bay. The coastal areas of Virginia and North Carolina are the wintering-over areas.
- The Mississippi route stretches from the Dakotas to Pennsylvania, southward to wintering-over areas along the Gulf Coast.
- The Central route extends from eastern Montana and the Dakotas, southeast to the Texas coast for wintering over.
- The Pacific route stretches from the northwest states, south for wintering over in the general area of the Sacramento Valley and points south.

Avoid these flyways as much as possible, but if you must fly in their vicinity for the next couple of months, keep an extra sharp lookout for flocks of birds.

One other tip, if you see flocks of birds, avoid flying under them, they tend to dive when approached by aircraft. Report concentrations of birds to the controlling facility.

—thanks to the Naval Safety Center for information used in this article.

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Recap of AVSCOM messages

Following is a list of AIG 8881 addressed messages transmitted by AVSCOM (AMSAV-XSOF) from 1 January through 31 March 1987.

UH-1-87-01 Safety-of-flight technical message concerning one-time inspection cleanup of UH-1C/H/M/V and EH-H/X aircraft, all serial numbers.

UH-1-87-02 Safety-of-flight technical message concerning one-time inspection of main rotor yoke, AH-1/TH-1/TAH-1 and UH-1C/M series aircraft.

UH-1-87-03 Safety-of-flight maintenance mandatory message concerning one-time inspection of 90-degree gearbox assembly, UH-1/EH-1 series helicopters.

UH-1-87-04 Safety-of-flight maintenance mandatory message concerning revision to one-time inspection of swashplate control assembly on UH-1H/V and EH-1H aircraft for proper serialization and identification.

UH-1-87-05 Safety-of-flight maintenance mandatory message concerning one-time inspection of UH-1H/V/X and EH-1H aircraft for nonconforming 90-degree fittings.

UH-60-87-01 Safety-of-flight maintenance mandatory message concerning one-time validation of correct torque of T700 engine fuel differential pressure indicator, UH-60A and AH-64A series aircraft.

UH-60-87-02 Safety-of-flight maintenance mandatory message concerning revision to message on T700 engine fuel differential pressure indicator, UH-60A and AH-64A series aircraft.

UH-60-87-03 Safety-of-flight technical message concerning one-time and recurring inspection of the first three tail rotor drive shaft spline couplings, UH-60A/EH-60A aircraft.

UH-60-87-04 Safety-of-flight maintenance mandatory message concerning revision to inspection of eyebolt, P/N 7020902136-102, NSN 5306-01-102-8797, UH-60A/EH-60A aircraft.

AH-1-87-01 Safety-of-flight technical message concerning one-time inspection of main rotor yoke, AH-1/TH-1/TAH-1 and UH-1C/M series aircraft.

AH-1-87-02 Safety-of-flight maintenance mandatory message concerning recurring inspection of K747 blade root fittings, AH-1/TAH-1 aircraft.

AH-64-87-01 Safety-of-flight message concerning revision to maintenance mandatory message on connector wire sealing.

AH-64-87-02 Safety-of-flight operational message concerning caution regarding operation of engine chop collar.

AH-64-87-03 Safety-of-flight maintenance mandatory message concerning one-time validation of correct torque of T700 engine fuel differential pressure indicator, UH-60A and AH-64A series aircraft.

AH-64-87-04 Safety-of-flight maintenance mandatory message concerning revision to message on T700 engine fuel differential pressure indicator, UH-60A and AH-64A series aircraft.

AH-64-87-05 Safety-of-flight operational message concerning restriction on laser boresight, AH-64A Apache aircraft.

AH-64-87-06 Safety-of-flight maintenance mandatory message concerning one-time and recurring inspection of AH-64A aircraft for fuel cell leaks.

AH-64-87-07 Safety-of-flight maintenance mandatory message concerning inspection of AH-64A series aircraft for electrical cable chafing.

AH-64-87-08 Safety-of-flight operational message concerning restriction on firing area weapon system (AWS), AH-64A Apache aircraft.

CH-47-86-11 Safety of-flight technical message concerning one-time inspection of forward and aft transmission.

CH-47-87-01 Safety-of-flight maintenance mandatory message concerning one-time and recurring inspection of certain CH-47D aircraft rotor heads.

CH-47-87-02 Safety-of-flight maintenance mandatory message concerning one-time and recurring inspection of engine cross shaft, CH-47A/B/C/D aircraft.

CH-47-87-03 Safety-of-flight technical message concerning one-time inspection of CH-47D helicopter pivoting and swiveling actuator lower structural connections for proper hardware.

CH-47-87-04 Safety-of-flight technical message concerning one-time inspection of aft transmission to cooler fan quill shaft, CH-47D aircraft.

OH-6-87-01 Safety-of-flight operational message concerning flight restrictions on OH-6A and OH-58A aircraft with T63-A-700 engine.

OH-58-87-01 Safety-of-flight operational message concerning flight restrictions on OH-6A and OH-58A aircraft with T63-A-700 engine.

OH-58-87-02 Safety-of-flight maintenance mandatory message concerning one-time inspection of fuel control, Bendix P/N 2524886-9 on a T703-AD-700 engine, OH-58D aircraft.

C-12-87-01 Safety-of-flight technical message concerning one-time and recurring inspection of hose assembly between engine exhaust gas duct and engine intake anti-icing device (weld assembly), C-12F and UC-12F aircraft.

OV-1-87-01 Safety-of-flight operational message concerning restricted flight maneuvers of certain serial-numbered OV/RV aircraft.

U-21-87-01 Safety-of-flight technical message concerning one-time and recurring inspection of aircraft elevator attachment points, U-21 and RU-21 series aircraft.

SOF-GEN-87-01 Safety-of-flight technical message concerning night vision goggle (NVG) operations.

Addressees requiring copies of messages should contact their higher headquarters. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps

H series - Aircraft experienced loss of tail rotor thrust during cruise flight and went down in river. 8733

V series - While landing to a pinnacle at 12,000 feet, aircraft experienced a right spin and crashed. Post-crash fire consumed the aircraft. 8734

UH-1 Class B mishap

H series - Aircraft landed on helipad and crew shut engine down. Winds caused blades to continue turning and, 15 minutes after engine was shut down, large gust caused main rotor blade to flex down and hit tail boom. 8735

UH-1 Class D mishap

M series - Aircraft was engaged in hover-fire exercise when barrel clamp assembly on M134 machinegun barrel came apart. Fragment struck crew chief, cutting his right eyelid.

UH-1 Class E mishaps

H series - Crew felt moderate vibration during approach. On short final, vibration became severe. Caused by skin separation on main rotor blade.

H series - During flight, pilot and copilot simultaneously realized aircraft lacked sufficient altitude to clear tree branches in flight path. Copilot, who was on the controls, began a cyclic climb and increased power. Lower portion of fuselage struck tree branches without causing any damage. Copilot misjudged height of trees and pilot, who had been looking at his map, failed to properly divide attention inside and outside aircraft.

H series - While lifting fire bucket out of water, aircraft experienced loss of tail rotor effectiveness due to wind shift. Aircraft began turning right and crew was unable to stabilize aircraft. Without notifying PIC, pilot jettisoned fire bucket instead of jettisoning water. Wind shift at lift-off with load in high density altitude made power margin critical.

H series - While aircraft was hovering with 34 pounds of indicated torque, crew initiated maximum performance takeoff. Copilot increased torque to 40 pounds, then to 45 pounds, in order to clear 25-foot obstacles. The PIC, who was monitoring instruments during maximum performance takeoff, failed to read torque aloud to copilot. Copilot did not request that torque values be monitored and read aloud. Upon clearing obstacles, the PIC called out, "You have plenty of power." The copilot took this to mean more power was needed and increased collective. Torque rose to 54 pounds for 1 second, but no damage resulted from exceeding torque limits.

UH-60 Class D mishap

A series - During short final to field landing site, PIC repositioned aircraft to avoid simulated enemy troops on the ground. PIC landed next to a tree line with a slight downslope of 3 degrees. Aircraft had a ground roll of 20 feet on wet grass and pilot, who was on left side of aircraft, did not realize the aircraft had rolled underneath some small tree branches. As aircraft was brought to hover for takeoff, crew heard a loud

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	1	0	1-20 May	4	1
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	33	27	Total to Date	22	21

bang. Three main rotor blade tip caps were damaged. Wet landing surface increased landing roll, positioning aircraft near trees.

UH-60 Class E mishaps

A series - During flight, No. 2 engine tgt increased to 840° C. without any other abnormal engine indications. No. 2 engine power control lever was retarded to reduce tgt. Tgt momentarily stabilized at 750° C. then increased to 810° C. Caused by failure of No. 2 engine environmental control unit.

A series - Aircraft was at flat pitch during refueling when stabilator horn, master caution and stabilator lights came on. No. 1 stabilator amplifier bias was out of adjustment. After adjustment by maintenance, the aircraft was released. During a later flight the same day, aircraft was descending to a 10-foot hover when the same thing happened. Cause is unknown.

Attack helicopters

AH-1 Class C mishap

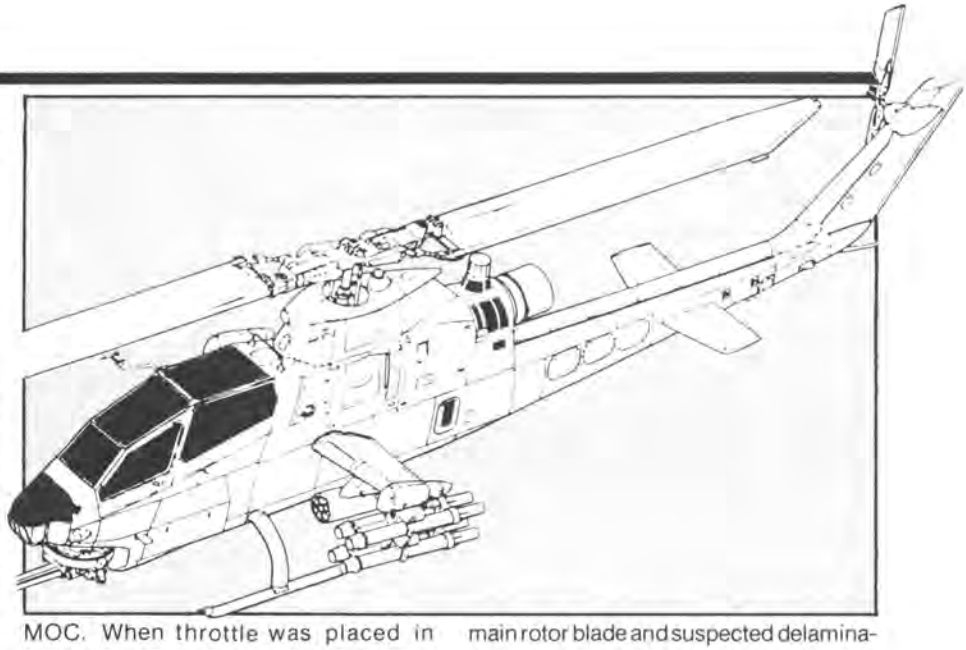
P series - Crew was conducting transition training and had just completed third simulated engine failure from altitude. During power recovery on fourth maneuver, as throttle was advanced to full open 100 percent N2, crew heard a sharp report from engine area and N2 dropped to zero. IP made autorotation to an open field without further damage to aircraft. Hole in combustion section of engine, hole in engine cowling, and damage to both tail rotor blades amounted to about $75,000. Cause of engine failure has not been determined.

AH-1 Class E mishaps

F series - While repositioning to a firing position farther downhill, pilot stopped aircraft at OGE hover and turned right to line up aircraft's nose with target handoff. Torque climbed to 102 percent for 1 second.

F series - During climbout, crewmembers detected smoke and fumes in cockpit. Caused by short in ac inverter.

F series - Aircraft had history of return line leaking on Nos. 3 and 4 bearings. Return line was replaced and all systems were normal during start for



MOC. When throttle was placed in flight-idle position, engine oil bypass light came on. As throttle was rolled off, aircraft was engulfed in white smoke. Suspect bearing pack failure on Nos. 3 and 4 bearings.

P series - Aircraft had power loss during straight and level flight at 2,000 feet agl. Aircraft yawed left and rpm light and audio came on. As crew entered autorotation, engine instruments verified power loss; but power was restored during deceleration and aircraft landed with power. Cause has not been determined.

S series - During demonstration of simulated engine failure at night, IP was distracted by proximity of civilian airport and allowed a high sink rate to develop. Realizing sink rate was high, he began power recovery early, opening throttle and raising collective simultaneously. N2 rpm bled off to 5800 and torque rose to about 58 psi. IP lowered collective, regained rpm, and made an uneventful landing. No damage from overtorque was found.

S series - During hover fire, transmission bypass light came on and transmission oil temperature rose 20 to 30 degrees. Bypass valve assembly opened, causing transmission oil to bypass oil cooler.

AH-64 Class C mishap

A series - During scheduled fuel stop PIC saw discoloration on bottom of one main rotor blade and suspected delamination. Damage to top side of intermediate gearbox cover was found. Suspect main rotor deice wire harness clip bonding failure. Investigation is in progress.

Cargo helicopters

CH-47 Class A mishap

C series - Aircraft was at 500 feet agl when No. 2 generator light came on, followed immediately by small explosion and fire from No. 2 engine area. Because of terrain, it took a short period of time for pilots to find a place to land. After landing, pilots were unable to extinguish fire. Aircraft was destroyed. One crewmember was killed. Three other crewmembers were injured. 8736

CH-47 Class D mishap

D series - Aircraft was hovering over 2½-ton dump truck during NVG mission. Pilot allowed aircraft to descend, impaling aircraft on M16 which hookup man had slung on his back. Rifle punctured lower rescue door and aircraft skin.

CH-47 Class E mishaps

D series - Aircraft was descending through 3,500 feet during approach when master caution, No. 2 generator, No. 2 AFCS, No. 2 rectifier, and right fuel pressure lights came on. After about 2 seconds, all lights went out except No. 2 generator. Caused by failure of No. 2 generator.

Mishap briefs

D series - During flight, aircraft transmission oil pressure indicator went to zero. There were no caution lights or corroborating indications. Aircraft transmission oil pressure transducer was replaced.

Observation helicopters

OH-58 Class D mishap

A series - During power recovery, IP failed to ensure throttle was full on. During resultant landing, spike knock and pylon whirl were encountered, causing damage of $1,200.

OH-58 Class E mishaps

A series - As the aircraft turned crosswind immediately after lift-off, master caution and fuel boost lights came on for about 2 seconds. Caused by failure of fuel pressure switch.

C series - Aircraft was at 50-foot hover in firing position. Without any prior indications, there were two loud pops and engine made loud whining noise. N2 began to drop as pilot maneuvered aircraft to open area and made uneventful landing. No. 1 engine bearing had failed, followed by compressor stall.

Training helicopters

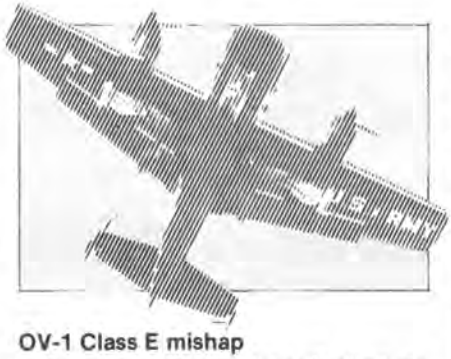
TH-55 Class E mishap

A series - While cruising at about 1,000 feet msl, student pilot initiated simulated engine failure. About 2 or 3 seconds into the maneuver, engine rpm dropped from around 2,000 rpm to zero and oil pressure also dropped to zero. IP took controls and made a successful autorotative landing to a terraced field. Maintenance inspection failed to reveal cause of engine failure.

Fixed wing

C-12 Class E mishap

D series - When gear was lowered for landing, nose gear-down light didn't come on. Recycling had no effect. Tower personnel reported nose gear appeared to be down. Gear was retracted and aircraft was diverted to another airfield. Again, light failed to come on when gear was extended, although gear appeared to be down. Normal landing was made, but pilot held nose gear off runway until full elevator control was used. When nose gear touched down, warning horn and transit lights in gear handle came on. Gear-down indicator switch was out of adjustment.



OV-1 Class E mishap

D series - During takeoff climb to mission altitude, pilot saw engine egt spiking above 820° C. Other instruments indicated engine was functioning normally. During descent, egt fluctuated between 300° and 550°. Short in vertical indicator display system cable resulted in faulty reading.

U-21 Class E mishap

A series - When flaps were extended on right base approach, no control problem was noted. When full flaps were extended on final approach, crew felt slight rolling motion. To maintain wing level, considerable right aileron had to be applied. Control was maintained by applying right aileron and aircraft landed. Inboard left flap did not extend during landing. Nut on end-drive lock pin, which holds left inboard flap actuator assembly in place, had backed off, causing flap actuator drive unit to disengage flap drive assembly.

Maintenance

UH-1 Class D mishap

H series - Fire guard failed to disconnect APU from aircraft before moving tug, damaging receptacle connector and tearing bracket and skin around connector.

CH-47 Class E mishap

A series - During flight, FE noticed white smoke trailing behind aircraft and looked out right side of aircraft where large oil leak on No. 2 engine could be seen. At the same time, pilot saw No. 2 engine oil-low light come on and engine oil pressure dropping rapidly. No. 2 engine was secured and uneventful running landing was made. No. 2 engine oil filter had been improperly installed during phase inspection.

OH-58 Class E mishap

A series - Master caution and 20-minute fuel-low lights came on during flight and fuel gauge registered a noticeable constant decrease. Predicted burn rate was 145 pounds per hour, but actual burn rate was 185 pounds per hour. Aircraft landed, but it would take on only about 20 gallons of fuel during refueling. Maintenance replaced fuel gauge and calibrated the fuel indicating system. Two days later, the same thing happened. Previous maintenance procedures had not corrected the fault in the fuel indicating system. This time, fuel transmitters were replaced.

U-8 Class E mishap

F series - After No. 2 engine was shut down during general test flight, accumulator pressure on No. 2 engine was too low to bring prop out of feather. Maintenance recharged accumulator to correct pressure. During a subsequent general test flight, prop again wouldn't come out of feather position. Accumulator pressure had been set using uncalibrated pressure gauge. System

(continued on next page)

Mishap briefs

functioned properly after pressure was reset using calibrated gauge.

Safety messages

• Safety-of-flight technical/operational message concerning revision to message on lifting of restriction on firing area weapon system (AWS) on AH-64A Apache aircraft (AH-64-87-12, 080300Z May 86). Summary: The purpose of this message is to make changes/corrections to AVSCOM safety-of-flight technical/operational message AH-64-87-11, 282300Z Apr 87, concerning lifting of restriction on firing AWS on AH-64A Apache aircraft. Contact: Leo Smith, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight technical message concerning tail rotor swashplate, clevis ring inspection of AH-64A series aircraft (AH-64-87-13, 102000Z May 87). Summary: A cracked tail rotor clevis ring and excessive wear in the bellcrank/clevis ring attachment points have created a requirement for inspection. The clevis ring is bolted to the inboard side of the nonrotating portion of the tail rotor swashplate assembly. This message directs inspections on all AH-64A delivered aircraft. Contact: Robert Lawyer, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight technical message concerning one-time inspection of pivoting and swiveling actuators on CH-47A/B/C aircraft (CH-47-87-05, 052300Z May 87). Summary: The RAF recently identified a pivoting dual-acutating cylinder that had a roll pin missing. The roll pin secures the fluid controller to the clevis rod. Absence of the roll pin can allow the fluid controller to unscrew from the rod which, over a period of time, could reduce the pilot's control authority over that cylinder with an ultimate loss of control. The defective cylinder was a new item which had not been drilled to accept the roll pin and the fluid controller had just started to unscrew. The cylinder was manufactured by Teledyne-Hydrapower. To date, only this one instance of roll pin omission has been identified. These cylinders are installed in CH-47A, B, and C helicopters. The purpose of this message is to require an inspection of all new and overhauled actuators manufactured by Teledyne-Hydrapower. Since overhaul procedures require an inspection for the roll pin, actuators which have been through overhaul need not be physically inspected. P/N 114H7200-1 and 114H6600-20 series actuators manufactured by Teledyne-Hydrapower must all be inspected even if records indicate they have been overhauled. There is evidence that a strain gauge assembly inspection was recorded as an overhaul. The inspection is to ensure that the required hole has been drilled and a roll pin and lockwire installed. Contact: Roger Heidenreich, AUTOVON 693-9089, commercial 314-263-9089.

For more information on selected aircraft mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

What if you survive the crash?

Sometimes machines break; there isn't a whole lot a pilot can do about that. However, when it happens, a pilot's training and skills may avert an accident—but not always. Even if there is an accident, and the aircraft is damaged or even destroyed, there can be survivors. But if you survive the crash you may need help and, unless someone sees the accident, you're going to need some way to get that help. In the following accident, the pilot was lucky because he wasn't seriously injured. If both pilots had suffered major injuries, the outcome could have been tragic.

The mission was a ferry flight with a twofold purpose: to transport the pilot and recover the AH-1F. Because of a lack of AH-1 pilots at the field location, the platoon leader decided to use an OH-6 pilot as copilot for the flight. The pilot had 1,532 rotary wing hours—324 in AH-1s. The copilot had 320 rotary wing hours in OH-6s.

After an uneventful mission briefing (except that no premission briefing sheet was filled out), 50-hour inspection, preflight, and maintenance operation check, the aircraft took off. The AH-1 climbed at a rate of 500 feet per minute and leveled off at 6,000 feet msl. The flight was expected to take about 1½ hours.

The pilot allowed the copilot to take the controls to get a feel for flying a Cobra. During the flight, when the pilot turned on the environmental control unit (ECU) for cooling air, he noticed a consistent rise in turbine gas temperature (tgt), from 760° C. into the yellow margin. When the tgt reached 830°, he turned the ECU off. The tgt returned to 760° and the ECU was left off for the remainder of the flight.

About 5 or 10 miles from destination, the pilot took the controls, descended to 200 feet agl and proceeded to a pinnacle/confined area west of the airfield. He flew over the confined area, made an area recon, and demonstrated to the copilot a confined area landing to the pinnacle. The pilot then executed an airspeed over altitude departure from the pinnacle, making a right turn to a heading parallel with a dirt road. The aircraft was about 200 feet agl, between 90 and 100 KIAS.

The copilot was becoming familiar with the telescopic sight unit (TSU) and the pilot pointed out a tree to the right of the flightpath and told the copilot to sight in on it. The copilot couldn't find the tree with the sight, so the pilot began a hard right turn to make another pass by the tree.

While in the right turn, still about 200 feet agl at 100 knots, the pilot heard a loud bang. He looked out the right window to see if he could see anything and, while he was looking out the window, he heard the low rpm audio and felt the aircraft yaw left. The low rpm light came on, needles split, and the rotor rpm began falling out of the green.

The pilot lowered collective, continuing on a 180-degree turn to avoid the side of a hill. He then leveled the aircraft and chose a dirt road as a touchdown point. He lowered the aircraft's nose to increase the glide distance, rolled the throttle off, and turned the main fuel off. He managed to get a Mayday call off and then, realizing he couldn't make his intended landing area, he leveled the aircraft and pulled in all the collective.

The AH-1 struck the ground right-skid low, collapsing and severing the crosstubes and skid tubes, sliding on the fuselage and right wing stores. The aircraft bounced and hit the second time on the TSU and 20mm gun, cartwheeled, and came to rest upright on the fuselage and left wing stores. It was 180 degrees from the impact heading.

The pilot called to the copilot, but he didn't answer. The pilot tried to get out through the pilot's door, but couldn't get it open. After activating the canopy jettison, which worked for the aft cockpit but not for the front because the lines had been severed, he tried the door again and this time it opened. He found the copilot pinned in by the TSU and instrument panel and he couldn't find a pulse. After first being unable to break the seal on the first-aid kit, he got it open and tried to administer first aid. By this time, the copilot was able to talk.

Realizing he couldn't free the copilot and knowing there was no survival

(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 - During PMD, $21,600 damage to midsection of both main rotor blades was found. Aircraft had been flown the day before, however, suspect damage had occurred during some previous flight.

UH-1 Class D mishaps

H series - Aircraft was on routine aviator refresher training mission. After discussion and demonstration of hovering autorotation by IP, pilot took controls and attempted maneuver. During touchdown phase, pilot overapplied collective pitch, causing aircraft to ascend after initially settling. IP took controls and landed. Aft crosstube failed, causing about $4,000 damage. Impact of landing did not appear severe enough to cause crosstube failure. Suspect preexisting fatigue of crosstube.

H series - Crew failed to secure tail rotor drive shaft cover and cover was damaged when it came open during flight.

UH-1 Class E mishap

H series - During approach into confined area, main rotor blade struck a pine tree which extended into landing zone. Caused by lack of crew coordination. Lack of crew rest may have been a factor.

UH-60 Class C mishap

A series - During flight at 8,000 feet msl, copilot and crew chief heard a thud and copilot could see No. 1 engine cowling was open. After landing, crew found cowling had broken off and damaged two rotor blades. Total damage was more than $22,000. Cause could not be determined, however, aircraft had been flown for more than an hour before cowling opened, indicating possible malfunction in latch assembly.

Attack helicopters

AH-1 Class D mishap

F series - Aircraft had been engaged in tactical training during unit ARTEP. During postflight inspection, crew found minor damage to leading edge of both main rotor blades. Crew failed to ensure proper clearance above trees, resulting in more than $2,500 damage to main rotor blades.

AH-1 Class E mishaps

F series - Crew was performing NOE flight during field training exercise. After landing to refuel, crew found small dents in main rotor blade and both tail rotor blades. Crewmembers suspect tree strike occurred while aircraft was being maneuvered for simulated target engagement.

S series - During flight, stability and control augmentation system (SCAS) pitch hardover occurred. IP took controls after SCAS was disengaged and had pilot reengage unaffected channels. SCAS channel assembly was out of balance.

S series - When aircraft slowed to 80 KIAS to begin approach, crew felt moderate medium- to high-frequency vibration. Caused by loose bearing in scissors and sleeve assembly.

S series - During flight at 2,000 feet msl, 110 KIAS, master caution and transmission oil bypass lights came on. During approach, transmission oil temperature rose to 90° C. Caused by failure of oil cooler thermostat.

S series - While moving to simulated firing position during a tactical training mission, pilot attempted to hover between two trees. While directing attention to tree on his right, he allowed the main rotor blades to strike the tree on the left.

AH-64 Class D mishap

A series - Main rotor blades struck bird at 300 feet agl, 100 KIAS. Bird then struck front canopy, causing it to shatter. Although copilot was showered with shards of glass, he was uninjured. Pilots had not seen bird prior to impact.

Cargo helicopters

CH-47 Class E mishap

A series - Aircraft was about 50 feet agl, at 50 KIAS, when the crew heard a loud bang and felt a shock in the pedals. FE reported sparks and fire coming from No. 2 engine and instruments confirmed No. 2 engine had failed. Rotor rpm dropped from 230 to 222 and torque rose to 700 pounds. Thrust was reduced and rpm regained by using normal engine trim. No. 2 engine was shut down and fuel valve shut off. Aircraft proceeded to nearest suitable landing area and made uneventful landing.

Observation helicopters

OH-6 Class E mishaps

A series - Crew was performing FM homing procedures while en route at about 2,500 feet agl. Copilot, who was on the controls, heard bang from engine and engine-out audio and lights came on. As copilot began autorotation, he noted N1 was decaying and generator-out light came on. After establishing autorotation, copilot turned controls over to IP who turned 180 degrees and landed in an open field. All engine instruments were normal and there were no warning or caution lights prior to engine-out warning. Caused by fuel starvation, although fuel indicated 110 pounds.

E series - Aircraft was performing standard autorotation. After touchdown, aircraft had ground slide of about 15 feet. Because of low rotor rpm, IP could not prevent aircraft sliding over sewer cover which was on runway to cover electrical wires. Right rear crosstube was cracked.

OH-58 Class E mishap

C series - Aircraft was about 100 feet agl during circling approach to field site. Copilot started left turn and began deceleration. As copilot decreased collective and decelerated from 35 knots to zero airspeed, the aircraft began rapid descent. Pilot took controls and rapidly increased collective to prevent aircraft from descending into the ground. Aircraft overtorqued for about 2 seconds. Copilot failed to recognize attitude and sink rate during approach and pilot was slow to recover aircraft.

Fixed wing

C-12 Class E mishap

C series - As power levers were advanced during takeoff roll, No. 2 engine was slow to accelerate. Air line to heated air pressure governor was cracked.

OV-1 Class A mishap

C series - Two aircraft were in trail formation, about 1 mile apart. During cruise flight, about 800 feet agl and approximately 170 KIAS, the lead aircraft rolled right and descended into water. Both crewmembers were killed. 8737

OV-1 Class E mishaps

D series - During autofeather check, No. 2 prop feathered prematurely due to fluctuating torque indications. Caused by failure of engine torquemeter power supply.

D series - During flight, right main gear indicated intransit. Gear emergency extension was used and aircraft landed without incident. Maintenance replaced main gear down-lock switch.

T-42 Class D mishap

A series - Copilot made normal descent and approach. After initial touchdown, aircraft became airborne again. On second touchdown, aircraft contacted ground in slightly nose-low attitude and again became airborne. After go-around, aircraft landed without further incident. During postflight

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	1	0	1–27 May	5	3
	June	2	2			
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	33	27	Total to Date	23	23

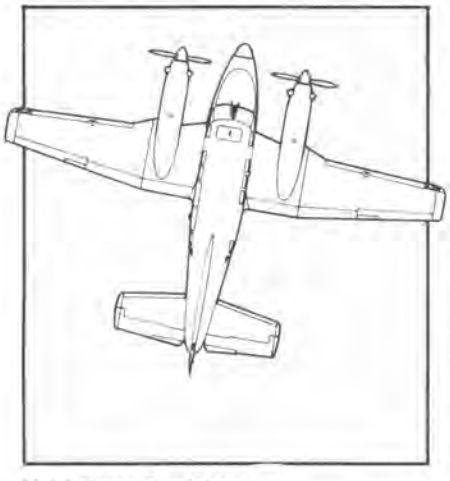
inspection, crew found nearly $9,000 damage to both propellers, caused by striking runway surface. Crew failed to initiate proper corrective action when aircraft became airborne after initial touchdown. PIC allowed copilot who was not current in aircraft to land aircraft.

U-8 Class E mishaps

F series - When landing gear handle was moved to the up position during recovery from slow flight, indicators showed gear intransit. Gear was recycled down and indicators showed down, but when gear handle was placed in up position, indicators still showed down. Motor for gears had burned out.

F series - When gear was lowered during landing, indicators showed unsafe on left main gear. Recycling had no effect until IP tapped indicator, which then gave safe indication. Maintenance personnel confirmed gear was down and aircraft landed. Dirt and residue buildup on down-lock switch was causing switch to jam.

F series - When aircraft landed to drop off passenger, one engine and both alternators were turned off. During restart, engine alternators were overlooked until battery indicated low power. When alternators were turned off, there was insufficient current to activate alternators. Caused by failure to follow checklist.



U-21 Class E mishaps

A series - Right fuel boost light came on shortly after takeoff. During 5-minute flight back to home base, fuel was crossfed from left fuel system to provide boosted fuel pressure to right engine. Caused by failure of right fuel boost pump.

A series - During climbout, fuel could be seen bubbling around rivets where trailing edge of nacelle is attached to the wing. Gaskets around inspection panel at top of nacelle fuel tank had deteriorated.

Maintenance

UH-1 Class D mishap

H series - While pilot was conducting hover check during post-phase MTF, aircraft started uncommanded turn to the right. There was no response when full left pedal was applied. AH-1 spline connector had been installed in a UH-1 hanger bearing assembly, causing No. 3 hanger bearing to fail at the spline. Mishap is being investigated.

CH-47 Class D mishap

C series - Aircraft was being ground run for MOC. Crew chief saw oil beginning to seep from No. 2 engine in vicinity of engine mechanical transmission (EMT), followed by intense smoke. After engine was shut down, transmission hot light came on. Shipping plug had been left in EMT oil return line.

OH-58 Class D mishap

A series - While aircraft was being tied down after test flight, dent was noticed in tail rotor blade. Trying to determine cause of dent, crew chief went to ramp area from which aircraft had taken off. Dented feeler gauge was found on ground. Suspect that during maintenance of tail rotor assembly, feeler gauge was left in area of gearbox. During runup or takeoff, gauge vibrated off and hit blade, causing about $1,150 damage.

OH-58 Class E mishap

C series - Engine failed as IP began demonstration of low-level autorotation. IP completed autorotational landing without further incident. Excessive play in throttle forced fuel control below idle cutoff.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time and recurring inspections of two longitudinal link assemblies and one lateral clevis assembly on all H-60 series helicopters for cracked bearing inner race (UH-60-87-07, 142030Z May 87). Summary: AVSCOM SOF maintenance mandatory message (UH-60A-84-11, 022100Z Jul 84) concerning inspection of longitudinal/lateral link assemblies for cracked bearing inner race, directed one-time and recurring inspections of the longitudinal/lateral links with bearings P/N SB 5078-101. That message stated that an improved bearing, P/N SB 5078-102 would be incorporated in links installed on production aircraft commencing with aircraft S/N 84-23938. Information has been published in a change to the parts manual that the improved bearing (-102) is installed in links and clevis. In fact, incorporation of the new bearing (-102) was not accomplished on production aircraft or new spare links/clevis. This -102 bearing cannot be identified by the field while installed in the cited links and clevis. All cited links and clevis are believed to have -101 bearings installed. These bearings have been and still are cracking due to stress corrosion. The purpose of this message is to direct one-time and recurring inspections on all cited links/clevis (see paragraph 4) similar to SOF maintenance mandatory message UH-60A-84-11, 022100Z Jul 84. Contact: Dick Mooey, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight technical message concerning adhesive repair to secure NVG panel lights on OH-58C aircraft (OH-58-87-04, 131530Z May 87). Summary: UH-1 aircraft have experienced a high failure rate of the night vision panel light inserts. These panel light inserts are also used on OH-58Cs modified with MWO 55-1520-228-50-32. Several of these failures in the UH-1

Mishap briefs

have caused near incidents when the unfiltered white light flooded the cockpit. The white light can cause immediate power-down of the night vision goggles, resulting in complete vision loss through the NVGs. The purpose of this message is to: 1) direct removal of one type of insert which is highly susceptible to failure, 2) require that all inserts be bonded in place, and 3) require a daily check to assure that inserts are secure. A design change will be made in the future which will eliminate the need for bonding the inserts. Contact: Lyell Myers, AUTOVON 693-9090, commercial 314-263-9090.

• Maintenance information message concerning connecting link (dog bone) NSN 3040-00-287-8938, P/N 114PS223-1 on CH-47 helicopters (MIM-CH-47-87-XSOF-02, 151900Z May 87).

• Aviation Life Support Equipment (ALSE) message (122010Z May 87) concerning delayed implementation of paragraph 2-9b, AR 95-17. AR 95-17: The Army Aviation Life Support System Program, effective 15 May 84, requires each aircraft crewmember to be equipped with a survival radio. Message, DA, DALO-AV, 131824Z Nov 86, delayed implementation of paragraph 2-9b, AR 95-17, until 15 May 87. This message authorizes a further delay of implementation of the requirement until 15 Nov 87. In the interim, the pilot in command (PIC) will continue to ensure that not less than one fully operational survival radio is on board the aircraft. This does not preclude other crewmembers from carrying additional radios on board the aircraft when assets are available. Additionally, the PIC will ensure that crewmembers without radios have other required signaling devices; e.g., L119 foliage penetration flare signal kit and the signaling mirror. Contact: MAJ Hinds, AUTOVON 227-0487, commercial 202-697-0487.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

History of AH-64 accidents... for countermeasure development

During level flight at 50 feet above treetops, the AH-64 flight mechanic activated the engine chop control. Both engines on the aircraft went to flight idle. The AH-64 and crew descended into the trees and crashed, causing total destruction of the aircraft and two major injuries. The cost of damages and injuries was $11,202,375.

What circumstances led to this accident? Were there human errors, materiel failures, maintenance mistakes, or environmental conditions that caused the crash? What actions were taken to correct the problems?

Knowing the answers to these questions could—

• Save your life.

• Save the lives of others in your command.

• Save the lives of the people who fly the aircraft you repair and maintain.

• Prevent the needless loss of manpower and materiel resources.

• Improve operational mission readiness.

A sourcebook containing this type of information is available. It contains separate sections on the human, materiel, and environmental causes of accidents. From this information, lessons can be learned and accident prevention programs developed.

Copies of the AH-64 sourcebook may be obtained by writing Commander, U.S. Army Safety Center, ATTN: PESC-M, Fort Rucker, AL 36362-5363. Ask for Technical Report 87-2: History of AH-64 Accidents for Countermeasure Development, FY 81-86. ■

ALSE retrieval program

The U.S. Army Aeromedical Research Laboratory (USAARL), located at Fort Rucker, AL, is responsible for examining and evaluating aviation life support equipment (ALSE) that has been involved in aircraft accidents (DA Pam 385-95: Aircraft Accident Investigation and Reporting). Information gleaned from this retrieval program is used in developing new ALSE equipment and for improving equipment already in the Army inventory.

Recently, some items sent to USAARL under the ALSE retrieval program have not been adequately labeled to show the following information: crewmember name, duty position, location in the aircraft, and case number. Without this information, it is very difficult to accurately evaluate the equipment to determine what improvements are needed.

Please ensure that you include all the needed information when you label equipment for shipment to USAARL for examination and evaluation. ■

—SSG Douglas Pritts, U.S. Army Aeromedical Research Laboratory, AUTOVON 558-6882, commercial 205-255-6882.

Reporting of altitudes in Flightfax

Many preliminary reports of aircraft mishaps (PRAM) cite aircraft altitudes in relation to msl (mean sea level). When this information is published in *Flightfax* it means little to the reader because we do not include geographic locations.

Altitude is vital to understanding what happened in many aircraft incidents and accidents. This information should be reported as feet agl (above ground level). ■

What if you survive the crash?

radio on the aircraft, the pilot left the first-aid kit with the copilot and ran 5 miles to the airfield to get help.

An hour and 15 minutes had elapsed before medical personnel reached the crash site. The copilot had somehow managed to get out of the aircraft and they found him lying on the ground. He sustained major injuries when the aircraft's nose was crushed during impact. Although he had facial lacerations and his helmet visor housing was cracked from impact with the TSU, the helmet probably saved his life.

Accident causes

Materiel. The loud bang the pilot heard was caused by pieces of the main drive shaft being ingested by the engine. As a result, the compressor stages of the turbine sustained damage which caused a severe engine power loss. While the depot determined that the drive shaft failed, causing the compressor damage and resulting power loss, the reason why the drive shaft failed still hasn't been determined.

Human error. After completing a right turn in autorotative descent, the pilot realized that he was going to land short of his intended point of landing, a dirt road. He, therefore, lowered the aircraft's nose in an attempt to extend his glide, thereby aggravating an already excessive rate of descent which had been brought on by low main rotor rpm and the right turn. Because of the excessive sink rate, the pilot had no time to perform an autorotative deceleration. By this time, he realized ground impact was imminent and he leveled the aircraft and pulled full collective pitch prior to impact with the ground. He made an improper decision because his attention was channeled on his selected landing area to such an extent that he failed to recognize an excessive rate of descent.

After the crash

Although both pilots survived the crash, there were several factors that could have meant life or death after the accident.

- Although the unit SOP and Army Regulation 95-1 require survival radios on aircraft, limited availability of survival radios in the unit had led to a restriction of one radio per aircraft. On this aircraft, however, there were no survival radios. Only PICs were authorized by flight operations to sign for survival radios and the PIC on this mission had originally deployed as a copilot, therefore, he had no radio. There also were no cold-weather survival kits on the aircraft.
- When the pilot made his Mayday call during the emergency, he transmitted on intercom rather than the flight-following channel.
- After ensuring the copilot was alive, the pilot had problems getting the first-aid kit open. The safety wire attachment on the kit's zipper required an excessive amount of force to break.

Machines, unfortunately, sometimes fail and human beings do make errors, particularly during times of great stress. Aviators, however, work in an unforgiving environment and mistakes such as a lack of life support equipment should never be allowed to happen. It requires absolutely no imagination to think about all the things that could have happened to this aircrew before help arrived at the accident scene. ■

U.S. ARMY SAFETY CENTER

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THE SIXTH SENSE OF SAFETY
AWARENESS • ACTION
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Flightfax
Report of Army Aircraft Mishaps

Fatigue...a deadly enemy

The problem of fatigue and its effects on flying operations have been studied extensively but there are still a lot of uncertainties, for example: How long can a person work? How much sleep is enough? How do other factors, such as repetitious monotony contribute to fatigue? The questions are endless and the answers may be as varied as the people studied. No wonder the subject of crew endurance is a problem, not only to commanders but for the aviators themselves.

AR 95-1 provides guidelines for unit crew endurance policies, but differences in stamina and recuperative power of individuals vary so widely, a policy to cover all of these variables in all types of aviation units would be unworkable. That is why commanders, following general guidance, must design a crew endurance program tailored to their unit mission and make the decisions regarding individual work and flight assignments.

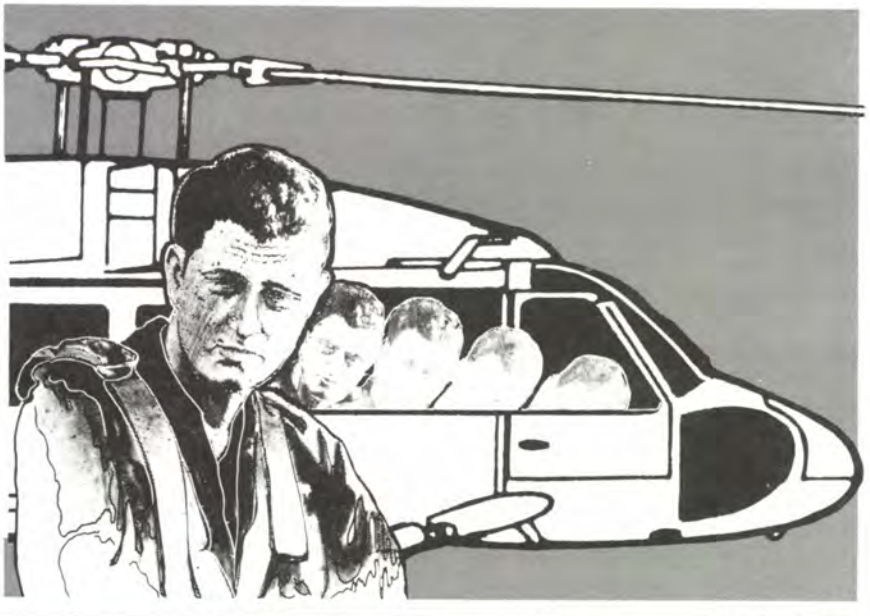
Individual reactions to lack of sleep, stress, diet, shifts in daily living cycles, and so on vary so widely that even when accident investigators tell us that the crew rest policy was not violated, we can't assume that fatigue was not present. An aviator may be in compliance with the crew rest policy and still be fatigued enough to affect his performance. In the following accident, fatigue was not a direct cause but it may have contributed to the actions that resulted in an accident.

Two UH-60s were parked on a ramp along with several other Black Hawks. Both aircraft were scheduled for missions. The control tower was closed, and both pilots made a "call in the blind" about their intentions. However, the pilot of one aircraft mistook a "9" for a "5" when setting the frequency on his radio and he was transmitting on the wrong frequency. The crew of this aircraft finished their runup and proceeded to taxi for takeoff, after seeing that the navigation lights of the other aircraft were still flashing, indicating that aircraft wasn't ready to taxi. The first aircraft turned onto the main taxiway and had moved about 50 feet when the pilot saw that the other UH-60 had also begun taxiing. The aircraft on the main taxiway stopped, but the main rotor blades of the two aircraft meshed and both UH-60s came to rest on their right sides. Flying debris also damaged several of the parked aircraft.

The copilot of the second aircraft failed to ensure that he was clear of obstacles and as a result taxied into the UH-60 which was located to his left on the main taxiway. He had channelized his attention inside the cockpit and to the immediate front of his aircraft. During the braking check, he had noticed his navigation lights were flashing and realized they should be changed to the steady mode during taxi. Illumination in the cockpit, when the lights were brought up to identify the tail wheel locking switch, also caused the copilot to channelize his attention inside the cockpit. Because of the limited clearance between parked aircraft, his attention was also on the taxi line so that he could avoid the parked aircraft.

Because of the 45-degree intercept angle of the parking taxi line and the main taxiway, the limited field of vision while wearing NVGs, and the door post structure of the UH-60, the copilot

(continued on next page)



Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Fatigue...a deadly enemy

would have had to turn his head to the left and look out his side window to see the other aircraft on the main taxiway. He didn't do it.

The investigating board concluded that fatigue may have had at least some part in the errors made by the copilot. It was the professional opinion of a flight surgeon on the investigating board that conditions within the unit, such as mission requirements, personnel shortages, living conditions, and other factors, created an atmosphere in which chronic fatigue was likely to develop. He had noticed signs and symptoms of chronic fatigue in unit personnel: sore throats, colds, back pain which got progressively worse, weight loss, and mild depression.

In its early stages, fatigue is insidious. The brain begins to shut things out and as stimuli inputs decrease, the eyes begin to narrow their scan, eventually tending to fixate on centrally located items. The brain is already filtering out many external inputs and now the eyes are providing fewer and fewer external inputs. As stimuli to the brain decrease, the mind begins to avoid stimulating actions. Head motion decreases and pilots may find themselves fixing their attention inside the cockpit, possibly even on a single instrument.

Other symptoms of fatigue include: increased reaction time, lowered standards (more tolerance for errors, sloppiness, and carelessness), inability to concentrate or to remember, slower decision making, and shorter attention span. Judgment is affected; irritability and resistance to criticism increase and may lead the aviator to fail to heed the advice or warning of others.

Effects of fatigue on memory or dulling of the sharp edge of reaction time, combined with task overload, can mean the difference in almost having an accident and actually having one.

The first part of the AH-1's mission in support of a field training exercise had been routine and the aircraft was en route to the mission area after refueling. At the designated battle position, it joined up with an OH-58 and another AH-1 making up the attack team.

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 then 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. Then he 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 waiting for 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.

The day before the accident the AH-1 crew had put in a duty day of 13 hours and 45 minutes. Their flight time was the equivalent of 8.2 hours. Using the environment relative factor in AR 95-1, 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, this crew would not have been flying on the day of the accident.

Sometimes a person's motivation about what they're doing is so high, feelings of fatigue are suppressed although the physiological effects of fatigue are measurable. On the other hand, if the job being performed is something the person doesn't want to do, they may feel intensely fatigued when there are no measurable physiological signs of fatigue. In other words, you can't trust how you feel to tell you if you're tired.

There are many other factors that contribute to fatigue. For example: illness; alcohol or drugs; environmental stresses such as heat, cold, dehydration; and emotional stresses such as loneliness, can add to feelings of fatigue.

Environmental stresses are a big fatigue factor during many Army activities. They are certainly abundant during field training and they may be

accompanied by emotional stresses as well. In the following accident, the commander was aware that the crews were exceeding their crew endurance limits. In fact, exceeding crew endurance limits appears to have been the rule rather than the exception during field training exercises, when crew rest should be monitored the closest because of the increased stress.

On the morning of the mishap, the pilot was flying his first mission as an AH-1 PIC while working as a recon team with the crew of an OH-58 helicopter. After a stop at a forward area refueling point (FARP), the aircraft flew NOE for more than an hour while supporting a zone reconnaissance. After returning to the FARP, the aircraft was repositioned and shut down. During postflight inspection, evidence was found that the main rotor blades had struck some kind of wooden object. The tail rotor blades also showed signs of contact with vegetation.

How much did the pilot's fatigue contribute to this Class C mishap? That's hard to say, but both the pilot and the copilot had exceeded the unit crew endurance SOP. Stress may have been an additional factor. The day before, the troop commander (who was in another aircraft) was constantly counselling the aircrews for unmasking too long, being too slow in crossing an open area, losing track of each other, and in general performing poorly. Counselling during a mission, rather than waiting until later, was approved procedure in this unit, but it probably added to the stress for a pilot who was flying this type of mission as PIC for the first time.

Field exercises can also play havoc with your body's work/rest cycle (Circadian rhythm), especially for an aviator who may have flown across several time zones then jumped right into an erratic work/rest cycle. The intense physical and mental effort required by the training activities, combined with the change in Circadian rhythm, can result in fatigue before anyone knows it's happening.

The pilot of an OH-58 started to pick the aircraft up to a hover while directing his attention to a gunship about 300 feet to his right rear. He didn't notice that the cyclic control was in the aft right quadrant. The aircraft came off the ground left skid first, then began pivoting about the heel of the right skid. In this configuration, it exceeded a 15-degree angle of bank, entered dynamic rollover, and came to rest on its right side.

During the 7-day period preceding the accident, the pilot had exceeded the crew rest policy in the unit SOP and AR 95-1. His flight time, computed with environmental factors for the flight, was 50.8 hours—AR 95-1 allows 37 hours. What may have been more significant was that rest periods in the preceding 48 hours never exceeded 4.5 hours in duration and were interrupted by periods of duty.

The day before the accident the pilot had 6.5 hours of continuous flight. Most of the flight time was during the day, but it involved terrain and NOE flight and hot refueling. He had finished flying at 1430, but because he was battle captain, he was required to do extensive mission planning which kept him busy until 2330. He got only 3.5 hours of sleep the night before the accident.

Fatigue contributed to the pilot's failure to properly direct his attention to the task of bringing his aircraft to a hover, and the result was an accident.

When we talk about the effects of fatigue on safety, we too often think only of aircrewmembers. If we disregard mechanics, armament personnel, and all the other people who perform maintenance functions, we place our aircraft and the lives of crews and passengers in jeopardy.

Because these people are not classified as aircrewmembers, they do not fall under the provisions of AR 95-1 and unit SOPs on crew endurance. The commander, however, who does not provide for adequate rest of these vital members of the aviation team is failing in an important area of his responsibility.

The same physiological, environmental, and psychological stresses that affect aviators, particularly in the field, take their toll on support personnel. Physical workloads, sustained operations, and rapid deployment, as well as exposure to heat, cold, noise, and other things that affect the pilot's ability to fly, also affect people who maintain the aircraft.

Fatigue often leads to shortcuts and makes maintenance personnel less likely to "go by the book." If a mechanic fails to record that he drained a gearbox, and he's so tired he doesn't even remember he did it, the aircraft is going to fall out of the sky just as surely as it will when the aircrew makes an error. Some of the things commanders and supervisory personnel should keep in mind are—

- Signs of inadequate rest in their personnel: vacant stare, pale skin, tendency to stagger, slowness of response, lapses in attention, inability to grasp directions, and unclear speech.
- Work shifts should be arranged so that some fresh individuals are on the job during every shift. When possible, have individuals work as a team to doublecheck what has been done. Rotating tasks will help keep workers alert.
- Ensure that all personnel get a minimum of 4 hours of sleep every 24 hours. Four hours on and 4 hours off will allow for at least minimum performance.
- Provide a place for off-duty soldiers to rest, as far away as possible from noisy activities, and enforce noise discipline in designated rest areas.
- Emphasize the importance of eating right and drinking plenty of water. Be sure your soldiers know that caffeine and alcohol cause the body to lose water and that thirst is not a good indicator of the need for water. The body, in fact, is already dehydrated before it signals with thirst.

We are just beginning a period of intensified activity throughout the summer months. Regular Army, Reserve, and National Guard units will be conducting training and we all need to increase our awareness of how fatigue can affect our ability to perform safely. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - Aircraft had been operating at 5500 rpm for 20 minutes, awaiting field extraction exercise. As aircraft was repositioning for takeoff, engine failed. Autorotation was successful, but FOD from engine caused $15,700 damage to main rotor blade, tail rotor blade, and tail boom. Cause of failure is unknown.

UH-1 Class D mishap

H series - Damage to tail rotor blade and missing 90-degree gearbox sprocket cover were discovered during postflight inspection. Rivets on sprocket cover nut plate were sheared.

UH-1 Class E mishaps

H series - Copilot was on controls during approach. At about 200 feet agl, during descending right turn to land, PIC armed cargo switch. There was no indication load was released and copilot said he did not touch release button, however, when crew chief checked load at termination to 50-foot hover, load was gone. Ground personnel reported load fell from about 200 to 300 feet agl. Suspect load released when cargo switch was armed.

H series - Aircraft was 2,000 feet msl when master caution and hydraulic lights came on. Crew heard loud noise from hydraulic pump and felt feedback through flight controls. Hydraulic line from servo ruptured, causing loss of hydraulic fluid.

H series - During flight at 1,000 feet agl, engine tachometer dropped to zero and rpm light and audio came on. Tachometer generator shaft sheared when tachometer generator seized.

H series - During transition to NOE flight, pilot slid aircraft to the right to avoid a tree in flightpath but main rotor struck a small branch. Crew failed to properly monitor potential obstacles in immediate vicinity of aircraft.

UH-60 Class E mishaps

A series - While aircraft was still on the ground before takeoff, stabilator failed twice. Collective position sensors were out of adjustment.

A series - During landing, crew saw smoke in cockpit. Wires behind ice rate meter were frayed, causing them to short-circuit against ice rate meter control box.

Attack helicopters

AH-1 Class E mishaps

F series - During NOE flight, copilot increased power too rapidly in attempt to avoid flying over muddy field at low altitude and slow speed. This resulted in overtorque; 100 percent indicated, 104 percent calibrated.

P series - Engine oil temperature began rising rapidly during flight. Operations in sandy environment resulted in clogged oil cooler fan collar.

S series - No. 1 hydraulic light came on during tactical training flight. B-nut on hydraulic line backed off, allowing line to chafe on transmission blower scroll and causing line to fail.

AH-64 Class E mishaps

A series - During flight at 100 KIAS, 500 feet agl, pilot moved fuel crossfeed switch from aft to normal position. Engine No. 1 fuel psi caution light came on and engine shut down. No. 1 engine power lever was moved to off position and aircraft made uneventful running landing. This was the fourth engine failure for the unit since 6 Apr 87. McDonnell Douglas is conducting an investigation; however, cause is not yet known.

A series - Stabilator auto mode failed during takeoff. Pilot switched to manual and landed aircraft. Caused by failure of stabilator actuator.

A series - During runup, APU clutch disengaged, causing "hard" electrical shutdown and aborted engine start. Caused by failure of NR sensor.

A series - Tail rotor temperature light came on during runup. Tail rotor gearbox was replaced due to overtemp.

A series - When pilot checked main landing gear brakes during ground taxi, pedals went to fully depressed stops and failed to function. Aircraft was returned to service after brake system master cylinder was filled and system bled.

A series - After crew performed overspeed check on No. 2 engine during runup, tgt for both engines began to fluctuate. No. 2 engine NG was oscillating from 87 to 91 percent. After a few seconds, tgt and NG on No. 1 engine began to drop and engine failed. Maintenance replaced fuel injectors in No. 1 engine.

Cargo helicopters

CH-47 Class E mishaps

C series - During takeoff, No. 2 engine N2 decreased, followed by increase, then another decrease. Attempts to control with emergency beep were unsuccessful. Caused by failure of electromechanical actuator.

D series - During low-level terrain flight, No. 2 engine showed symptoms of low-side engine trim failure and would not respond to normal engine trim inputs. Emergency engine trim switch was placed in manual position and upon application of emergency trim, No. 2 engine rapidly accelerated, causing rotor rpm to peak at 105 percent and engine torque to reach 60 percent. No. 2 engine condition lever was placed between flight and ground idle, rotor rpm returned to 100 percent, and crew made uneventful landing. N2 actuator had excessive internal play.

Observation helicopters

OH-58 Class E mishaps

A series - Pilot took off into sun at

Mishap briefs

dusk. At about 60 feet agl, 50 KIAS, pilot saw commo wire strung across flightpath. Wire was cut by upper wire strike protection system.

A series - Aircraft was trail in flight of six. About 15 minutes after takeoff, pilot noticed change in engine rpm. With N2 at 95 percent, rpm audio and light came on. Pilot lowered collective pitch and checked instruments, determining that engine had not quit. N1 stabilized, but N2 was fluctuating. Pilot found place to land among tall cactus and sandhills and landed successfully with less than 97 percent N2. Governor had failed internally.

D series - During hover taxi from hot refueling point, crew felt aircraft shudder, followed by severe vertical vibrations and lateral yaws. Engine noise first increased, then decreased. Throttle was reduced but vibrations continued and hovering autorotation was performed. Caused by air in fuel lines.

Fixed wing

OV-1 Class E mishaps

D series - Nose gear indicator continued to show intransit when gear was raised after takeoff. Light remained on after recycling and crew flew for about 45 minutes to empty fuel from drop tanks before making uneventful landing. Malfunction could not be duplicated.

D series - Pilot felt vibrations in airframe during takeoff roll at about 85 knots. Pilot elected to continue liftoff and flight. Suspecting possible nose wheel problems, pilot and observer inspected left and right main tires. They appeared normal and pilot continued with mission. Returning to home base, pilot flew past tower with gear down and tower personnel reported nothing appeared to be unusual. Pilot performed flaps-up landing, holding nose wheel off as long as possible. Upon touchdown, vibrations began again and aircraft pulled to the right before rolling to an uneventful stop. Observer reported right main tire was flat. Suspect defective tire or valve stem. Unit is investigating this incident and tire failures on other aircraft.

U-21 Class E mishap

C series - As speed approached 80 knots during takeoff roll, aircraft veered uncontrollably to the right. Failed right brake master cylinder caused right brake to lock up.

Maintenance

AH-1 Class E mishaps

F series - During flight at 1,000 feet msl, 110 KIAS, crew heard a pop followed by a grinding sound which continued throughout flight. Master caution and hydraulic lights came on. Wire bundle had been routed too close to hydraulic line to tail rotor servo. Chafing caused line to rupture and No. 1 hydraulic system failed.

P series - During NOE flight, transmission oil pressure slowly dropped to 40 psi. Jam nut was not installed correctly during rebuild 30 hours prior to mishap. Turn bolt for pressure regulation backed out, causing pressure to decrease.

OH-6 Class E mishap

A series - Engine oil bypass light came on during flight. External oil supply line failed due to chafing of safety wire on oil line attaching bolts.

Safety messages

• Safety-of-flight maintenance mandatory message concerning inspection of main rotor mast assembly on OH-58A and C series aircraft (OH-58-87-05, 212000Z May 87). Summary: During routine quality control inspections by the manufacturer, corrosion was found on some main rotor mast assemblies. In the resulting investigation, metallographic examination revealed that sulfide-type stringers in the material were the cause. The same defect may exist in selected main rotor mast assemblies, P/N 206-010-332-121, from the same lot of material. Purpose of this message is to direct inspection of all installed and spare main rotor mast assemblies for part numbers and serial numbers matching those in paragraph 4. Contact: Leo Smith, AUTOVON 693-9089, commercial 314-263-9089.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901.

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	1	0	May	5	3
	June	2	2	1-3 Jun	1	1
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	*34	27	Total to Date	24	24

***One accident was upgraded from Class B**

Shortfax

Well done

"There are old pilots and bold pilots, but there are no old bold pilots." That's the way the old saw goes, but it's not necessarily so, unless by bold you mean careless.

LTC William D. Macey recently retired after more than 37 years of service in the Kansas ARNG. LTC Macey was an Army aviator for 25 years, racking up more than 6,300 hours, including a combat tour in Vietnam, without an accident. LTC Macey was rated in both fixed and rotary wing aircraft. ■

Breakaway tip on WSPS

We have been asked to republish the following article from the 19 Sep 84 issue of Flightfax. This article first appeared in PS magazine.

The breakaway tip of the wire strike protection system (WSPS) is not long for this world if you're the least bit careless. If you should push a toolbox into the tip or hit it with a tool, for example, you'll damage the rivets or knock off the tip. Whichever, it means a repair or replacement job.

The easiest way to keep the WSPS in tip-top shape is to keep heavy boxes, tools, or equipment out of its reach. Here's a way to remind yourself that the tip is there.

Highlight and protect that tip during maintenance with something bright and soft. A tennis ball, NSN 7810-00-516-0152, or a styrofoam ball will do the job. Paint it a bright color as an eye-catcher. NSN 8010-00-958-8148 gets a 1-pint can of fluorescent orange paint.

The cover does double duty by protecting your head from a close encounter of the painful kind.

Remember to take the cover off the tip after maintenance. ■

A million-dollar idea

Vince Dorio, an equipment specialist at Sacramento Army Depot, came up with an idea that not only gave the Army the hoist it needed for maintenance on the OH-58D, it saved $1,049,908.

Once assembled and in place, the hoist is used to lift out the helicopter's engine, transmission and mast-mounted sight, a special enemy detection device mounted on top of the scout aircraft.

Dorio thought a contractor's estimate to build the hoist was too high and he convinced the Army Aviation Systems Command (AVSCOM) to give the depot a crack at making the hoist.

He took his conceptual sketch to the depot engineers, who designed and built a prototype. After a few bugs were worked out, the depot had its hoist and at a third less than it would have cost from the contractor. Ninety of the hoists will eventually be built.

Dorio's hoist is light, portable, and can be taken apart and stored in the OH-58D. Using instructions that have been added to the technical manual, two technicians can assemble the hoist for use in about 15 minutes. Parts are fastened together with quick-release pins—no tools are needed.

Dorio received a cash award of $8,450 for his idea. ■

—Sacramento Army Depot PAO

U.S. ARMY SAFETY CENTER

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Flightfax

Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
AWARENESS • ACTION
SAFE ARMY NOW
IN TRAINING AND LIVING

Where we are, where we're headed: A report on this year's accidents

During the first half of FY 87, there were 62 Class A through C Army aviation accidents, resulting in 19 fatalities. Sixteen of these accidents were Class As, 5 were Class Bs, and 41 were Class Cs. The total cost was $39.2 million.

In the same period in FY 86, there were 69 Class A, B, and C accidents: 19 Class As, 7 Class Bs, and 43 Class Cs. There were 11 fatalities and an accident cost of $40.9 million.

When we compare the first half of this year with last year, we find that there were fewer accidents this year in all three classifications. The most significant difference is in Class A accidents with three fewer this year. There were, however, 19 fatalities in the first half of this year compared to 11 in the first half of last year. Eight of the 19 fatalities were the result of 3 midair collisions.

At the end of the first half of this year, we were not only seven accidents below the same period in FY 86 for Class A-C accidents, we were five accidents below the SafeArmy objective for the 6-month period and nine accidents below the SafeArmy objective for Class A aircraft accidents. Army aviation was forecast to finish FY 87, 10 accidents below the objective for Class A accidents, with a better record than the 1.98 rate established in FY 86. This record-setting rate per 100,000 flying hours was the lowest ever recorded for Army aviation.

There have been 23 Class A-C accidents during the first two months of the third quarter of this fiscal year, with four fatalities. These 23 accidents included: 7 Class As, 4 Class Bs, and 12 Class Cs. One AH-1 and one OH-6 Class A accident occurred in April. The remaining five Class A accidents in the third quarter were during the month of May: two UH-1s, one AH-1, one CH-47, and one OV-1.

Already this quarter we have had three more Class A accidents than occurred during the entire third quarter of FY 86. Fortunately, none of the accidents involved such a large number of fatalities as the CH-47/Cobra midair collision last year. If accidents continue to increase, however, all of the statistics could exceed those established in the third quarter of fiscal year 1986. The progress made in Army aviation safety during the first half of this fiscal year could be completely wiped out unless everyone concerned—commanders, supervisory personnel, safety officers, maintenance personnel, and, above all, aviators—does every thing humanly possible to arrest the rising number of aviation accidents.

Following are synopses of selected accidents:

• Two aircraft were on a cross-country navigational training flight. The copilot of the lead aircraft allowed the formation to fly south of course and enter a protected area and traffic pattern at an airport. The lead aircraft made an unannounced abrupt right turn to avoid a glider in the airport traffic pattern. The second aircraft, a UH-60, was flying close to the lead aircraft's right rear. The pilot of the UH-60 entered a steep right bank, approaching 90 degrees, to prevent a midair collision. The aircraft could not recover from this maneuver and struck the ground.

• During dearming operations, PIC got out of aircraft to confirm weapons systems were clear and to inspect tailboom after firing rockets. He checked the right side of the AH-1, walked around the rear of the aircraft, and checked the left side. During his return around the rear of the aircraft, he was struck by the tail rotor and killed.

• During a weather recall, an OH-58 joined with four other aircraft as chalk 5 in the flight. The flight proceeded under night vision goggles, at 300 to 400 feet agl, inbound to the airfield. They encountered ground fog about 2 1/2 kilometers northwest of the field, in the vicinity of the airfield VOR. The aircraft was turning to final approach when it was seen in rapid descent into the fog. The aircraft was destroyed when it struck the ground.

• The UH-1 was on a MILES/AGES support mission. While at NOE altitude, the aircraft passed a tank and the pilot made a climbing, skidded left turn to pass close abeam the tank on the opposite side. During the turn, the pilot induced an extreme nose-low attitude and struck a sand dune while attempting to pull out of the dive. The UH-1 rotated right and struck several other sand dunes, coming to rest 250 feet from the point of first impact. The aircraft sustained major damage.

• A formation of two aircraft was returning to the airfield at the termination of a night vision goggle (NVG), low-level training mission. The crews were still under NVGs. The main rotor blades on the UH-60s meshed during a passing maneuver. The aircraft crashed and were destroyed.

• The pilot of an OH-58 was returning to a field site during hours 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 A mishaps

H series - Aircraft landed on ridgeline to offload forward observer team. One team member was killed when he was struck by the tail rotor as he attempted to cross from the right to left side of the aircraft. 8738

H series - Aircraft was repositioning from field FARP to cantonment area. It was 20 to 30 feet agl, at 30 KIAS, when the aircraft went into rapid descent, crashed, and burned. There were two fatalities and three critical injuries.8739

UH-1 Class D mishap

H series - Bird dove from above and struck windshield during approach to airfield. Windshield doubler was broken and windshield was damaged.

UH-1 Class E mishaps

H series - After 25 seconds with N1 at 35 percent during aircraft start, crew heard sharp report and pilot shut engine down. Investigation showed aircraft battery was deformed because of internal explosion caused by short in one battery cell.

M series - During NOE training flight, master caution and No. 1 hydraulic pressure lights came on. Caused by failure of No. 1 hydraulic pressure sending transducer.

UH-60 Class D mishap

A series - After numerous sorties in support of mass casualty exercise, crew chief told pilots a soundproofing panel at rear of cargo door had been lost. During inspection, small hole and dent were found in stabilator.

UH-60 Class E mishaps

A series - During takeoff, transmission oil pressure went from 67.5 psi to 30 psi and fluctuated. Probable cause was malfunctioning of transmission oil pressure regulator.

A series - During level flight, stabilator horn sounded and master caution and stabilator lights came on. Stabilator amplifier bias was out of adjustment.

A series - During takeoff, aircraft developed severe vibration. Anti-flap assembly had stuck and broken during takeoff.

A series - During terrain flight, pilot noted decreasing oil pressure on No. 2 engine and crew chief confirmed oil was leaking. Crew chief had failed to ensure oil cap was properly secured when he added oil between flights.

Attack helicopters

AH-1 Class D mishaps

E series - After engaging in running fire with target handoff, PIC began pulling out and applying collective at 50 feet agl, 90 KIAS. PIC misjudged clearance and aircraft struck a tree, damaging right rocket pod and ammo bay door. Wire cutter was broken and right skid was bent. Total damage was about $7,000.

E series - Aircraft was heading towards low-setting sun when crew spotted bird coming toward aircraft at same altitude. Pilot banked right and bird went through left side of rotor disk. Minor damage to main rotor blade was found during postflight inspection. Smoke and haze contributed to pilots' inability to see bird sooner.

AH-1 Class E mishaps

F series - During straight and level flight at 1,500 feet msl, forward fuel boost pump light came on. Caused by boost pump failure.

P series - Aircraft was in NOE flight along a gully at 20 feet agl, 20 KIAS, when crew heard single loud report. Aircraft yawed left and right as engine rpm waned and tgt went to 920° C. for 3 to 5 seconds. Crew heard another loud report as they turned aircraft toward suitable landing area. Variable inlet guide vane was out of adjustment.

Cargo helicopters

CH-47 Class E mishaps

C series - During instrument takeoff at about 250 feet agl, No. 2 engine transmission hot light flickered. Caused by bent pin on cannon plug.

C series - Aircraft was climbing after takeoff when crew chief reported hydraulic leak from area behind hydraulic filter. Caused by failure of preformed packing.

C series - Transmission light came on while aircraft was in climb through 5,700 feet to 6,000 feet. During descent to land, caution light went out at about 3,000 feet. Aft transmission assembly was replaced.

D series - When No. 1 engine condition lever (ECL) was brought to ground position during TEAC, No. 1 engine decelerated below 60 percent and shut down completely. When ECL was moved from flight to ground position, corresponding N1 actuator moved from flight to stop position. Caused by defective spring in rod assembly.

CH-54 Class E mishap

A series - During flight, IP simulated No. 1 hydraulics system failure. When system was turned off and then turned back on, it failed to respond. Segment light stayed on and the pressure gauge remained at zero. Caused by failure of No. 1 hydraulic boost manifold.

Observation helicopters

OH-6 Class E mishap

A series - At 100 feet agl, during takeoff, with 70 pounds torque applied, N2 increased to 107 percent and then decreased to 102 percent three times. Cause is unknown.

OH-58 Class D mishap

A series - Aircraft was on modified downwind approach while practicing pinnacle approaches. About 500 meters east of pinnacle, bird flew up and struck the windscreen. Flight was under NVG at 40 percent illumination due to cloud cover.

OH-58 Class E mishaps

C series - After aircraft departed FARP, engine and rotor rpm bled off, low rpm audio sounded, and helicopter began to settle. High water content was found in fuel sample. Another aircraft had a fuel filter caution light during flight and still another experienced N2 droop during flight at 200 feet agl. Water was also found in fuel samples from these aircraft. All aircraft were from the same unit.

C series - During taxi for takeoff, engine oil temperature gauge indicated 51o C. Maintenance cleaned oil temperature bulb and, after MOC, aircraft was released.

Fixed wing

C-12 Class E mishap

C series - During takeoff roll at about 70 knots, copilot saw No. 1 engine tgt gauge drop about 100 degrees. All other instruments were normal. Aircraft continued takeoff, stayed in closed traffic pattern, and landed. While in the traffic pattern, tgt continued to fluctuate between 400 and 650 degrees. Caused by failure of thermal couple trim compensating probe.

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	1-10 Jun	2	3
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	*34	27	Total to Date	25	26

***One accident was upgraded from Class B**

Mishap briefs

OV-1 Class D mishap

D series - Upon completing before-landing check, crew noted hydraulic pressure was zero and confirmed hydraulic failure by attempting to activate gear and windshield wipers. Gear was blown down and aircraft made uneventful landing. Pin-size hole in one hydraulic line allowed all hydraulic fluid to escape, resulting in failure of hydraulic pump due to cavitation and lack of lubrication.

U-8 Class E mishap

F series - During taxi, aircraft's right wwing tip struck vertical stabilator on parked UH-1, breaking right navigation light lens cap on U-8.

U-21 Class E mishap

A series - When crew extended flaps for landing, they heard grinding noise during last 5 percent of extension. After normal landing, flaps wouldn't retract. Flap motor attaching screw had loosened, causing flap motor drive spline to partially disengage from gearbox, stripping the flap motor drive shaft spline.

Safety messages

• Maintenance information message concerning cancellation of MIM-AH-64-86-XSOF-04, 291400Z Sep 86, regarding hydraulic system contamination of AH-64A series aircraft (MIM-AH-64-87-XSOF-02, 191800Z May 87).

• Maintenance information message concerning failure of new C-6533/ARC intercommunication system (ICS) boxes when installed in the pilot's position on CH-47D aircraft (MIM-CH-47-87-XSOF-03, 281430Z May 87).

—For more information on selected aircraft mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Where we are, where we're headed:

darkness. As the pilot attempted a low-level tactical approach over a snow-covered field, at about 30 KIAS, the aircraft struck a rise in the terrain 150 meters short of the intended landing area.

• Pilot tried to take off in a UH-1 from a rocky pinnacle at 4,800 feet msl, 22° C., with an estimated gross weight of 9,600 pounds. Aircraft turned to the right when main rotor rpm bled off to 5800. Pilot entered autorotation, turned on emergency governor as aircraft descended, and had crew throw an estimated 550 to 650 pounds of equipment overboard. Engine rpm was re-established in normal operating range during the descent. Left skid tube was damaged during landing. Pilot operated aircraft over maximum weight allowable for the operating altitude.

• Aircraft was being landed for refueling on sod area of airfield where there had been heavy rain the day before. The ground sloped slightly to the rear of the touchdown point and the aircraft rocked back as collective was lowered. Pilot applied collective and forward cyclic to maintain level attitude. The aircraft's skids stuck momentarily in the soft ground, then released suddenly. Due to forward cyclic input, aircraft lurched forward abruptly and contacted ground with toe portion of skids. The main rotor flexed downward and struck roof-mounted wire-cutting device with both blades, resulting in Class C damage. ■

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Report of Army Aircraft Mishaps

Seven receive Broken Wing Awards

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.

• **Mr. Chesley D. Auten, Pan Am Support Services, Inc., U.S. Army Aviation Center, Fort Rucker.** Mr. Auten, an IP on a TH-55A, was instructing a primary student who had 30 hours of total flight time. The aircraft was at 100 feet agl, during a simulated maximum performance takeoff, when Mr. Auten noticed the manifold pressure dropping. He told the student to maintain power, then, seeing that the student had the throttle full open and no more power was available, Mr. Auten took the controls. He lowered the collective but continued to lose rpm. Realizing that powered flight could not be maintained, he began an autorotation to a small open field. Although the aircraft was in a hazardous position because of its low altitude and slow airspeed, Mr. Auten managed to complete the autorotation and land with no damage or injury. The cause of the mishap was a defective fuel pump.

• **Mr. Rayford Cole, Pan Am Support Services, Inc., U.S. Army Aviation Center, Fort Rucker.** Mr. Cole was instructing a presolo student with less than 21 hours of flight time in the TH-55A. The aircraft had crossed a highway leading into the installation and made the base to final turn to a stagefield. The aircraft was at 435 feet agl, 50 KIAS, when the engine suddenly began to backfire and lose power. The IP immediately took the controls and entered autorotation. There were trees ahead and to the left. To the right was the highway, but there were also high tension power lines on the right side of the road. Mr. Cole could see a clearing on the other side of the power lines, however, the aircraft had such a high sink rate, he determined that it wouldn't be possible to clear the power lines. The left side of the highway leading into the post had heavy traffic, but traffic on the right side of the road was light. Mr. Cole set the helicopter down on the right side of the road with very little ground slide. It came to rest, undamaged, about 6 feet from the nearest utility pole. The emergency was caused by a broken fuel line.

• **CW3 Richard M. Lynn, 126th Medical Company (AA), 175th Medical Brigade, California Army National Guard, Los Alamitos, CA.** The UH-1H, with a crew of four and six passengers on board, was on the final leg of a local training flight, en route back to its home station. The copilot was on the controls. The aircraft was in cruise flight at 1,480 feet agl, 90 KIAS, when the cyclic control jerked suddenly and violently. CW3 Lynn took the controls and the same jerking movement happened again, then the jerking became intermittent and the control seemed to calm down. CW3 Lynn told approach control that he was making a precautionary landing. The cyclic control again began jerking and this time the movement was constant and extremely violent. CW3 Lynn began a gradual descent, but made no other control movements. In order to reach the nearest airfield, the aircraft would have to pass over a large, heavily populated area. CW3 Lynn decided to land in a plowed field. As the descent continued, the jerking movement became so violent that the cyclic was almost torn from the pilot's hand. Despite the temptation to get the aircraft on the ground as quickly as possible, CW3 Lynn maintained his slow, shallow descent. As the helicopter came within ground effect, CW3 Lynn had to force it through translational lift, but he made an uneventful landing. The right forward cyclic servo had come loose from its bracket. Two studs were sheared, the self-locking nut was completely off the third stud, and the servo was being held onto the aircraft by the fourth stud, on which the nut was loose.

(continued on next page)

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Seven receive Broken Wing awards

• **CPT Thomas A. Johnson, 224th Attack Helicopter Battalion, 29th Infantry Division (Light), Maryland Army National Guard, Bel Air, MD.** CPT Johnson was pilot of an OH-6A which, along with an AH-1S, would be on static display during a community charity fund-raising event. A crowd of several hundred people were on hand. The AH-1 had just landed and was shutting down as CPT Johnson maneuvered his OH-6 to prepare for final approach. The aircraft was about 800 feet agl when the N1 and N2 began decreasing, transmission oil temperature rose to 843° C., and the master caution, transmission, and engine-out lights came on. The engine had failed. Without hesitating, CPT Johnson broke to the right, away from the crowd and the other aircraft on the ground. As he entered autorotation, the only suitable landing area he could see was a highway. As he maneuvered the aircraft, he had to avoid two sets of 50- and 75-foot power lines, a large highway information sign, and traffic on one side of the highway. The helicopter touched down on the highway at a 15-degree forward uphill slope. There were no injuries to the two people on board or damage to the aircraft. The engine failure was caused by malfunctioning of the fuel control.

• **CW4 Randall R. Long, 7th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CW4 Long had just completed a standard ammunition upload in an AH-1S and had begun instructing a student in terrain flight aerial gunnery engagements. The student was flying the aircraft from the pilot's seat. He had completed several holding orbits over the range running/diving fire release point and received clearance to continue to the range to engage targets. The student leveled the AH-1 from a left orbit and proceeded on a 355-degree course toward the target area at about 125 feet agl, 55 KIAS. The aircraft was 50 feet above some tall trees in the area. Suddenly, the helicopter experienced a hard left yaw, decreasing engine and rotor rpm, and the master caution and numerous other warning lights came on. CW4 Long, in the gunner/copilot's seat, took control of the aircraft and immediately began reducing the collective, trimming the aircraft, and applying slight aft cyclic to avoid hitting some of the taller trees. He considered an autorotative landing into a nearby area of smaller trees but, remembering there was a range access road just 100 meters to his left, he decided to attempt a forced landing on the road. The aircraft's low altitude at the time of the engine power loss required CW4 Long to increase collective pitch and sacrifice some rotor rpm to clear trees adjacent to the road and execute the sharp right turn required to align the aircraft with the road. CW4 Long maneuvered the helicopter down through the trees, in a decelerative attitude, while still experiencing low rotor rpm. At 10 feet agl, CW4 Long applied initial collective pitch to slow the rate of descent. At 2 to 4 feet, he applied collective cushioning but, due to the low rotor rpm, the cushion was ineffective and the aircraft landed slightly hard. The combination of high gross weight and low rotor rpm caused minor damage to the landing gear and underside of the fuselage. The emergency sequence had begun with failure of the starter generator shaft. This caused a lockup of the accessory gearbox, resulting in fuel control failure and fuel starvation of the engine.

• **CW2 Joseph R. Ramos, 7th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CW2 Ramos was performing night aerial gunnery diving fire to enable his student in the AH-1S to acquire and engage targets with the telescopic sight unit (TSU) and the M197 20mm universal turret in this mode of flight. After the engagement, CW2 Ramos placed his armament switches in the safe position and began dive recovery. He initiated a left turn, with 30-degree angle of bank, to clear the range. The aircraft was about 700 feet agl at this time. As CW2 Ramos attempted to neutralize the cyclic he discovered that it had frozen in the left lateral position. He immediately disengaged the stability and control augmentation system and checked the hydraulic circuit breakers. During this time, the aircraft continued its left roll. As it passed through 60 degrees angle of bank, CW2 Ramos asked the student to help him as he attempted to level the aircraft. With both pilots on the controls, the aircraft continued to roll to 90 degrees. CW2 Ramos realized that the aircraft was going to continue to roll until it crashed inverted into the trees. He decided to reduce the throttle in an attempt to allow the aircraft to pendulum to an upright position so that it would afford maximum protection to the crew. The thrust reduction allowed the aircraft's weight to override the rotor thrust and stopped the left roll. As the aircraft began to level, CW2 Ramos and his student regained marginal control over the aircraft. However, due to reduced rotor rpm and attitude of the aircraft there was excessive feedback and oscillation in all of the controls. Once the aircraft had been partially leveled, the control feedback caused it to pitch plus or minus 20 degrees with intermittent uncontrollable feedback oscillations. At one point, the aircraft experienced a severe uncommanded pitch oscillation that caused the aircraft to dive and descend within 2 feet of the treetops. CW2 Ramos contacted the range tower to report his situation. The pilot of another AH-1 responded to the radio call and began guiding CW2 Ramos to a training site where a run-on landing could be attempted. As CW2 Ramos attempted to maneuver the aircraft to the area, it again began uncontrollable oscillations. Fearing he would soon lose total aircraft control, CW2 Ramos decided to try to land on a dirt road leading to the open area. He established an approach, working through the uncommanded pitch and lateral oscillations, and made a successful run-on landing. Maintenance found No. 2 reservoir was contaminated with a small amount of water. The

(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 - After uneventful runup, aircraft was picked up to a hover and taxied to ramp for maintenance checks. Aircraft was turned into wind and engine response check initiated. At about 25 feet agl, 35 psi torque, engine gave two loud, sharp reports, shuddered for about 5 seconds, and yawed violently to the left about 45 degrees. Compressor blades may have been eroded from constant desert operations.

UH-1 Class E mishaps

H series - During cruise flight, aircraft jolted and lost power, N1 dropped to 62 percent, and rpm decreased to 6000. Copilot performed emergency governor operations. Throttle was reduced and collective was increased as engine recovered. Rotor and engine oversped to 7100 for 3 seconds.

H series - Cabin bleed air switch was turned on about 1 minute after takeoff. Almost simultaneously, the engine began overspeed and N2 needle dropped to zero rpm. Throttle was reduced to regain manual control of the engine and aircraft made uneventful landing. Suspect failure of spur gear, resulting in loss of drive for N2 accessory drive gearbox and related components.

UH-60 Class E mishap

A series - In separate incidents, two aircraft, one at 80 KIAS, the other at 60 KIAS, had automatic flight control system (AFCS) and airspeed lights come on. AFSC was reset but failed again. Stabilators were manually slewed to zero degrees and aircraft returned to home base. Cause has not been determined.

Attack helicopters

AH-1 Class B mishap

F series - Aircraft was hovering to battle position over trees when it experienced compressor stall. Aircraft descended vertically into the trees. Transmission and rotor system separated from the aircraft. 8740

AH-1 Class E mishaps

F series - Aircraft was about 1,000 feet agl, 120 KIAS, when copilot, who

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	1-17 Jun	3	3
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	*34	27	Total to Date	26	26

*One accident was upgraded from Class B

was on the controls,. noticed it was yawing. There was no feedback in the pedals. Pilot checked to be sure stability control and augmentation system (SCAS) was engaged and took controls. Yawing became violent and aircraft began uncommanded roll. Pilot suspected tail rotor malfunction. He disengaged SCAS and began running landing to a road. At about 5 feet agl, aircraft began yawing rapidly 15 to 20 degrees left and right of direction of travel, but pilot was able to complete landing with no damage to the aircraft. Maintenance suspected SCAS failure. Changing SCAS cards did not correct the problem. Investigation continues.

P series - During NOE flight, gunner and pilot spotted wires. As pilot tried to decelerate, aircraft struck and cut commo wire. Wire had been strung in contravention of local regulations.

AH-64 Class E mishaps

A series - Aircrew was performing masking/unmasking operations. While at 40 feet agl, No. 1 engine started to overspeed, immediately followed by overspeed on No. 2 engine. As power on the engines reached 119.5 percent, the overspeed protection system shut down both engines. An uneventful hovering autorotation was performed with no damage to the aircraft. Malfunction is under investigation.

A series - Oil low utility hydraulics light came on during flight. Nut had come loose from solenoid, causing loss of hydraulic fluid. Cause could not be determined.

Cargo helicopters

CH-47 Class A mishap

C series - After performing NVG training, aircraft struck water, coming to rest partially submerged. Right forward landing gear was broken off and left rear landing gear was damaged. 8741

CH-47 Class D mishap

D series - During postflight, pilot saw a gouge in aft main rotor blade and found inspection door on droop stop shroud was missing. Crew chief had failed to properly secure door after preflight.

CH-47 Class E mishap

C series - Aircraft was in climb after takeoff. At 850 feet agl, FE discovered cargo ramp extension door assembly was about to fall off and told the pilot. Pilot began immediate descent for landing, but the door came off while the aircraft was still at 500 feet agl. Suspect door was improperly installed.

Observation helicopters

OH-6 Class E mishap

A series - Aircraft was 1 foot agl. As pilot began to pull power to achieve 2-foot hover, three sharp reports were heard from engine. N1, torque, and turbine outlet temperature (TOT) rose out of normal limits with TOT estimated at 840° C. About 20 seconds later, TOT again reached 840° C. Compressor stall is indicated.

OH-58 Class E mishaps

C series - During runup, N2 drooped and would not recover or beep up. Oil and smoke could be seen coming from exhaust stacks and engine oil temperature went to 150° C. Suspect internal failure of engine seals.

C series - During flight at 12,000 feet msl, 80 KIAS, aircraft rolled into 30-degree bank and experienced moderate to severe vibration. An uncommanded main rotor tip path variation of one to two feet was observed. Aircraft was rolled level and power and airspeed were reduced. Vibration subsided to acceptable level as aircraft passed through 10,000 feet and 60 KIAS. Isolation mount failed, causing transmission oscillations.

Mishap briefs

D series - Aircraft was being hovered to parking, following two other OH-58s. Pilot felt airframe shudder for about 2 seconds, followed by severe vertical vibrations and erratic yaw rates. Engine noise increased, then decreased. Pilot reduced throttle but vibrations continued. Pilot felt vibrations were increasing to the point that safe landing with power could not be accomplished and he decreased throttle to engine idle and made a hovering autorotation. Engine surges continued until aircraft was on the ground. Caused by air in fuel lines.

Fixed wing

C-12 Class E mishaps

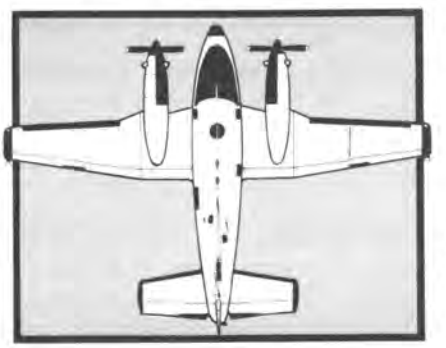
C series - About 3 hours into flight, No. 2 engine fire handle light came on. There were no indications of fire and instruments remained normal. PIC suspected malfunction of fire warning system and continued flight to closest military airfield. No. 2 fire detector amplifier had malfunctioned.

F series - During flight in light moisture, with temperature minus 20° C., crew saw two or three lightning bolts strike wing tips. Nearest thunderstorm on weather radar was 20 to 25 nautical miles distant.

G series - As aircraft leveled at altitude, pilot noticed fuel starting to leak from nacelle access panel. Caused by deteriorated gasket.

U-21 Class D mishaps

A series - Aircraft was descending from FL 100. Pilot saw lightning flash to right front and requested permission for immediate left turn to avoid weather. Another bolt of lightning struck right engine propeller, damaging engine, strobe lights, and rudder.



H series - Aircraft was being ground-guided by contract maintenance personnel. During 270-degree turn to position aircraft for parking, lower left antenna protective cap struck the steering wheel of a tug parked on the edge of the taxiway. Pilot, who was sitting in left seat, wasn't familiar with ground-guiding signals being used and failed to respond to signal to halt when wing tip came close to tug.

UV-18 Class E mishap

E series - Pilot misjudged clearance while trying to position aircraft in front of hangar door. Flaperon control lever on left wing contacted bows on back of 2½-ton truck.

Maintenance

UH-60 Class D mishap

A series - Aircraft was being test flown for blade tracking. Crew chief was adding weight to the blade and he decided to move the deice cable out of the way so he would have more room for his ratchet wrench. He placed the deice cable plug over the receptacle, but did not completely tighten it down. He also failed to write up what he had done. The result was damage to the deice distributor assembly and to a main rotor blade. When the test pilot reviewed the writeups and checked the work that had been done, he did not check the deice cable because it is not normally removed during the procedure the crew chief had been performing. The crew chief deviated from standard maintenance procedures by removing the cable and, even more important, he failed to make the proper entry in the log book.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Seven receive Broken Wing awards

reservoir was flushed and reserviced. A collet pull check was performed and found within limits. During a 1-hour test flight, no discrepancy was noted in the cyclic and the aircraft was released for flight.

• **CW2 Michael R. Crabb, U.S Army Transportation Center, Fort Eustis.** CW2 Crabb was the pilot of a UH-1 which was returning to its home base after a service mission. A crew of three and seven passengers were on board. Shortly after takeoff, at 500 feet agl, 80 KIAS, the crew heard a loud whining noise coming from the rear of the aircraft. The instruments were all in the normal range and showed no apparent fluctuations. CW2 Crabb decided to continue flight to an airport about 2 miles to the north, where he could land and investigate what was causing the noise. However, after the initial turn to the airport, the UH-1 began experiencing engine surges. CW2 Crabb immediately initiated a descending left turn to begin an approach to the parking lot in a state park. On final approach, at about 300 feet agl, the aircraft began having severe compressor stalls and the crew heard loud reports from the engine. Power was reduced and the heater and deice were checked to be sure they were off. The initial power reduction lessened the severity of the compressor stall but, during level descent, at 60 knots, severe compressor stalls began again. The aircraft was rapidly approaching an uncontrollable condition due to left and right yaws of 40 degrees or more. CW2 Crabb reduced the throttle to the engine-idle position and completed an autorotational descent from approximately 50 feet agl. The aircraft landed with minimal ground slide and with no damage to the airframe or injury to the passengers and crew. Cause of the mishap was internal failure of the compressor section. ■

Desert lessons learned

As summer training shifts into high gear, it's to your advantage to do everything you can to protect your aircraft during desert operations. The March 1987 issue of *PS Magazine* contains some valuable tips to help you keep your aircraft in the air. ■

Secure toolbox for flight

When the Huey crashed, the crew chief's toolbox ripped loose. (Just a single tiedown strap held it to the cargo floor.) It became an unguided missile looking for a target.

Fortunately, the toolbox hurtled through the cockpit without hitting either the pilot or copilot. They were lucky. If they had been hit, they might not have survived.

Secure your toolbox before every flight, crew chiefs. To make sure it stays secured, use at least three tiedown devices to prevent movement in *any* direction—forward, backward, sideways, and up.

Most operators manuals give specific instructions for using tiedown devices to secure cargo. Use your -10 TM and TC 1-201: Tactical Flight Procedures for the best method to secure your toolbox aboard your bird. ■

—PS Magazine

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

THE SIXTH SENSE OF SAFETY
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SAFE ARMY NOW
IN TRAINING AND LIVING

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 23 Jul 86 issue (8638) □ While in cruise flight over mountainous terrain, at an altitude of less than 300 feet agl, the UH-1H crew spotted what they thought was a downed aircraft. When a descent was made to an altitude of 20 to 30 feet above the trees, the aircraft slowed below effective translational lift. The aircraft spun to the right, but the pilot was able to recover. However, when he attempted the same maneuver again, he was not able to recover as the aircraft spun right and descended into the trees. The aircraft struck the ground nose down. Both pilots and one passenger were killed. The crew chief and one passenger received minor injuries and were rescued when the wreckage was discovered more than 15 hours after the mishap.

Cargo helicopters

CH-47 and AH-1 Class A mishap in 23 Apr 86 issue (8628) □ Aircraft collided while flying in opposite directions during low-level NVG flight. The main rotor blades of the CH-47 struck the forward cabin area and main rotor system of the AH-1, causing inflight breakup of both aircraft. Neither aircrew initiated any evasive action, indicating the crews did not see the other aircraft in time to prevent midair collision. Both crewmembers on the AH-1S and all six occupants of the CH-47D were killed.

Attack helicopters

AH-1 Class A mishap in 25 Jun 86 issue (8633) □ The AH-1F was on the third circuit of a racetrack pattern simulating firing support for a troop insertion. The aircraft cut the pattern short in a nose-low left bank at low altitude, then leveled and assumed a nose-high attitude to stop the descent. It struck several trees with the main rotor and tail rotor and began a climb to about 100 feet agl. The tail rotor drive shaft was severed by the tree strike. The aircraft descended vertically in a right spin, struck the ground nose- and right-side low, and came to rest on its right side. Both crewmembers were killed.

Observation helicopters

OH-6 Class A mishap in 18 Jun 86 issue (8632) □ Downgraded to Class C. During cruise flight at 700 feet agl, 70 KIAS, the pilot heard a bang and the aircraft yawed violently to the right. The pilot reduced collective and attempted a reduced power approach to a nearby field. Upon termination, he increased collective, causing the aircraft to spin right. The aircraft struck the ground in an approximate 600 fpm rate of descent, and in a spin, causing the right skid assembly to be torn free and the aircraft to roll onto its side. The pilot was not injured and he got out of the aircraft unassisted. ■

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	1-24 Jun	5	13
4th Qtr	July	5	3			
	August	3	1			
	September	2	2			
	Total for Year	*34	27	Total to Date	28	36

*One accident was upgraded from Class B

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap

H series - While performing simulated engine failure at altitude, crew saw rotor rpm dropping through 345 rpm. Collective power was adjusted to return rotor rpm to within limits and power recovery was made.

UH-1 Class D mishap

H series - Dzus fastener on vertical fin drive shaft cover came loose and struck tail rotor blade. Dent and 1/2-inch crack were found on leading edge of tail rotor.

UH-1 Class E mishaps

H series - Upon arrival at range area, pilot was unable to orient himself with his map and could not locate the destination refuel site. After an unsuccessful search, PIC made precautionary landing before need arose to use fuel reserve. Fuel truck was dispatched from refueling site to aircraft. Pilot was in totally unfamiliar area and was using an outdated and inaccurate map. The PIC knew that a fuel truck was available at the intended destination and he made a conscious decision to remain in the area beyond the point where the aircraft could have reached an alternate refueling site.

H series - During flight, engine surged and aircraft yawed slightly to the right. About 15 minutes later the engine again surged. Systems indications remained in normal range both times. Caused by malfunction of fuel control.

H series - When power was added for landing, pilot found antitorque pedals wouldn't move. Pilot made go-around for landing into wind and completed successful running landing above translational lift. Caused by failure of magnetic brake.

M series - During engine shutdown, crew chief noticed fluid beneath aircraft. Caused by ruptured line from No. 2 hydraulic pump to hydraulic reservoir.

UH-60 Class E mishaps

A series - After night flight, fishing line, which may have come from a kite caught in trees, was found wrapped around main rotor control tubes. No abnormal control responses or binding was noticed during flight.

A series - Aircraft was downwind when it lost all ac electrical power. Low main rotor rpm audio came on and pilot decreased collective. There had been no aircraft yaw and copilot believed power was still applied to rotor system. When pilot increased collective, low main rotor rpm audio came on again. Ac power came back on when aircraft was about 300 feet agl. Backup pump, tail rotor servo, and flightpath stabilization lights came on. Caused by internal failure of left input module.

A series - Aircraft was in IMC flight in moderate to heavy rain, at about 10,000 feet agl, 135 KIAS. After about 30 minutes, master caution, airspeed advisory capsule, and flightpath stabilization lights came on. Crew reset airspeed capsule light but couldn't eliminate fault. Crew took manual control of stabilator and landed. Suspect water got into air data transducer, causing a short and subsequent malfunction.

Attack helicopters

AH-1 Class C mishap

E series - Immediately after takeoff, TOW missile launcher on left wing store fell from aircraft. Launcher was recovered by ground search party, but was damaged beyond repair. Investigation is in progress.

AH-1 Class D mishap

E series - As aircraft was coming to a stop during running landing, left front crosstube broke just above skid bracket. Pilot brought aircraft to a hover, aligned crosstube and saddle mount, and landed without further damage.

AH-1 Class E mishaps

F series - During maintenance test flight, pilot heard loud reports from transmission area and felt medium-frequency vibration. Suspecting transmission failure, pilot autorotated to open field. Noise was caused by failure of No. 2 hydraulic pump.

F series - While at 5-foot hover, aircraft began left turn and low rpm audio and light came on. N2 and rotor rpm were at 92 rpm. Throttle was full open. Aircraft was turned right and landed without incident. Maintenance could not duplicate problem.

F series - Aircraft took unusually long start time and first attempt was aborted. Second attempt at start up was successful, but throttle couldn't be set in idle position. Caused by failure of idle-stop solenoid.

F series - After autorotation check during test flight, N2 returned to 100 rpm. However, when collective was applied, engine rpm bled off. After two or three attempts to regain power, collective was reduced and aircraft landed. Several subsequent attempts to bring aircraft to hover were unsuccessful. After operating aircraft at flight idle for 10 to 15 minutes, another attempt was made and aircraft hovered normally. Suspect fuel

control malfunction.

S series - During OGE hover at about 6 feet agl, crew heard loud popping noise from engine section. N2 fluctuated about 300 rpm and tgt rose to 810° C. Aircraft yawed left 10 to 12 degrees. Variable inlet guide vane actuator was sticking and out of adjustment. Bleed band was also sticking. Insufficient air intake caused compressor stall.

AH-64 Class E mishaps

A series - During cruise flight, crew detected odor of hot plastic and pilot heard loud squeal and thump. Aircraft responded to thump with slight shudder and shaft-driven compressor light came on. Shaft-driven compressor failed, causing oil to spill onto transmission deck.

A series - During flight, No. 2 engine caution light at copilot/gunner station came on. There was no indication at pilot station, but before crew could land, pilot's nose gearbox chip light came on. No. 2 engine power lever was retarded to idle position. As aircraft turned base to final to make running landing, No. 2 engine-out light came on. Failure of No. 2 engine was verified and uneventful running landing was completed. Fuel and oil samples were found within standards and normal fuzz was found on chip detector. Investigation of engine problem continues.

A series - During APU operation, utility hydraulic psi light came on and cockpit hydraulic accumulator psi gauge read zero. Hydraulic fluid vented overboard at pressure relief vent. Caused by failure of utility hydraulic pump.

Cargo helicopters

CH-47 Class E mishaps

C series - During flight, crew heard loud squeal, followed by drop in No. 1 engine flight boost pressure. No. 1 engine hydraulic and stability augmentation system off lights came on. Caused by failure of pressure return line on No. 1 flight boost hydraulic system.

C series - Engine transmission hot light came on during final approach. Cannon plug was replaced.

D series - When No. 2 power transfer unit (PTU) was turned on during runup, No. 2 hydraulic pressure light remained on and No. 2 hydraulic pump fault indicator button popped. Check valve in No. 2 power control module failed, restricting flow to the PTU and causing the light to remain on.

Observation helicopters

OH-58 Class D mishap

A series - While practicing hovering operations, pilot hovered over to tree line and pond area to practice masking and unmasking. After completing maneuver, pilot decided to hover across dry pond to opposite tree line. While hovering across dry pond, pilot looked down to judge hover height. When he looked back up, he saw the aircraft strike a 3/8-inch wire which was located about 50 meters from the tree line. The wire struck the aircraft midway on the windshield deflector/cutter assembly and continued up into upper wire cutter. The wire was cut and the aircraft made an uneventful landing. Wire had been added in area used for slide-for-life training since last master hazard map update. Although aircraft was hovering at less than 5 KIAS and the wire was 50 meters to the front of the aircraft, the pilot did not see the wire in time to avoid it.

OH-58 Class E mishaps

A series - Pilot noticed N2 droop during cruise flight. Gauge read 97 to 98 percent, which constitutes an underspeed condition. Aircraft landed with power. Power loss was caused by loose elbow on right air line of diffuser scroll.

A series - Aircraft had been flying for 1.9 hours on IP refresher training mission. Aircraft was at 3-foot stationary hover and SIP was demonstrating hovering autorotation. When throttle was reduced to engine-idle detent, engine failed. JP-5 fuel was being used and deceleration check on runup was 2 plus seconds. Engine failed the first time throttle was reduced during the flight.

Fixed wing

C-7 Class E mishap

A series - Cockpit heater fire light came on when heater was turned on during flight. Light didn't go out when heater was shut down. After heater fire extinguisher was expended, light went out. Kink in cockpit heater air control cable did not allow microswitch to disable heater unit, causing heater to operate without cooling air flow.

C-12 Class E mishaps

C series - No. 1 engine had blade tip failure in second stage power turbine wheel. Blade was found on deck during postflight. Crew had noticed no indications of engine malfunction.

C series - Crew had just completed second high-speed run to glaze the brakes after test flight. As aircraft began a right turn, both brakes failed. The aircraft maintenance technician controlled aircraft with full reverse and differential power. Cause of brake failure is unknown.

C series - During postflight inspection, burn marks were found on right inboard flap and nose gear strut. Right engine propeller had a chip missing and trailing edge of left aileron showed gouge and burn mark. Caused by lightning strike.

Mishap briefs

SD-3-30 Class E mishap

During taxi for departure, crew found left brake inoperative and right brake was grabbing. Caused by air in brake system.

U-21 Class E mishaps

H series - During after-takeoff check, crew discovered fuel venting from left wing fuel cap. Flange for cap receptacle was bent.

C series - Flaps wouldn't come up when switch was placed in up position during after-landing check. Caused by loose wire on flap motor circuit breaker.

Maintenance

AH-64 Class E mishap

A series - Aircraft was being run up. During chop check, with crossfeed normal, pilot placed the power lever in idle position. Fuel psi light on No. 2 engine came on and engine flamed out. Suspect MWO on forward fuel cell was done improperly.

CH-47 Class E mishap

C series - While carrying concrete training load, aircraft's No. 1 engine chip light came on. Load was jettisoned, engine secured, and aircraft made uneventful running landing. Improper nut used to install wire on chip detector plug caused system to short out.

OH-6 Class D mishap

A series - Aircraft was in flight at 1,500 feet agl, 90 KIAS. First indication of problem was oil spots forming inside windscreen and on back of pilot's helmet. Aircraft landed and crack in transmission was found. Transmission had been installed without checking alignment. Shims required on right rear mounting point had not been installed, causing stress, and resulting in crack.

Safety messages

• Maintenance information message (OH-58A-87-XSOF-03, 051600Z Jun 87) has been issued to correct the message control number **only** on MIM-OH-58A-87-XSOF-01, 301830Z Apr 87, regarding aircraft vibration tests after field installation of helical torquemeter gear on OH-58A and OH-6A aircraft. This message control number duplicates another message control number. The correct message control number for OH-58A aircraft is MIM-OH-58A-87-XSOF-02. Message control number MIM-OH-6A-87-XSOF-01 for OH-6 aircraft is correct and all other parts of the referenced message are unchanged.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commericial 205-255-4198/3901

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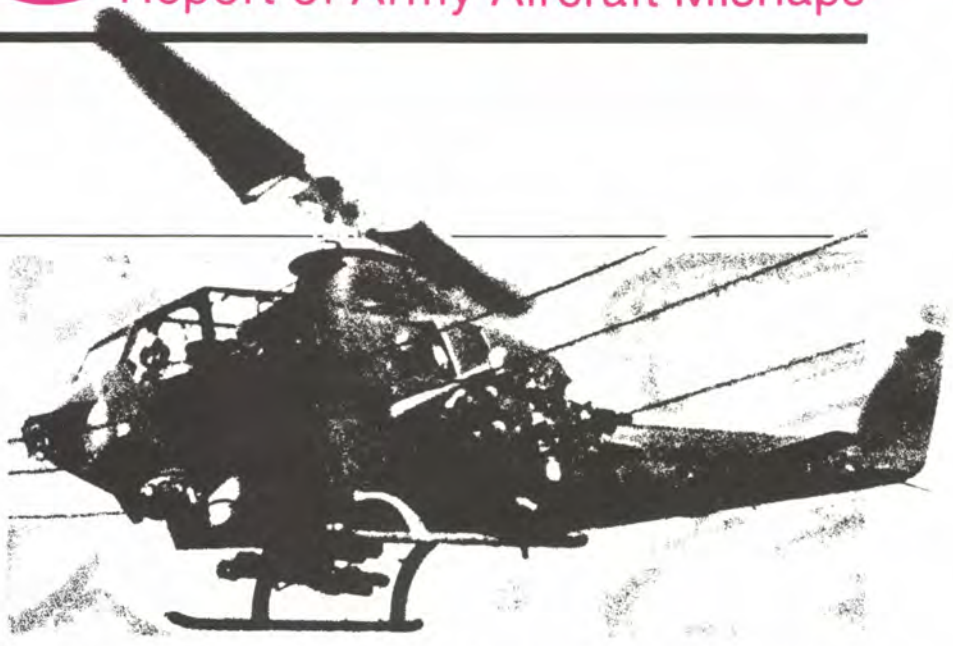
Report of Army Aircraft Mishaps

They didn't see the wire



Two teams, each consisting of an OH-58C and two AH-1S helicopters, were given a mission to perform as advance guard for a cavalry ground force during a major training exercise. The mission briefing and preflight planning, including a wire hazard analysis, were completed, and takeoff was scheduled for 0700 the next morning. The weather didn't cooperate, however, and takeoff was delayed until 1400.

The accident aircraft, an AH-1, and the rest of its team, took off from the tactical field site, and the AH-1 made an en route stop at a fuel site to top off and ensure it had sufficient fuel to complete the mission.

The team then proceeded at NOE altitudes along a twisting river route to the staging area. The copilot of the accident aircraft was at the controls. The flight was routine and uneventful until the team approached a large set of wires suspended between red- and white-painted towers. The lead OH-58C in the team climbed to avoid the wires, and the accident AH-1 followed. However, after clearing the wires, the copilot continued the climb until the AH-1 was approaching the underside of the OH-58.

The PIC took control of the aircraft and veered away from the rest of the flight. He talked to the copilot about the near miss, explaining the distances that he should have been maintaining between his aircraft and the lead aircraft.

While the PIC was flying the aircraft, he had lost track of their location because of the way the river wound around. As they approached the staging area, the crew received a radio call telling them to go tactical, which meant to slow down and begin lowering their altitude.

The PIC returned control of the aircraft to the copilot and airspeed was reduced to about 70 knots. The PIC was momentarily distracted by a column of tanks fording a river. At the same time, he was trying to reorient himself on the map while still clearing the aircraft and looking for wire hazards. In the next instant, the PIC saw three 1/2-inch power lines—just before the aircraft hit them.

Upon impact, the PIC took control of the aircraft. One of the wires went above the canopy, missed the wire strike protection system, and was hit by the erosion guard on one main rotor blade. The other blade cut the wire. The two lower wires went underneath the aircraft and were cut by the lower forward wire cutter.

In spite of having marginal aircraft control and severe vertical vibrations caused by damage to the main rotor blade, the PIC managed to land in 2 feet of water. As the aircraft settled, it rolled to the left, and the main rotor blades struck the water and separated from the aircraft.

The aircraft came to rest on its left side, and the engine shut down due to water ingestion. The PIC activated the explosive canopy removal system, and he and the copilot got out of the aircraft without assistance.

An engineer crew, with a rubber raft, was 20 feet from the point where the AH-1 landed in the river. They assisted the pilot and copilot to shore where they were given first aid and evacuated to a hospital. They both were released the same day.

The PIC failed to detect the power lines because he made an improper decision to return control of the aircraft to the copilot. He had taken control when the copilot allowed the aircraft to approach too close to the lead OH-58, and as he returned control to the copilot, he took time to discuss the incident. He also reached for his map, which had dropped to the cockpit floor. As he tried to reorient himself, scan for wire hazards, and ensure the copilot was maintaining the aircraft in a safe manner, he was distracted by the column of tanks. He failed to see the wire hazard because of poor division of attention.

The PIC of the mishap aircraft had 4,193 rotary wing hours, 2,030 in AH-1s—288 of them in the AH-1S aircraft. The copilot had 215 rotary wing hours—41 in the AH-1S.

The copilot, who had control of the aircraft at the time of the mishap, failed

(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 D mishaps

H series - During climbout, after simulated engine failure, IP heard a "whoosh" behind him. A few minutes later, during level off at 1,550 feet msl, 85 KIAS, IP felt a jolt in airframe. He took the controls and turned toward an open field for landing. At about 150 feet agl, IP felt another identical jolt in the airframe. After landing, damage was found to VOR antenna, fiberglass tail cone, and both tail rotor blades. A seatbelt, which was secured in a cubbyhole behind the pilot's head, had left the aircraft through the open cargo door. The belt wrapped around the VOR antenna, and wind caused the seatbelt end snap to fly into tail rotor blades. Tail rotor blades and hub, 90-degree gearbox, 42-degree gearbox, fiberglass tail cone, and VOR antenna will be replaced.

V series - Aircraft took off with right jump door in full-open position, resulting in cracks to bulkhead attaching stringer and rivets. Door slammed shut about 5 minutes after takeoff and was secured. Medic had failed to secure door after opening it to remove a backboard. Crew failed to notice open door because of darkness.

UH-1 Class E mishaps

H series - During slingload operations with 650-pound training load, cargo hook released when sling became tight. Load was hooked up again and same thing happened. Wire rope assembly on cargo hook was out of adjustment, causing hook to open at 600 pounds of pressure.

H series - During approach to reconnaissance site, crew heard two loud reports accompanied by engine vibration. Egt remained at 580° C., while torque indicated pressure increased 3 to 4 psi. Caused by failure of interstage actuator assembly.

H series - While departing to enter NOE route, aircraft had 30-degree uncommanded right yaw. When heading control was regained, two loud bangs were heard. All instrument readings were normal. Special compressor stall inspection was performed with no discrepancies noted.

H series - During flight, hydraulic light came on, and controls became stiff. Locknut failed, causing loss of fluid and pressure.

H series - Engine failed during IFR climb from 5,000 to 7,000 feet. Autorotation was performed, and aircraft made uneventful landing. Engine was replaced.

H series - During postflight, oil was seen on tail boom and vertical fin. The 42-degree gearbox was empty, and the cap was off. Crew chief failed to replace cap after filling gearbox.

UH-60 Class D mishap

A series - Crease along upper leading edge of tip cap abrasion strip was found during postflight. Caused when main rotor blade contacted a tree.

UH-60 Class E mishap

A series - As aircraft approached 50 KIAS, shortly after takeoff, aircraft's nose pitched down 10 degrees, and stabilator horn sounded. Pilot arrested acceleration, and copilot manually slewed stabilator to zero degrees. Stabilator switched out of auto mode.

Attack helicopters

AH-1 Class D mishap

F series - During NOE flight along creek bed, the pilot, in front seat, flew aircraft between two trees about 25 feet apart. Pilot initiated a right turn after passing the trees, and while attempting to maintain tail rotor clearance, pilot allowed main rotors to strike tree on the right side of the aircraft. Damage to both main rotor blade erosion guards amounted to about $700.

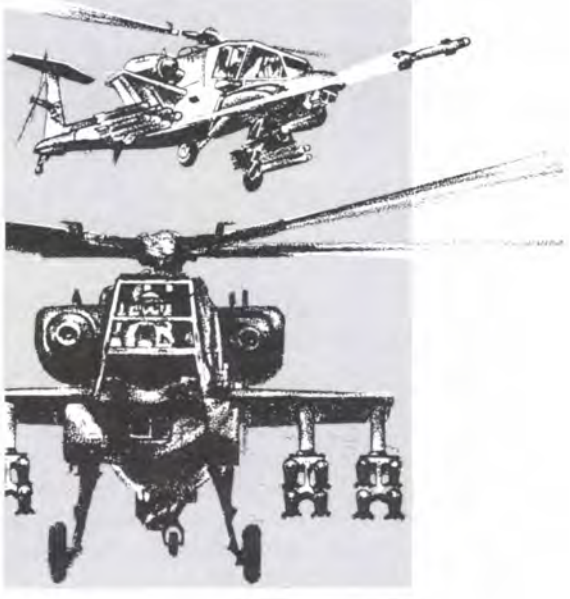
AH-1 Class E mishaps

F series - During hover for takeoff, crew heard loud report from engine area, and aircraft's nose yawed right 30 degrees. PIC made hovering autorotation to runway, and aircraft landed without damage. Prior to compressor stall, all engine indications were normal. During inspection, engine showed normal wear. The backlash of the 90-degree gearbox was found to be excessive, requiring replacement of gearbox.

P series - During runup, IP noticed 22-percent difference in pilot and gunner torque gauges, and fuel gauge needle was spinning. While IP went to get assistance from maintenance personnel, generator light came on, and copilot shut down aircraft. Cannon plug on left side of aft engine fire wall failed, causing wires to make contact.

AH-64 Class E mishaps

A series - During hover, No. 2 engine NP increased to 112 percent. No. 2 power lever was reduced to stop over-



speed. Yellow wiring harness was replaced on No. 2 engine. That afternoon, No. 2 engine NP on same aircraft failed to high side. Power lever was reduced to ground idle as No. 2 engine NP reached 106 percent. Engine overspeed was within limits, and problem couldn't be duplicated. After 1 hour of flight, later the same day, aircraft was being prepared for another takeoff, and No. 2 engine had overspeed of 119.6 percent. No. 1 engine appeared to have followed No. 2 engine to at least 110 percent NP. Yellow and blue wiring harness, alternator, and engine control unit were replaced.

A series - During runup, No. 1 engine NG began to fluctuate between 88 and 66 percent. No. 1 engine power was cycled from fly position to idle and back to fly position, but NG wouldn't stabilize. No. 1 engine yellow wiring harness was replaced.

A series - During runup, No. 1 engine failed after power lever was placed in fly position. All instruments were normal prior to engine failure. NP was adjusted, and aircraft was released.

A series - Aircraft landed, and No. 2 engine was shut down for refueling. Shortly afterwards, No. 1 engine fuel psi came on and No. 1 engine quit. Caused by failure of pilot's fuel panel.

A series - As airspeed and power were increased during flight, crew felt vertical vibration in airframe. Vibration increased with power and airspeed. Clevis bolt holes in tail rotor swashplate were elongated.

A series - Collapsed tail wheel strut was found during postflight inspection. Crew had no prior indication of strut collapse. A roll-on landing had been performed, and tail wheel may have hit uneven ground before reaching smooth surface.

A series - During NOE flight, crew heard noise from rotor system and noticed slight vibration in airframe. Caused by delamination of main rotor blade. On another aircraft, crew found debonding on three main rotor blade doublers after cross-country flight. The crew of a third aircraft heard loud popping noise during cruise flight. Trailing edge of main rotor blade had separated near swept tip.

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	Jun	5	13
4th Qtr	July	5	3	1 July	0	0
	August	3	1			
	September	2	2			
	Total for Year	*34	27	Total to Date	28	36

***One accident was upgraded from Class B**

A series - During takeoff, No. 1 nose gearbox light came on. Oil showed high metal content, and gearbox was replaced.

A series - Four aircraft had shaft-driven compressor failures, causing loss of transmission oil.

Cargo helicopters

CH-47 Class E mishaps

C series - During demonstration of in-flight engine fire, No. 1 engine condition lever was advanced from ground to flight position. No. 1 engine N1 decreased, and power turbine inlet temperature (PTIT) increased to 900° C. Engine was shut down, restarted in flight, and aircraft landed. N1 control rod internal spring failure allowed control rod to compress below the ground position.

C series - On shutdown, No. 2 engine PTIT rose to 1,000° C., and fire was reported coming from engine cowling. Both fire bottles were fired, and two hand-held extinguishers were discharged. No external fire damage could be found. Engine was replaced.

D series - While hovering over external load, pilot felt unusual control inputs in the cyclic, followed shortly by a thrust problem. Pilot moved aircraft to front of load and landed. Electromechanical actuator failed.

D series - Aircraft was loading cargo at tactical field site with both engine condition levers in ground position to save fuel. Copilot noticed No. 1 engine N1 gauge read zero. Caused by defective engine wire harness.

Observation helicopters

OH-58 Class C mishap

C series - PIC was conducting NOE deceleration at 3 feet agl, 10 KIAS. During deceleration, tail skid struck ground, causing lower section of vertical fin to bend left. Tail rotor blades cut off part of tail skid and cut into vertical fin. At the same time, the left rear skid cross-tube collapsed. Damage amounted to nearly $75,000.

OH-58 Class D mishap

C series - During NOE flight, crew felt high-frequency vibration through tail

rotor pedals. Due to amount of feedback, an immediate running landing was made. Caused by failure of tail rotor trunnion.

OH-58 Class E mishap

A series - Low rotor rpm at touchdown during autorotation caused spike knock, but no damage resulted. Pilot was slow in crosschecking instruments.

Training helicopters

TH-55 Class D mishap

A series - After demonstrating a steep approach to his student, IP performed takeoff and maintained control until reaching base leg. Student took control on base and set up for a steep approach. Student initiated approach at about 200 feet agl and made a small throttle adjustment to maintain engine rpm at 2900. As the helicopter began passing through effective translational lift (etl), at about 50 to 75 feet, the IP and student noticed engine rpm was at about 2650 and decreasing. As the aircraft continued passing through etl, the student attempted to regain 2900 rpm by increasing throttle, but with no response. At this point, the IP was on the controls with the student, attempting to regain rpm. The IP then assumed full control, still attempting to regain rpm. The helicopter struck the ground hard and straight ahead. After impact, the aircraft rolled up on the front of the skids and started a yaw to the right. The IP regained rpm as he was applying left pedal to correct for the right yaw. The helicopter rolled down, left skid hard, causing damage to the landing gear. The crew, however, was unaware of the damaged landing gear, and the IP increased collective at 2900 engine rpm and stabilized the helicopter at a 6- to 8-foot hover. As the IP attempted to land, the damaged landing gear was discovered. The IP continued to hover while making radio contact for permission to return to the stagefield. Reaching the stagefield, he hovered in the slope area until a pad of rubber tires could be built up on which to land the helicopter. There was no further damage to the aircraft. Damage to landing gear amounted to about $1,900.

Maintenance

AH-1 Class E mishap

P series - After cool down, crew chief saw fuel running down left side of aircraft. Fuel pressure switch had been cracked during installation.

UH-1 Class E mishap

H series - During engine start, oil pressure gauge indicated zero at flight idle position. Loose bolt was left in internal portion of engine oil pump during installation. Bolt jammed pump vanes, causing oil pump shaft to shear.

Safety messages

• Safety-of-flight technical message concerning engine wiring harness inspection PAS rigging test and collective rate POT test on AH-64A aircraft (AH-64A-87-14, 191105Z Jun 87). Summary: An incident has occurred in which an Apache has experienced an apparent dual-engine, high-side failure. A separate but similar incident has occurred in which the flight crew reduced power after reaching 110-percent NP/NR. Findings indicate that the incident was caused by moisture in the yellow engine wire harness. The moisture was probably introduced by high-pressure water washing of the aircraft. The purpose of this message is to direct removal of the engine yellow harness, check PAS rigging, and perform collective rate POT test prior to next flight. Contact: Lyell Myers, AUTOVON 693-9090, commercial 314-263-9090.

• Maintenance information message concerning time since overhaul (TSO) hours on forward swashplate assembly, P/N 145R3551-1, NSN 1615-01-115-3623; and aft swashplate assembly, P/N 145R3551-2, NSN 1615-01-115-3610 (MIM-CH-47-XSOF-04, 152030Z Jun 87).

• Aviation life support equipment (ALSE) advisory message concerning signal kit distress, foliage penetrate, (L119), NSN 1370-00-490-7392, used in the SRU-21/P survival vest (ALSE 87-4, 161700Z Jun 87). Summary: Armament, Munitions, and Chemical Command is experiencing a shortage of the subject signal kit. The inventory manager has advised that action has been initiated to expedite procurement of the signal kit; however, delivery is not expected until third quarter FY 88. In view of this, a waiver is granted to substitute, using signal kit (L116) type M185, NSN 1370-00-319-7579. Substitution is authorized until such time as the subject signal kit becomes available, not to exceed June 1988. Contact: D. B. Hopkins, AUTOVON 693-3215, commercial 314-263-3215.

For more information on selected aircraft mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

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A. E. Hervey, Jr.
Colonel, Aviation
Commander, Army Safety Center

Helicopters used to treat heatstroke victims

The use of helicopters to provide emergency medical treatment and evacuation came of age during the Korean War, and at the peak of U.S. involvement in Vietnam, there were 116 UH-1 helicopter ambulances in service. Between 1965 and 1969 alone some 373,000 military and civilian casualties were evacuated by Dustoff helicopters.

Another important use of military aeromedical evacuation and rescue helicopter resources is the MAST (Military Assistance to Safety and Traffic) program, which began in 1970. MAST is a joint effort by the U.S. Departments of Defense and Transportation to assist civilian authorities in their efforts to provide swift evacuation to hospitals for people seriously injured in accidents and other patients who without such transportation might not survive.

Still another aspect of the helicopter's role in saving lives is reported in an article by Dr. Thomas J. Poulton and Dr. Richard A. Walker, Anesthesiology/Critical Care Medicine Research Laboratory, Creighton University School of Medicine, Omaha, NE, in the April 1987 issue of *Aviation, Space, and Environmental Medicine*.

The report, "Helicopter Cooling of Heatstroke Victims," describes treatment of three patients with serious heatstroke by spraying them continuously with tepid water (30 to 32° C.) while using the downdraft from a light utility helicopter to dissipate heat, primarily by evaporation and convection. The doctors found theoretical and clinical evidence suggests traditional ice-water immersion is not the best therapy for heatstroke. Also, according to Dr. Poulton and Dr. Walker, the typical air-conditioned hospital emergency department in summer is much too cool an environment for optimal vasodilatation and can only hinder cooling efforts. "We believe that results **do** favor the use of relatively high ambient temperatures to promote peripheral vasodilatation."

Precautions were taken to protect patients' hearing during treatment by use of sound-attenuating muffs. Wet washcloths were placed over the patients' eyes to protect them from dust. Because of the distractions inherent in dealing with emergency situations, medical personnel were cautioned regarding the danger to themselves from the aircraft's rotors. Designation of one person to oversee the safe positioning of all personnel while the helicopter was operating was suggested as a further safety measure.

Under some circumstances, use of helicopters to treat heatstroke patients would be prohibitively expensive or impractical. However, since the greatest likelihood of heatstroke among soldiers is in the field or training environment, where helicopters are likely to be available, this method of emergency treatment is viable and could be used to stabilize the patient before evacuation.

One factor that must be considered is the type of surface available on which to land the helicopter. The helicopter used to treat the patients in this report was sitting on a concrete helipad. Unless an improved landing area is available, safety hazards created by blowing dust and poor visibility might prohibit use of a helicopter for this purpose.

Prevention of heatstroke by curtailing outside activities during periods of extreme heat and humidity, and by stressing the importance of acclimatization and drinking sufficient water, is a responsibility of commanders and supervisory personnel. Keep in mind that even a short period of time spent in air-conditioned facilities; e.g., as little as 2 weeks working in an office, a leave spent in a cool climate, or a brief hospital stay, means personnel will have to become acclimatized all over again.

Heatstroke, like accidents, should never happen in the first place, but if does, and once a person has suffered a heat injury, the likelihood of it happening again is even greater. Persons suffering from heatstroke may be: disoriented, combative, or unresponsive. They stop sweating and skin becomes dry and hot. The victim collapses and remains unconscious, and body temperature sometimes reaches 106° to 110° F. Pupils may be wide open, and muscular twitching is possible.

Heatstroke must be regarded as a life-threatening emergency. Immersing the victim in cool water while awaiting medical evacuation has been the recommended emergency treatment, but according to the report cited, soaking the victim's clothing with tepid water and creating a flow of air by some type of fanning is better. The best means of providing the air movement needed to quickly lower body temperature just might be the nearest helicopter. ■

to maintain adequate attention to obstacle avoidance. His inattention can be attributed to the following:

Lack of experience

When he arrived in-country, he was medically grounded for 2 months because of a broken foot. He received one proficiency flight of 1.7 hours in an OH-58 and did not fly again for about 2 1/2 months, except for 9 hours in an AH-1S. In the 6 months after graduating from flight school, until the day of the accident, he had flown less than 11 hours. Although he was operating an aircraft in an environment with a high density of wire hazards, his lack of flying experience and proficiency in the aircraft caused him to channel all of his efforts toward flying the aircraft and diverted his attention from all the other tasks associated with NOE flying.

Improper supervision

The copilot was marginally proficient in the aircraft because he had not received sufficient or adequate continuation training since his initial utilization assignment to the squadron. The squadron chain of command failed to ensure that he received proper continuation training before being placed in a major field training exercise that required more training and proficiency than the copilot had acquired during his 5 months in-country. ■

Army units in Europe receive OH-58D helicopters

The first shipment of OH-58D Advanced Scout helicopters to Army units in Europe began 11 June when an Air Force C-5A Galaxy, with 12 of the helicopters on board, took off from Amarillo, TX. Deployment of Advanced Scouts to USAREUR will continue throughout 1987.

Accompanying the OH-58Ds were all of the support and maintenance equipment needed to keep the aircraft's high-tech systems combat ready. In preparation for fielding the aircraft in Europe, operations and maintenance personnel had undergone OH-58D training and were transferred to the receiving units in advance of the aircraft.

In 1981, Bell Helicopter Textron was selected winner of the Army Helicopter Improvement Program (AHIP) which called for modification of OH-58As to the Advanced Scout configuration. Production has been completed on the first two lots of 60 aircraft, and 39 Advanced Scouts are currently being modified. A fourth production lot of 36 OH-58Ds will begin in mid-1988.

The OH-58D was developed to provide the Army with a day/night combat aerial scout reconnaissance helicopter capable of surveillance and intelligence gathering as well as laser designating targets for attack by precision guided missiles fired by the attack helicopter and the field artillery. In addition, the AHIP has recently been found to excel in the helicopter air-to-air combat role using onboard air-to-air stinger missiles. To fulfill these roles, existing OH-58s are being modified with dynamic components, target acquisition sensors, and state-of-the-art controls and display systems.

Among the OH-58D's features is an improved tail rotor. This provides accurate and stable heading control in winds up to 35 knots from any direction. The crew can employ the aircraft, taking maximum advantage of the terrain for concealment, without regard to wind direction and do so with safety margins. ■

—Courtesy Public Affairs Office, Bell Helicopter Textron

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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 mishap

H series - The aircraft was observed in low-level flight before it descended out of sight behind a hill. When it reappeared, the aircraft was nose low and rotating about the mast out of control. It then impacted the ground. The crew of four and six passengers were killed. 8742

UH-1 Class C mishap

H series - During final approach, crew heard one loud bang before engine noise ceased. Engine oil pressure was zero and N2 and rotor rpm needles split, confirming total engine failure. Autorotation was begun at about 80 feet agl, 50 KIAS. Aircraft contacted the ground in soft sand with ground run of about 9 feet. Additional damage was caused by hard landing. Investigation into cause of engine failure continues.

UH-1 Class D mishaps

H series - Aircrew had just completed MOC following 25-hour inspection. Crew chief placed aircraft logbook on the center console. Copilot, in right seat, transferred controls to pilot. Rpm was 6600, and throttle was full open. As pilot assumed controls, his attention was diverted outside the aircraft. Copilot reached back, picked up logbook, and placed it on his left knee to record HIT check. Aircraft engine and rotor rpm immediately started to increase. As throttle was reduced, crew noted rpm decreasing through 7000 and saw that the governor switch was in the emergency position. Caused by lack of care in coordinating cockpit runup procedures and inattention as objects were moved around cockpit area.

H series - Aircraft was at operating rpm and preparing to lift off to a hover when all crewmembers smelled smoke. As crew chief got out of the aircraft on the left side, he saw smoke coming from the aft radio compartment. About $9,000 damage was caused by arcing in electrical wires.

UH-1 Class E mishaps

H series - While hovering, aircraft yawed left, then right, 15 to 20 degrees Crew heard 8 to 10 loud reports as aircraft experienced compressor stall. Inlet guide vanes were adjusted, and aircraft was cleared for one-time flight. After aircraft was on the ground, compressor stall reoccurred. Cause is under investigation.

H series - During flight at about 1,000 feet agl, pilot noticed drop in oil pressure and rise in engine oil temperature. As aircraft turned toward airfield, engine oil pressure and engine chip lights came on. Engine oil pressure dropped to zero, and oil temperature went to 93° C. As pilot made approach to an open field, engine power was lost. Pilot completed successful autorotation. Suspect internal failure of accessory gearbox.

H series - During takeoff, pilot smelled fuel and immediately returned to landing zone. Caused by fuel leak at breakaway fitting on fuel filter.

UH-60 Class E mishap

A series - During instrument approach,

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	1-8 Jul	0	0
	August	3	1			
	September	2	2			
	Total for Year	34	27	Total to Date	28	36

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Mishap briefs

moderate to severe vibration developed. A power-on approach was made to an open field, and aircraft made uneventful landing. Caused by excessive radial play in No. 4 tail rotor drive shaft viscous damper.

Attack helicopters

AH-1 Class C mishap

S series - During low-level flight, pilot felt severe vibration in the airframe and flight controls. He verified that he had no master caution or advisory lights before attempting a precautionary landing. The attempt to land was unsuccessful due to the unusual nose-high attitude of the aircraft caused by the 20mm gun being in the full-down position. The pilot brought the aircraft to a hover, placed the master arm switch in the off position, and the vibrations stopped. The pilot then flew to an airfield where maintenance personnel assisted in raising the 20mm gun so that he could land the aircraft. The turret saddle support mount was broken.

AH-1 Class D mishap

S series - Aircraft was hovering on side of hill during tactical training mission. Crew felt vibration in tail rotor and landed. PIC had allowed aircraft to settle into the top of a tree.

AH-1 Class E mishap

F series - While hovering from refueling point, aircraft had sudden loss of engine power. After aircraft landed, FOD screen was found covered with grass. Freshly cut grass around refueling point had collected on the screen.

AH-64 Class E mishap

A series - Prior to taxi, No. 2 engine fire handle illuminated. Fire handle was pulled and primary fire bottle was discharged but fire handle light remained on. Reserve fire bottle wasn't discharged. Engine was shut down and secured and no other indications of fire were found. Maintenance couldn't duplicate fault. Heavy rains had occurred for several days before flight. Same problem had been experienced about 8 months earlier.

Cargo helicopters

CH-47 Class E mishaps

C series - During hover, No. 2 flight boost gauge started to fluctuate from 2500 to 3100 psi. Caused by failure of reciprocating pump.

C series - During flight, Nos. 1 and 2 torque needles split 30 percent during power changes. There were no indications of rpm increase or decrease. No. 2 engine would not respond to normal beep inputs, and emergency engine beep was used to control No. 2 engine. No. 2 engine N2 actuator failed to program properly because of moisture in cannon plug to N2 actuator.

D series - Aircraft was on downwind when crew chief reported utility pump fault light on the maintenance panel. Filter button on utility return module had popped and would not reset. During landing, crew chief heard grinding noise in ramp area and utility pressure surged to 4,000 pounds. Caused by failure of utility hydraulic pump.

D series - No. 1 engine had static beep failure on short final. Engine trim was placed in manual position after aircraft landed. Rotor torque increased to 105 percent rpm, and copilot placed No. 1 engine condition lever in ground position. Engine droop eliminator was out of rig.

Observation helicopters

OH-58 Class A mishap

A series - While hovering during NOE, aircraft drifted right and hit a stump with the right skid. The pilot corrected to the left and the main rotor blades struck the ground. 8743

OH-58 Class B mishap

C series - While flying contour at 60 KIAS and 40 feet agl, the pilot entered a steep turn. As he was coming out of the turn, he increased power but got insufficient response. The low rpm audio and light came on and the pilot leveled the aircraft. Power was applied but response was not sufficient to preclude contact with the ground. The rotor system contacted the sand dunes and separated. The aircraft came to rest between the dunes. 8744

OH-58 Class E mishaps

A series - About 2 miles from departure point, transmission hot light came on, and aircraft landed. After landing and throttle was rolled to engine idle, transmission low pressure light came

on. Aircraft was shut down, and while blades were coasting down, hot warning light went out. Vernatherm control valve had stuck in closed position, causing high oil temperature.

A series - Aircraft was 1,400 feet agl at 100 KIAS. Torque was 74 psi, and turbine outlet temperature (TOT) was 690° C. TOT began rapid increase. Collective was lowered to full-down position to arrest TOT, but not before it had exceeded 850° C. Maximum power available without exceeding TOT limits was 40 psi. Compressor scroll assembly failed, allowing bleed air elbow tube to blow loose.

C series - During takeoff, N2 drooped to about 96 percent and would not recover. After landing, N2 recovered to 98 to 99 percent. Maintenance could not duplicate problem.

C series - During shutdown, crew heard racheting and squeaking noise from main rotor hub. Investigation showed noise was coming from the pillow block bearings. When an attempt was made to grease the bearings, seals popped out. Caused by failure of main rotor trunnion bearings.

C series - During NOE flight, crew felt high-frequency vibration through the tail rotor pedals. Caused by failure of tail rotor trunnion assembly.

Fixed wing

C-12 Class E mishaps

C series - No. 2 propeller feathered as pilot placed power levers in beta range while taxiing for takeoff. Caused by internal failure of primary governor beta valve.

C series - Aircraft was in IMC flight at FL 110, in light rain and no turbulence. Nearest radar indications showed a thunderstorm in progress about 40 to 50 miles away. Crew saw lightning bolt to aircraft's right front, but it seemed to be some distance from the aircraft and there were no indications of a strike. The following day, signs of lightning strike were found on left elevator, right flap, right propeller and engine, and antenna on right vertical stabilizer.

OV-1 Class D mishap

D series - During landing rollout, right main gear locked momentarily, causing aircraft to yaw right. Pilot maintained directional control, and aircraft rolled to stop without further incident. Wheel bolt backed out of wheel and jammed brake assembly. Suspect faulty lock nut.

OV-1 Class E mishaps

D series - Aircraft struck two birds during final approach at 100 feet agl. Numerous birds were in area due to nearby landfill.

D series - After 30 minutes of flight, No. 1 torque indicator went to 115 percent. All other indications were normal. Suspect failure of electronic control box.

U-21 Class E mishap

H series - Aircraft was at 2,500 feet agl, 140 KIAS. When gear handle was placed in down position, right main indicator showed unsafe indication. Gear handle was recycled three times and showed safe indication each time, but prior to landing, right main gear again indicated unsafe. Landing gear down-lock switch was out of adjustment.

Maintenance

OH-58 Class E mishap

A series - During attempt to conduct HIT check, N2 dropped below limits. Pilot reduced collective. Two more attempts were made with the same results. Copilot's collective was improperly installed.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time and recurring inspections for proper grounding of fire warning detector installation on UH-1/EH-1 series aircraft (UH-1-87-06, 231700Z Jun 87). Summary: There has been a case experienced on a UH-1 helicopter of a fire burning in the engine cowling with no fire warning indication. The fire warning "press to test" switch checked functional. Analysis of this problem reveals that the above problem could exist if the fire warning detector loop was not electrically grounded to aircraft ground. The referenced TMs do not require a specific check for this electrical ground whenever the detector loop is disturbed during installation/reinstallation or during a specified time interval. The purpose of this message is to direct a one-time and recurring inspection of the UH-1 fire warning sensor to ensure that it is electrically grounded to the main airframe. Contact: Dick Mooy, AUTOVON 693-9089, commercial 314-263-9089.

• Safety-of-flight technical message concerning one-time inspection of certain tail rotor hub assemblies on all UH-1 and EH-1 series aircraft (UH-1-87-07, 232330Z Jun 87). Summary: Recent investigation has indicated that certain tail rotor hub assemblies, to include yoke and aluminum grip subassemblies, may have remained in service after reaching their retirement life. This message directs a one-time inspection of the tail rotor yoke and grip for serial numbers listed in the SOF message. Contact: Dick Mooy, AUTOVON 693-9089, commercial 314-263-9089.

For more information concerning selected aircraft mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

ALSS-GRAM

ALSE questions and answers

Q. With so much going on in the night vision goggles (NVG) area, where can I get some good information and support to answer my questions?

A. A night vision flying accident prevention kit is available by writing to: Commander, U.S. Army Safety Center, ATTN: PESC-M, Fort Rucker, AL 36362-5363. You will also find articles on night vision goggles in the 11 Feb and 6 May 87 issues of *Flightfax*. We suggest you obtain this published material, and start a file on night vision goggles. Include information from ALSS-GRAM in *Flightfax* and PEARL from *Aviation Digest*.

The Aviation Training Brigade, U.S. Army Aviation Center, is the Department of Army-designated proponent for Army aviation airborne night vision systems—operation and training. Address your questions to: Commander, Aviation Training Brigade, ATTN: ATZQ-ATB-O-NVS, Fort Rucker, AL 36362-5000. The AUTOVON numbers for this office are 558-2864/4630/4632. There is also a 24-hour-a-day hotline available by calling AUTOVON 558-6487.

Q. What is the latest information on the requirement to have survival kits on board for all aircrewmembers?

A. We are presently coordinating a recommended change to AR 95-17. Modular-type survival kits are being developed for utility, observation, and attack helicopters. These survival kits are two- to five-man configurations with environmental modules attached. DT-2 testing of the kits is scheduled for July 1987. Waiver of OT-2 testing is being considered by the Combined Arms Center. Initial operating capability is scheduled for July 1988.

Q. What items of flight clothing are authorized for issue to aircrewmembers?

A. Following are the only items of flight clothing authorized for issue to aircrew personnel:

Item	Climatic Zone
Coverall, flyers, lightweight, sage green	All
Jacket, flyers, lightweight, OD	All
Jacket, cold weather, CVC/aircrewman, OD	All
Jacket, extreme cold, sage green, CWU-45/P	V-VII
Hood, extreme cold, sage green, CWU-17/P	V-VII
Trousers, extreme cold, sage green, F-1B	V-VII

Note:

—The two-piece Nomex camouflage uniform is a developmental item currently in the design stage.

—In the 8 Oct 86 issue of *Flightfax*, Vol. 15, No. 3, we stated that the old two-piece Nomex aviator/tanker uniform which consists of: shirt, hot weather LIN No. T03002 and trousers, hot weather LIN No. X35980, was still authorized for issue to combat vehicle personnel only. However, aircrew personnel may retain and wear the two-piece Nomex uniform until it is unserviceable unless prohibited by local policy. Contact: DALO-TST, Shirley Bryant, AUTOVON 224-7344; AMCPM-ALSE-L, Jim Dittmer, AUTOVON 693-3215.

Q. What can you tell us about availability of cyalume light sticks, and are there any new colors available?

A. A new stick has been developed and is available through GSA. It is 6 inches long and will last for about 12 continuous hours. The sticks are available in white, green, yellow, red, blue, and orange.

Q. What is the status of the ALSE Supervisors Course? Has it been approved to meet the requirements of paragraph 3-2, AR 95-17?

A. A letter from the U.S. Army Aviation Logistics School, ATSQ-TDI, dated 27 Mar 87, approved the course to meet the requirements of paragraph 3-2, AR 95-17. Personnel who have been awarded an additional skill identifier (ASI) of 1F or Q2 are authorized to perform inspections, tests, repairs, and other maintenance on all ALSE. Contact: Boone Hopkins, AUTOVON 693-3215/3817.

Q. We heard that the Army Western Region Aviation Survival School, Vancouver, WA, is in full swing and that they have some good information on uses of parachute suspension cord in survival situations. Can you give us some tips?

A. Whenever possible, carry at least 50 feet of parachute suspension line in your survival kit/vest, or cut the line in pieces and stow in several pockets. Ends can be melted to keep them from fraying, but be careful; this melted material can cause burns much like those from hot tar. Don't waste any of the line; every inch can be used for some kind of survival purpose. Following are some of the ways this parachute suspension line can be used.

- Take pieces of the line apart, and coat with candle wax to make thread for sewing.
- Twist two suspension lines together to make a heavy-duty rope with an approximate tensile strength of 1,150 pounds.
- Use for all kinds of lashing and rigging, in construction of shelters, and in making animal snares or a gill net for fishing. It can also be used for weaving snowshoe webbing and for making harness.

Camouflage the white line by rubbing in dirt, mud, sand, or charcoal, and

remember, don't discard scraps of line in the bush; these telltale signs will be there for a long time.

Lessons learned

Everyone kept telling me to be sure to wear my seatbelt and shoulder harness, but I found them uncomfortable, so I didn't heed their words. My buddy also kept harping at me about it, but I ignored him too. I wish now that I had paid more attention to their concern and listened to what they were trying to tell me. We do have a lot of pretty nurses here in the hospital, but I would give a lot to be back flying missions with my unit and going home at night to my wife and kids. So, a message to the wise, don't fly or drive unless your seatbelt and harness are properly fastened. Take it from me, don't find out for yourself like I did.

ALSS-GRAM 6 8 July 1987

Prepared by the Deputy AMC Product Management Office, Aviation Life Support Equipment, 4300 Goodfellow Blvd, St. Louis, MO 63120-1798, AUTOVON 693-3215, commercial 314-263-3215. Information published generally precedes normal staffing and distribution of Army official policy and is intended as advance information to enhance the critical area of ALSE.

A.B.C. Davis, Jr.
Deputy AMC Product Manager
Aviation Life Support Equipment

Aircrew personnel body armor

Aircrew personnel body armor, small arms protective, front torso, and front/back torso, is currently available in all sizes of assembled items and replacement components. Source of supply is S9T. NSNs are:

Assembled items

Size	Body armor, front torso	Body armor, front/back torso
Short	8470-00-935-3183	8470-00-936-3192
Regular	3184	3193
Long	3185	3194

Replacement components

Size	Vest	Front plate	Back plate
Short	8470-00-999-1473	8470-00-935-3177	8470-00-935-3174
Regular	1474	3178	3175
Long	1475	3179	3176

Cold climate survival kit

The new cold climate survival kit, NSN 1680-00-973-1862, which retains the same NSN of the previously issued cold weather survival kit, is 2 inches greater in depth and has been redesigned to accommodate the larger size of the new arctic sleeping bag, NSN 8465-01-131-7921. This sleeping bag can be packed only in the survival kits manufactured in July 1985 or later. The date of manufacture is stamped on the survival kit.

Users should repack this kit using the same arrangement as when the kit was received from supply. The arctic sleeping bag, NSN 8465-01-131-7921, is vacuum packed in a thin vinyl bag, which is easily damaged. Care must be taken when handling and packing to prevent tearing and losing the vacuum. Should the vacuum be lost, the sleeping bag will swell and become too bulky to repack in the survival kit. Sleeping bags in this condition must be removed and replaced.

We will keep you informed about this equipment through ALSS-GRAM in *Flightfax* and PEARL in *Aviation Digest*. Following are some useful points of contact: Ted Fletcher, Army Support Center, Philadelphia, AUTOVON 444-2525; AMCPM-ALSE, Boone Hopkins, Jim Dittmer, Rainey Bell, or Harlyn Hubbs, AUTOVON 693-3215; *Support Activity Digest*, Vickie Di Domenico, AUTOVON 444-2569.

Small-size survival vest

A small-size survival kit, individual vest type, is now available from DPSC. The new small-size kit is intended primarily for personnel on flying status who are exposed to emergency escape and evasion situations. A replacement component of the kit—the survival vest, SRU-21/P, size small—is also available for replacement purposes.

The new small vest size is designed to fit small-bodied male and female aviators (up to 37-inch chest measurement). The survival kit is authorized in CTA 50-900 under LIN U72733, survival kit, individual vest type. Following is requisition information:

Nomenclature	NSN	U/P	U/I	SOS
Kit, survival, sml indiv vest type	8465-01-174-2355	$226.90	Ea	S9T
Vest, survival, SRU-21/P	8415-01-173-8098	80.05	Ea	S9T

Prop control failure

The OV-1D was in cruise flight at FL 160 when the pilot and technical observer heard an abnormal increase in prop rpm. A crosscheck of the instruments revealed that rpm on both props was exceeding normal limits.

The pilot disengaged the autopilot and reduced power with no effect on prop rpm. Both props were pulsating in and out of the normal range, but No. 2 prop appeared to be worse and the pilot elected to shut No. 2 engine down. When shutdown was completed, the pilot attempted to add power to No. 1 engine, which again resulted in No. 1 prop exceeding normal limits.

At this time, the pilot made an unsuccessful attempt to restart No. 2 engine and notified ATC of his situation. A second attempt to restart No. 2 engine succeeded before the aircraft had descended below 9,000 feet msl.

The pilot continued descent down to 6,000 feet msl en route to home base. No. 1 engine remained at about 15 percent torque, while prop rpm appeared stable at 1600.

About 10 nautical miles from home base, the No. 1 engine experienced an unexpected and sudden prop runaway, exceeding 2000 rpm. The pilot completed shutdown of No. 1 engine and continued to the airfield where he made an uneventful landing.

Contributing factors

Confusion during the initial overspeed indications caused the pilot to select the wrong engine for shutdown.

During the first attempt to restart No. 2 engine, the technical observer was attempting to read restart procedures and the pilot was also talking to ATC on the radio. This may have resulted in an item being omitted during the restart sequence; resulting in an aborted start. The second attempt to restart No. 2 engine was successful.

Result

The pilot's decision to leave No. 1 engine on line resulted in a total overspeed of No. 1 prop. The dash 10 states that the engine will be secured if the prop cannot be controlled, however, the prop appeared to be stable prior to overspeeding.

Causes

- The prop control malfunctioned, allowing No. 1 prop to exceed normal limits.
- Suspect the syncrophaser commanded No. 2 prop to follow No. 1 prop to an out-of-limit condition.
- No. 1 prop control eventually failed, allowing No. 1 prop to overspeed. ■

U.S. ARMY SAFETY CENTER

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A. E. Hervey, Jr.
Colonel, Aviation
Commander, Army Safety Center

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THE SIXTH SENSE OF SAFETY
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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 - Aircraft climbed from 7,000 feet to 9,000 feet msl. About 2 minutes after leveling off, the crew heard a loud bang from the aircraft's rear. The aircraft yawed about 25 degrees, N1 dropped to 80 percent, torque fluctuated to 10 psi, and egt rose above 750° C. Caused by dust and sand from operating in desert environment. Four sets of first-stage compressor blades showed FOD damage and were replaced.

UH-1 Class E mishaps

H series - During unmasking maneuver, crew heard several thuds from engine, and rpm momentarily went to 6700. Aircraft was 30 to 40 feet agl with 27 to 30 psi torque. Caused by compressor stall.

H series - While performing compass swing during test flight, pilot noticed engine oil temperature indicator needle was at the maximum, and transmission temperature gauge indicated 100° C. Postflight inspection revealed a blade on the engine/transmission oil cooler fan had fractured and was lodged against the fan case. During preflight inspection, the fan was freewheeling and appeared serviceable.

UH-60 Class E mishaps

A series - About 10 minutes after takeoff, crew smelled something burning and saw smoke coming from pilot's overhead circuit breaker panel. Short in circuit breaker console resulted in failure of No. 2 dc converter and stabilator. Only damage was to wiring in circuit breaker panel.

A series - As aircraft landed, No. 1 generator failure light came on. Attempt to reset was unsuccessful. Caused by internal failure of generator control unit.

A series - During takeoff, crew felt pounding in airframe and controls. Aircraft was brought to a hover and landed. Antiflap had stuck after becoming unseated from assembly support.

A series - Aircraft was on general maintenance test flight after replacement of main transmission. During vibration check at 140 KIAS, copilot noted transmission oil temperature rising rapidly from 80° C. to 110° C. Caused by failure of main transmission strainer chip detector/temperature sending unit.

Attack helicopters

AH-1 Class B mishap

S series - The copilot was on the controls when the aircraft landed beside a pond after completing day NVG training. The copilot (pilot was wearing goggles) started a built-in test of the telescopic sight unit for the next phase of training. The pilot brought the aircraft to a hover and then noticed the transmission oil pressure was in the lower operating range. While his attention was

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	1 – 22 Jul	2	5
	August	3	1			
	September	2	2			
	Total for Year	34	27	Total to Date	30	41

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Mishap briefs

diverted inside the cockpit, the aircraft drifted right, striking the marshy ground. The pilot could not recover the aircraft before it rolled over. The main rotor, drive train, fuselage, and tail boom were damaged. 8745

AH-1 Class E mishaps

E series - Aircraft was 450 feet agl at 120 KIAS. PI in the front seat was on the controls. N2 dropped to 91 rpm and could not be beeped up, and PI suspected linear actuator failure. Due to airspeed, altitude, and proximity to a dirt strip, the PI elected not to use emergency governor. He traded airspeed for altitude until clear of the forested area and made an uneventful running landing.

F series - During final approach, pilot noticed rpm warning light and brief audio tone. N2 rpm was fluctuating with rotor and N1 normal. IP took controls and landed. Caused by failure of N2 tachometer generator.

S series - Aircraft was repositioning into a mountain saddle during an NVG NOE flight. While in a hover, aircraft increased altitude and student IP reduced power to descend. During power change, crew heard loud report, saw bright flash of light, and the aircraft yawed left. IP took controls, reduced power, and made a right descending turn, using forward cyclic to gain airspeed. Power setting was 40 psi, and tgt was 810° C. There was no suitable landing area in the mountainous terrain, and IP elected to return to airfield. Cause has not been determined.

S series - During cruise flight at 120 KIAS, aircraft nose pitched up rapidly. Stability and control augmentation system (SCAS) was disengaged at pilot's cyclic switch. Roll and yaw channels were reengaged, and aircraft returned to base. During hover to parking, nose pitched down twice. SCAS pitch channel was disengaged throughout. Wiring harness was replaced.

AH-64 Class E mishaps

A series - During OGE hover at firing point, tail rotor gearbox temperature caution light came on. Aircraft landed at rearm pad and light went out. Light did not come on again during test flight back to airfield. Tail rotor gearbox was replaced.

A series - Primary hydraulic oil low caution light came on during landing. Primary hydraulic pump internal seal had ruptured, causing hydraulic fluid to be pumped overboard through pump drain pipe.

A series - During turn from base leg to final approach, crew felt abnormal vibration and noise. Postflight inspection revealed bonding separation inboard from swept tip area of main rotor blade. This had been a recurring defect for over a year, and main rotor blade was replaced.

A series - During flight, No. 2 engine NP fluctuated between 78 and 102 percent with corresponding NR fluctuations. Aircraft landed at rearm point, and maintenance adjusted NP to 100 percent.

A series - While performing NOE flight, crew heard loud, whining noise followed by high-frequency vibration in controls and airframe. Aircraft landed and shut down. No caution lights had come on. APU was run up to duplicate problem, and after about 3 minutes, shaft-driven compressor (SDC) failed, and SDC light came on.

A series - Aircraft experienced hard-over while at 75-foot OGE hover. Aircraft nose pitched down and to the left. Digital automatic stabilization equipment (DASE) dropped off line, and primary hydraulic psi gauge indicated zero. Caused by failure of pressure line from primary hydraulic pump.

A series - After all engine checks were completed during aircraft systems check, NP on both engines began rapid climb. NP and NR reached 110 to 112 percent before power levers could be reduced. Overspeed could not be duplicated.

A series - About 5 seconds after No. 2 engine was placed in fly position during runup, IP heard an increase in engine noise and felt aircraft yaw. IP looked at the NP/NR gauge and noticed both engines were at about 106 percent NP and increasing. IP pulled No. 2 power lever to idle, and rpm returned to normal. IP then attempted to place No. 2 power lever in fly position, and at three-quarters travel, rpm went to 105 percent NP. IP shut down both engines. Maintenance reconnected cannon plug to hydromechanic unit.

A series - During runup, No. 1 engine surged to 104 percent NP three times, and No. 2 engine attempted to follow. Torque and gas producer also increased and decreased accordingly. Problem could not be duplicated.

Cargo helicopters

CH-47 Class D mishaps

D series - While hovering over a gamma goat during an NVG mission, aircraft descended and contacted the vehicle's antenna mount and steering wheel. The crew chief advised the pilots that they were low, but he did not see or feel the load contact. The aircrew was unaware of the contact and completed the mission. Damage was not found during postflight because of its location and the darkness. Supported unit reported damage the next morning. The crew chief did not indicate to the pilot how close to the load he was hovering, and he did not tell the pilots that the hookup crew was crouching, not standing up on the load. The pilot failed to maintain adequate clearance over the load due to poor visual cues. Small holes were punched in underside of aircraft. The antenna mount and steering wheel of M561 were bent and broken.

D series - During formation flight training, pilot felt stiffness in the flight controls. Crew chief found No. 2 hydraulic pressure was at maximum limit, and pilot elected to land. During approach, No. 2 hydraulic pressure increased to 3300 psi. Pilots turned on power transfer unit, which seemed to relieve stiffness, and pressure returned to normal. Maintenance was unable to duplicate problem.

Observation helicopters

OH-6 Class C mishap

A series - While starting engine, pilot did not close throttle in time to prevent turbine outlet temperature (TOT) from exceeding 927° C.

OH-58 Class D mishap

C series - During takeoff from confined area, the pilot saw some leaves fly from a small tree. He immediately landed and found a 2-inch hole that had completely penetrated one main rotor blade. Pilot failed to clear top of tree during takeoff.

OH-58 Class E mishap

C series - Crew smelled fuel during flight, and indications showed higher-than-normal fuel consumption. After landing, fuel could be seen leaking from aircraft's side. O-ring seal in manual fuel shutoff valve failed.

Fixed wing

OV-1 Class E mishaps

D series - During flight at 14,000 feet agl, 160 KIAS, pilot reduced prop rpm from 1600 to 1400. Aircraft shuddered, and technical observer saw flames coming from No. 2 exhaust. All engine and flight instrument indications were normal. No. 2 engine bleed band and variable inlet guide vanes were out of adjustment.

D series - While at 9,000 feet agl, IP put aircraft in nose-high attitude while simulating near-vertical flight. During recovery, IP saw airspeed indicator decreasing from 150 KIAS to zero. As recovery was completed and aircraft resumed level flight, airspeed indicator suddenly increased from zero to 130 KIAS. Erratic airspeed indication was caused by insect larvae in pitot static vent.

U-21 Class E mishaps

H series - After 2 hours of flight, indicator showed fuel in left side was 100 pounds less than in right side. After 3 hours of flight, the difference was 300 pounds. Crew suspected possible fuel loss or leakage and terminated flight. Maintenance recalibrated left fuel gauge.

H series - Predicted takeoff power could not be obtained on No. 2 engine. Bleed air was leaking from the compressor bleed valve.

Maintenance

UH-1 Class E mishaps

H series - While aircraft was at a 3-foot hover during maintenance test flight, crew felt high-frequency vibration in airframe. When left pedal was applied, aircraft started an uncommanded right spin. Test pilot executed hovering autorotation without further damage to the aircraft. Investigation showed No. 3 hanger assembly had sustained internal failure identical to failure of No. 1 hanger assembly on same aircraft about a month before. Investigation showed both failures were the result of intermixing UH-1 and AH-1 hanger assembly parts.

H series - Aircraft was being test flown after tail boom replacement. When MTP turned aircraft's tail into wind for rear hover check, he heard a loud report from the engine compartment. Aircraft made uneventful landing. No materiel malfunctions were found. MTP had inadvertently left deice on, and the maneuver required rapid, maximum power application.

AH-64 Class D mishap

A series - Following rearming, aircraft proceeded to firing point (FP). After firing 30mm cannon, aircraft flew to another FP and engaged a target with 2.75 rockets. The IP noticed rockets were firing from left side only and returned to rearm pad where he was told the right 2.75 rocket pod had ejected. Investigation revealed No. 3 ejector cartridge had fired, but operational check showed voltage was not going through No. 4 ejector firing system. Stores jettison control panel was removed, and wires to No. 4 ejector selector switch were found disconnected. A retaining screw and washer were found in the cockpit area indicating the screws did not vibrate out in flight. No other malfunctions could be found. Wires were reconnected to No. 4 ejector switch, and stores jettison control panel was reinstalled. A stray voltage operational check was performed, and no faults could be found. Apparently, while the aircraft was firing its 30mm gun, the recoil of the weapon allowed the loose wire ends to get close enough to arc or touch, and No. 4 ejector cartridge fired. Suspect maintenance error; however, origin of error has not been determined.

Safety messages

• Safety-of-flight technical message concerning replacement of engine cross shaft bolts on CH-47D aircraft (CH-47-87-06, 092200Z Jul 87). Summary: TB 55-1520-241-20-42 imposed visual inspection and torque checks on CH-47 cross shaft bolts to prevent in-flight failure of the bolts. This procedure has been successful on the CH-47A/B/C models; however, there has been another instance where bolts failed during operation of a CH-47D. The failed bolts were in an adapter that has a rollover of metal (burr) in the bolt holes as explained in cited reference. Corrective action for the CH-47D bolt failure problem is to replace the present hollow cross shaft bolts with stronger solid bolts and to rework the adapters to remove the burrs. This SOF message specifies part numbers for the hollow cross shaft bolts and the replacement solid shaft bolts. Contact: Roger Heidenreich, AUTOVON 693-3738, commercial 314-263-3738.

—For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Stacom

Standardization Communication

STACOM questions and answers

Q. AR 95-1: Army Aviation: General Provisions and Flight Regulations, paragraph 3-20.1, requires aviators to be evaluated during Annual Proficiency and Readiness Test (APART) in each flight crew station at which they are authorized to fly. Does this mean only pilots in command?

A. Paragraph 3-20.1 does not distinguish between pilots in command and aviators who are not pilots in command. It is intended to assure commanders that their aviators are competent to *fly* (actually manipulate the flight controls) the aircraft from the flight crew stations they occupy. If an aviator sits at the copilot station but does not *fly* the aircraft, there is no requirement for that person to be evaluated at the station during APART.

The key phrase is "to fly an aircraft" versus "to fly in an aircraft." To fly an aircraft requires aviator skills, but to fly in an aircraft requires none.

All provisions of paragraph 3-20.7b are applicable to flight crewmembers who actually put their hands on the aircraft flight controls and fly. Before the commander (subparagraph (1)) designates an aviator in writing, authorizing that aviator to fly the aircraft, there must be some evidence that the aviator is, in fact, capable of flying the aircraft from that seat.

All flight crewmembers who log flight time as PI, PC, UT, IP, SP, IE, MP, ME, and XP, and who actually *fly* Army aircraft must be evaluated during APART in each flight crew station at which they are authorized to fly.

Q. I am the unit standardization instructor pilot in UH-1 helicopters. May I log SP time on the DA Form 2408-12 each time I fly?

A. AR 95-1, paragraph 1-19a, lists the *duty* symbols to be used. The emphasis is on the word "duty," not "title." If you are, in fact, performing *duties* described in paragraph 3-27 at all times during each flight, then SP is the correct symbol. However, you are first an instructor pilot who very likely performs instructor and evaluator *duties* to determine other aviators' abilities to fly as a pilot. You may also be an instrument flight examiner whose *duty* is to conduct instrument flight evaluations. When you perform instructor pilot and examiner duties, IP and IE are the *duty* symbols to use.

In the next revision of AR 95-1, paragraph 1-19a, lines 3-5, will be changed as follows: "Only one aviator, occupying a flight crew station, may use any one of these symbols for any time period. Aviators instructing or evaluating from non-flight crew stations will use the symbol for the duty being performed."

Proponent for FM 1-300 is the Department of Enlisted Training, ATZQ-DET-O, Fort Rucker, AL 36362-5000. POCs for questions or information regarding flight records procedures are MSG Sutton and SFC Valdez, AUTOVON 558-2169/2361.

Q. An aviator underwent an APART evaluation in an out-of-country area where no instrument approaches were available. The IE noted on the grade slip that the instrument flight evaluation was not complete but would be completed upon return to the United States. The aviator returned to a stateside installation 46 days beyond the APART period. The commander investigated the situation and was advised that he could not authorize additional time for completion of the instrument flight evaluation because more than 30 days had passed since the end of the APART. What choices did the commander have under these circumstances?

A. Paragraph 3-9a, AR 95-1, provides that the commander will investigate when an aviator's aircrew training program (ATP) requirements are not met and, after investigation, may grant up to 30 additional days to complete requirements. In the case mentioned, the commander investigated the situation when the aviator returned to home station and could have granted up to 30 additional days **or** requested a waiver per paragraph 3-10, AR 95-1, **or** placed the aviator before a Flight Evaluation Board. When a commander becomes aware that an aviator has not met an ATP requirement within the prescribed time—e.g., SFTS requirements, tasks required for readiness level advancement, MACOM-required task, or commander-selected task—that commander may grant up to 30 additional days for completion of the requirement, even though discovery of the deficiency was some time later. The additional time period that may be granted begins after the commander's investigation, which may or may not be at the end of the APART period.

It must be recognized that there are some legitimate reasons that a commander may not know at once that a problem exists. For example, an error made by an IP failing to indicate on a grade slip the completion of a required task. In that situation, the IP is at fault—not the aviator being evaluated. The next revision of AR 95-1 will include a clarification of this information.

STACOM 123 22 July 1987

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.
Colonel, Aviation
Director, DES

Q. How can we contact people in Directorate of Evaluation and Standardization?

A. The mailing address is: Commander, U.S. Army Aviation Center, ATTN: (see list below for appropriate office symbol), Fort Rucker, AL 36362-5000. Telephone numbers are AUTOVON 558- or commercial 205-255-. Following are names and telephone extensions of key personnel.

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ARNG Standardization Advisor	LTC Ferreira	3589
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Plans Officer	CPT Moore	6346
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Cdr, Utility Branch	CPT Barth	2442
Cdr, Cargo/Fixed Wing Branch	CPT Pitt	6066
Cdr, Flight Standardization Branch, National Guard (Eastern Army Aviation Training Site)	MAJ Petrick	AV 235-2042
Chief, Flight Standardization Branch, National Guard (Western Army Training Site)	CPT Bond	AV 853-8542

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Cdr, Internal Evaluation	CPT Twigg	4691

Operations/Resource Management Division ATZQ-ESO		
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Chief, Operations Branch	CPT Nadeau	2244
Chief, Tech Support Branch	Mr Rowe	4691
Resource Management Office	Mrs. Skipper	3617
Admin Officer	Mr Roach	3589

Literature Review Branch ATZQ-ESO-L		
Chief	CPT Kidrick	3029
AR 95-1	Mr Wall	2453
Rotary wing dash 10 and checklist	Mr. Cameron	4770
Fixed wing dash 10 and checklist	Mr James	4603

Halon 1211 fire extinguisher

The following article was written by CW4 Robert J. Rendzio while he was assigned to the Investigation Division, U.S. Army Safety Center. CW4 Rendzio is presently a safety officer assigned to the 3d MI Battalion in Korea.

A lot of people are reportedly unhappy with the small, dry-chemical, portable fire extinguishers because of the cleanup required after their use. On the other hand, the 2 3/4-pound aircraft Halon 1301 (CF3BR) fire extinguisher cylinder must be replaced after it has been used. There is another alternative, however. It is a small 2 1/2-pound Halon 1211 fire extinguisher that is fully rechargeable. Halon 1211, like Halon 1301, is a liquified gas, but there are some significant differences between Halon 1211 and Halon 1301, and it is important that these differences be understood.

Although both Halon 1301 and Halon 1211 are liquified gases (like propane), Halon 1301 will expel as a gas due to its very low boiling point (-72° F), whereas Halon 1211, under most conditions, will expel as 85-percent liquid because it has a much higher boiling point (25° F). In fact, Halon 1211 can be placed in a glass beaker (although it will vaporize in short order). Another Halon agent, Halon 2402, is stored like water because it has a boiling point of 114.8° F. So, what does all this mean?

If, for instance, you have a deep-seated fire or one involving common combustibles, such as paper, then you will certainly want to be aware of the positive attributes of extinguishing agents with a high boiling point, such as Halon 1211 or Halon 2402. Halon 1211 may be a much more practical extinguishment than Halon 1301 for many areas of concern such as vehicles, generators, tent stoves, and so on.

However, although Halon 1211 operates on the same principle as Halon 1301 and all other halogeneated extinguishments by interfering with the chemical chain reaction of the fire, and it has certain other decided advantages

Halon 1211 fire extinguisher

Halon 1211 fire extinguishers are used on Army aircraft and have been approved by the FAA for hand-held spot applications in onboard passenger cabins

over Halon 1301 or dry chemical, there is a price attached. The price, in this case, is toxicity: Halon 1211 is more toxic than Halon 1301. However, let's put this into proper context.

Halon 1301 is presently considered a safe extinguishing agent approved for total flooding systems with human habitation under certain conditions. The synthetic flight training systems buildings are good examples. Halon 1211 is considered in the same category as carbon dioxide for toxicity. In fact, Halon 1211 is approved by the FAA for hand-held spot applications in onboard passenger cabins.

As you can see, extinguishing agents have a wide area of application, and knowing what product to use for a particular job can be very important to you and your unit.

One source for the 2 1/2 pound Halon 1211 fire extinguisher is Buckeye Fire Equipment Company. Units are individually boxed and are warranted by the manufacturer. The unit comes sealed and complete with a bracket and gauges. The NSN is 4210-01-092-4420 and cost per unit is about $21.00. The extinguisher is fully rechargeable and it will certainly complement any unit's field or garrison needs.

Note: Although the 2 1/2-pound Halon 1211 fire extinguisher is rated at 5BC, its lack of a rating for common combustibles is due to the rating system limitations by UL; not because it is ineffective on Class A fires. ■

—U.S. Army Safety Center point of contact is LTC F. Sisk, Research and Analysis Division, AUTOVON 558-3842/5916, commercial 205-255-3842/5916.

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

Rappelling accident injures soldier

The unit was tasked to provide an aircraft and rappellers for a demonstration in support of a joint civil disturbance exercise. The UH-1H was rigged with rappelling equipment and inspected by the rappel master and pilot in command (PIC). It took off at mid-morning with the three-man crew and four rappellers on board and hovered about 1,000 feet to the area where the demonstration was to take place.

The pilot performed an out-of-ground-effect hover check and confirmed adequate power was available to perform the mission. The aircraft was then established at a hover altitude directed by the rappel master and confirmed by the safety officer on the ground.

The pilot reported that the aircraft was stable and the rappellers could exit. Four rappellers, including the rappel master, made a normal exit; then the pilot was informed that a rappeller had been injured.

One of the rappellers had fallen from his rope, approximately 75 feet to the airport ramp surface below. After treatment on the scene, the injured rappeller was transported to a civilian medical center. He suffered permanent total disability from his injuries.

Inadequate training and experience

A "spider bag," which is attached to the rappeller's leg, was being used during this demonstration. The injured soldier, however, did not have an overhand knot tied in the rope he was using on the outside of the bag. The rope passes through a grommet on the bottom of the bag, and there should have been a knot in the rope on the inside and on the outside of the bag.

During his descent, the inexperienced accident victim failed to recognize that he was at the end of his rope. There was nothing to indicate he had ever performed tower rappels using the "spider bag."

Failure to check equipment

The rappel master/safety NCO did not inspect the accident victim's equipment and he failed to detect that there was no overhand knot exposed on the bottom of the victim's "spider bag." He failed to give proper attention to checking the equipment because, just before the rappelling demonstration, he had to give a class to state police personnel on equipment techniques and procedures. The class was being given at the same time the rappel aircraft crew were rigging and readying the aircraft for the demonstration.

Unauthorized equipment

The rappel master failed to use two ropes in the bag and he allowed the use of "spider bags," which is not an accepted procedure.

The unit commander allowed personnel under his command to use equipment and techniques that were not approved: use of "spider bags," single-rope rappelling, nonstandard equipment,

(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 D mishap

H series - Master caution and hydraulic lights came on. Cyclic moved suddenly to left rear quadrant. Aircraft pitched up and rolled left. Running landing was made to dirt field. Right chin bubble, both cross tubes and skids, and lower wire strike protection system were damaged during landing.

UH-1 Class E mishaps

H series - Aircraft was on short final, at 5 feet agl and 10 knots. Tail rotor pedals stuck, with right pedal slightly forward of neutral position. Malfunction lasted for about 10 seconds, then tail rotor pedals broke free. Caused by internal failure of tail rotor servo assembly.

H series - Engine oil pressure light came on. Oil pressure transmitter was replaced.

H series - Noise was heard as aircraft was hovering out of ground effect. Suspect compressor stall.

UH-60 Class D mishaps

A series - As passengers were being secured in rear compartment, rotorwash from nearby hovering UH-60 caught rear right passenger compartment door and pulled it off the hinges.

A series - Pilot was making hovering, pedal turn when he felt a slight bump on aft part of aircraft. Aircraft had hit dead tree. Left outboard stabilator was bent and torn.

A series - Crew heard loud noise during hover. Right main landing gear strut had failed internally.

UH-60 Class E mishaps

A series - Stabilator failed during takeoff. No. 2 stabilator actuator was replaced.

A series - Stabilator failed as tail wheel touched down on refueling pad. Auto control reset corrected the problem. Stabilator failed again 10 seconds later. Aircraft was at flat pitch with stabilator in full-down position. No. 1 stabilator actuator was replaced.

A series - Boost off, SAS off, and No. 2 reservoir low lights came on during flight. Stiffness was felt in controls. Caused by failure of hydraulic pump.

Attack helicopters

AH-1 Class C mishap

F series - Two barrels of M179 gun hit ground during landing. Right rear cross tube was crushed at saddle mount and tail stinger damaged.

AH-1 Class E mishaps

F series - Pilot entered autorotation to verify rotor rpm. N1 speed decreased below idle speed. Pilot opened throttle. N1 continued to zero percent indicated. Aircraft was landed. Suspect fuel control malfunction.

F series - Engine oil temperature increased to 93° C., and transmission oil temperature increased to 105° C. Oil cooler fan assembly was replaced.

AH-64 Class A mishap

A series - At 50 feet agl, rated student pilot announced a flickering shaft-driven compressor light. IP began descent. Both engine fire lights came on during descent. IP landed aircraft, shut down both engines, and activated fire bottles into engines. Both crewmen moved away from aircraft. Aircraft was destroyed by fire. (8746)

AH-64 Class E mishaps

A series - Master caution and hydraulic lights came on during hover. Primary hydraulic psi pressure gauge indicated zero. Caused by ruptured hydraulic pressure hose.

A series - Primary hydraulic low light came on, and primary hydraulic pressure gauge fluctuated during landing. Caused by malfunction of lateral servo solenoid valve.

A series - Skin on white main rotor blade debonded during flight.

A series - Burning odor was detected in cockpit, and smoke was seen coming from rear of aircraft. Postflight inspection revealed excessive oil around shaft-driven compressor area.

A series - Several ground observers heard loud metal-to-metal grinding noise coming from aircraft as aircraft was landing. Caused by failure of shaft-driven compressor.

A series - Pilot felt high-frequency vibration in seat and pedals. Vibration stopped, and crew smelled hot oil from environmental control system. Caused by internal gear failure of shaft-driven compressor.

Cargc helicopters

CH-47 Class E mishaps

D series - No. 1 AFCS and hydraulic boost caution lights came on. After aircraft was landed, hydraulic fluid was pouring from forward pylon over windshield. Suspect leaking actuating cylinder assembly.

C series - Pilot and copilot rotor rpm indicators dropped to zero during flight. Tachometer generator was replaced.

Observation helicopters

OH-58 Class E mishaps

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

C series - When throttle was opened for power recovery during simulated engine failure, rotor rpm began to build. Aircraft was at 400 feet agl in partial decelerative attitude. Collective was increased to stop rotor rpm, but rpm was not controlled until the turbine tachometer reached 113 percent for 1 second. Aircraft was landed without further incident.

Fixed wing

C-12 Class D mishap

D series - Lightning struck No. 2 engine propeller during flight. Aircraft was flying in clouds and light rain. Post-flight inspection revealed damage to prop, outboard flap, and static wick.

C-12 Class E mishap

C series - No. 2 engine chip detector light came on. Engine oil pressure dropped below minimum during landing. Metal chips and fragments were found in engine.

OV-1 Class D mishap

D series - Left brake assembly overheated during deceleration and taxi because No. 1 engine would not reverse. Brake was changed and power lever rod adjusted.

Maintenance

UH-1 Class E mishaps

V series - Fireguard spotted fuel leak in engine compartment during engine start. O-ring on servo fuel filter was replaced. Suspect mechanic pinched O-ring during maintenance.

H series - Engine oil pressure dropped when power was reduced for practice approach. Oil pressure gauge was out of adjustment.

UH-60 Class E mishaps

A series - No. 2 reservoir low light came on. No. 2 hydraulic pump low fluid sensing switch failed due to corrosion of wiring and pins.

A series - Master caution and stabilator lights came on, and stabilator audio activated. Pitch bias was out of adjustment in stabilator amplifier.

AH-1 Class D mishap

S series - Compressor stall occurred as aircraft was repositioning from POL to parking pad. Pilot reduced collective, and aircraft touched down and slid forward on pad. Investigation revealed severe foreign object damage on first stage compressor. Six-inch No. 2 phillips screwdriver, with handle missing, was found. Screwdriver was probably left in inlet section during phase maintenance.

AH-1 Class E mishap

E series - Low fuel light came on at 400 pounds indicated. Aircraft was landed. After 15 to 20 minutes of ground idle, engine quit with fuel quantity indicator showing 160 pounds. Fuel quantity indicating system was out of calibration.

OH-58 Class E mishap

A series - N2 rpm dropped to 80 percent and rotor rpm to 300 during takeoff. Pilot returned to airfield and landed. Airline fitting on engine at fuel control was loose.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time inspection for cracked UH-1H/V and EH-1H/X tail boom attachment fittings (UH-1-87-08, 302200Z Jun 87). Summary: Message directs a one-time additional inspection of tail boom attachment fittings using a 3-power or greater glass, paying particular attention to the upper left fitting. Contact: Dick Mooy, AUTOVON 693-3738, commercial 314-263-3738.

• Safety-of-flight technical message concerning immediate grounding of selected CH-47D series helicopters to replace 3-way hydraulic valves (CH-47-87-08, 160100Z Jul 87). Summary: CH-47D helicopters with serial numbers 86-01635 through 86-01666 are grounded until defective hydraulic valves have been replaced. Contact: Leo Smith, AUTOVON 693-3738, commercial 314-263-3738.

• Maintenance information message concerning UH-1/AH-1/OV-1 shipping reducer plug assemblies for all T-53 fuel controls (UH-1-87-XSOF-05, AH-1-87-XSOF-03, OV-1-87-XSOF-01, 131500Z Jul 87).

—For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	1–29 Jul	3	5
	August	3	1			
	September	2	2			
	Total for Year	34	27	Total to Date	31	41

Rappelling accident injures soldier

no belayman, and no rope on the ground. He was overconfident in his own abilities and those of his men. The unit had inadequate written procedures for the type training conducted during this mission. There were no written procedures in the unit covering the use of "spider bags," and there is no known publication in which use of this equipment is authorized. There also were no training records in the unit.

Lack of communication

There was a lack of communication between the rappel master, the unit commander (who was the ground safety officer), and the PIC of the aircraft.

The unit SOP required that the rappel master be connected to the aircraft intercom system, but he wasn't. Therefore, the PIC did not have direct communication with the rappel master. After the helicopter was underway, the rappel master was communicating with the pilot through the crew chief. Once the aircraft was established at the rappel site, the rappel master indicated the aircraft was too high and told the pilot he wanted an altitude of 90 feet. He received an okay through the crew chief. The pilot adjusted altitude, and both the rappel master and the ground safety officer confirmed the altitude was satisfactory. The rappel master participated in the rappelling demonstration, and once he exited the aircraft, there was no further communication between him and the pilot.

The rappel master had not told the pilot that "spider bags" would be used in the demonstration, and nothing was said during the safety briefing about using the bags. The pilot assumed the rappellers were using deployment bags or had ropes on the ground. He had performed rappelling operations in the past, and there had always been ropes on the ground. The pilot was overconfident in the rappel master and the ground safety officer. He took their word that the altitude of the aircraft was correct for a safe rappel operation, and he did not believe that he had to verify the altitude. The aircraft was, in fact, about 150 feet agl when the rappellers exited.

During the rappelling demonstration, the unit commander told the PIC the altitude looked good and to go ahead with the mission. He misjudged the distance and was overconfident in the PIC's ability to ensure the aircraft was at the correct height.

There was also a lack of communication between the unit and its higher headquarters. The battalion headquarters did not approve or know that the unit was using "spider bags." ■

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Report of Army Aircraft Mishaps

Unqualified for mountain flight

The PIC of the ATM training flight had accumulated a total of 1,508 military flight hours, all but 94 of them in rotary wing aircraft. He had 1,201 hours in the UH-1H—467 as an IP in the aircraft. The copilot had 1,486 rotary wing hours—933 in UH-1Hs. During the flight, the crew would be providing orientation rides for a group of cadets.

The UH-1H with the two pilots and two cadets already on board took off and proceeded to another location where they would pick up a senior advisor. The altitude at that point was 7,200 feet. After picking up the advisor, the crew performed an out-of-ground effect hover check before continuing on to the base camp where the other cadets were undergoing survival, evasion, resistance, and escape (SERE) training. The elevation in this mountainous region was 9,050.

The orientation rides would be conducted with two cadets on each trip in addition to the five people already on board. The first six orientation rides, lasting about 5 minutes each, were conducted in a low-level flight terrain mode. The seventh flight, with the last two cadets on board, was to be a short NOE flight.

The PIC, in the left seat, was at the controls. The aircraft was picked up to a 5-foot hover for a power check, which required about 35 pounds of torque. That was actually the maximum power available for the UH-1's engine while operating in this mountainous area, but neither the PIC nor the copilot was aware of this fact.

The aircraft turned east, departing over about 150 meters of open terrain before the beginning of a forest of 40- to 50-foot trees. At the start of the tree line, the PIC slowly flew the aircraft above the trees and continued up a small draw. After about 250 meters of NOE flight over the trees, he slowed the aircraft to demonstrate an unmasking and remasking maneuver.

As the aircraft descended to about 20 feet above the trees, during the remasking maneuver, it began an uncommanded, right yaw. At the same time, the low rpm warning light came on, and the audio sounded. The crew and passengers also noticed a decrease in engine noise.

The PIC called out "engine failure," as he followed the right turn with cyclic and leveled the aircraft. When the copilot heard the pilot announce engine failure, he moved the governor switch to the emergency governor position. There was no engine response to the emergency governor, and the PIC told the passengers the aircraft was going to crash into the trees and to assume the crash position.

The aircraft rotated about 360 degrees to the right in a level attitude. Full collective was applied to decrease rotor rpm before the aircraft entered the trees. The UH-1 crashed through the trees and struck the ground in a nose-low attitude. The tail of the helicopter caught and hung on a tree as the aircraft came to rest.

The aircraft came to rest in a 10-degree nose-low attitude with 10 degrees right roll. It was at the bottom of a small draw in 40-foot trees. All personnel got out of the aircraft unassisted except the senior advisor, who was dazed and required assistance.

This accident was caused by human error on the part of the PIC. He made an improper decision to conduct the flight into a mountainous area, a mode of flight that he had not been cleared to perform nor was qualified to conduct. The unit to which he was assigned did not have a mountain support flight mission; therefore, the unit PICs were not evaluated in the performance of mountain flight operations or the planning to conduct such a mode of flight.

The PIC made an improper decision to conduct the mountainous flight due to overconfidence in his abilities and in the aircraft's capabilities to operate in the high-altitude environment. He was relying on past mountain flying experience during a previous assignment where he had operated from sea level up to 6,000 feet msl. Not having been qualified, nor mountain oriented in his current flying area, he lacked an appreciation for the increased criticality of performance planning for operating in elevations at the 9,000-foot level, which always significantly affects aircraft performance for the UH-1 aircraft. As a result, while attempting an OGE maneuver at high density altitude, under high-pressure altitude conditions, he lost control of the aircraft and crashed.

The PIC failed to follow the proper procedures prior to conducting nap-of-the-earth flight. He failed to properly compute the aircraft performance data for the intended flight and then failed to confirm the aircraft performance capabilities before conducting NOE flight maneuvers. He computed the aircraft performance data for the area of takeoff and not for the area of intended landing. Additionally, he conducted the OGE hover check at 6,000 feet msl and considered it sufficient for the conduct of NOE flight at 9,180 feet msl. The aircraft was being operated at about 7,400 pounds gross weight, at a pressure altitude of 8,850 feet msl, and a temperature of 23° C., which translates to a density

(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 A mishap

H series - Radio contact was lost after aircraft crew reported they were aborting the mission due to bad weather conditions. Six people were killed, and one was seriously injured when the aircraft flew into a hill. 8747

UH-1 Class E mishaps

H series - Left boost pump failed 40 minutes into flight, and right boost pump failed after 1 hour and 10 minutes of flight. Failure of boost pumps to supply fuel over flapper valves apparently caused fuel starvation, and engine rpm began decaying below 6200. Increase/decrease switch was used to increase rpm to 6350 before rpm again began decaying. Needles split and maintenance test pilot made successful touchdown with partial power loss.

H series - After leveling off at 1,500 feet agl, IP noticed N2 was 6650. When he attempted to beep N2 down, severe compressor stall occurred. Engine surged violently three or four times, and crew heard loud banging noise. N2 fluctuated between 6200 and 6600, and exhaust gas temperature fluctuated between 520 and 580. IP began autorotation, terminating with power to an open field. During descent and landing all engine indications were normal. Suspect fuel control malfunction.

H series - During cruise flight, crew heard a noise from rear of aircraft. Aircraft yawed right and developed vibration. Rpm bled off between 5900 and 6000, and copilot began emergency procedures. Pilot landed aircraft under partial power conditions.

H series - During flight at 4,000 feet msl with approximately 27 pounds of torque, crew heard several loud raps, and aircraft yawed left about 20 degrees. Pilot lowered collective, and noises and yawing ceased. Aircraft made shallow approach and running landing with minimum power. Caused by malfunctioning of engine fuel control.

M series - When throttle was reduced to engine idle upon entering autorotational descent, clutch failed to disengage. Maintenance could not duplicate.

UH-60 Class D mishap

A series - During one of several landings to an unimproved LZ, crew apparently failed to correctly estimate depth of foliage and allowed aircraft to strike an unseen object. Ten-inch puncture and cracked stringer were discovered during postflight inspection.

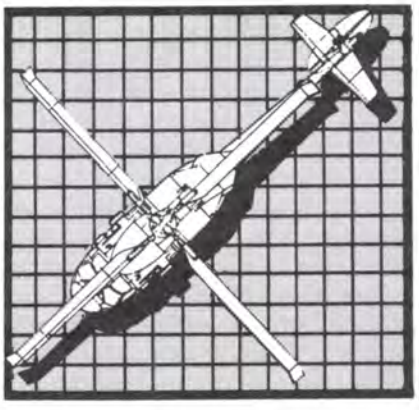
UH-60 Class E mishaps

A series - Crew felt vibrations when power was applied during climbout. Anti-flap bushing had broken loose from anti-flap cam. Aircraft was released after bushing was reseated.

A series - During final approach, No. 1 reservoir low and No. 1 tail rotor servo lights came on. Pilot executed emergency procedures, placing tail rotor switch in backup position and switching backup pump on. Backup system failed to function. Pilot entered autorotation, placing power levers in off position. Aircraft yawed right, making about three slow 360-degree turns; then right yaw stopped, and aircraft made uneventful landing. Right relay panel was replaced.

A series - Engine torque indicator split, rpm on both engines fluctuated, and main rotor rpm increased and decreased. PIC placed No. 1 power control lever in lockout position, set No. 1 engine torque 10 rpm below No. 2 engine, and landed. Caused by failure of engine control unit.

A series - Aircraft was being operated on the ground with controls in flight position when pilot noted failure of No. 1 ac generator. Pilot reset the generator, and all instruments were green. Then the main module oil temperature gauge showed 170° C., main module oil temperature light came on, and smoke was seen coming from left side of hydraulic deck. Pilot shut down, with APU running for about 2 minutes, and main module temperature never went below 170° C. Left input module was a brown color, all plugs were melted, and oil was leaking out. No. 1 accessory module changed color, paint was blistered on main module in some places, and oil from the main module was light brown. Cause unknown; investigation continues.



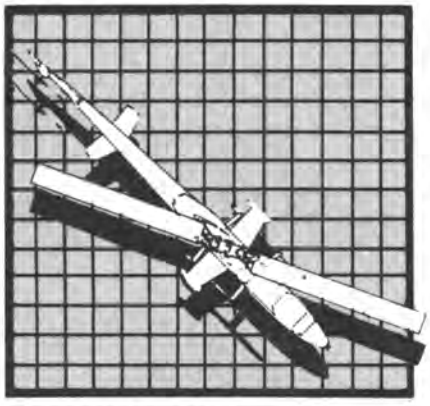
A series - During OGE hover check, No. 2 converter, pitch bias actuator, stabilator and No. 2 stability augmentation system lights came on. Relay activated after about 30 seconds, and No. 2 generator caution light came on. Transmission oil pressure momentarily dropped to 30 psi and recovered. Crew started APU after attempting to reset generator and made uneventful landing. Maintenance replaced magnetic contactor in No. 2 junction box.

Attack helicopters

AH-1 Class A mishap

F series - Aircraft was in a low-altitude 45-degree right turn at high airspeed when it descended to ground level. Pilot leveled aircraft before impact, but aircraft

hit hard and skids separated. Aircraft rolled two or three times before coming to rest 300 meters from initial impact point. Aircraft was totally destroyed, but both crewmembers got out of the aircraft unassisted. 8748



AH-1 Class C mishaps

F series - Crew positioned for hover fire during NVG gunnery mission. Torque indication was 86 rpm, and go-no-go was predicted at 89 rpm. PIC, who was on the controls, did not have proper reference points for hovering at 100 feet agl under NVGs. PIC sensed rearward movement of aircraft, and vertical speed indicator showed 300 feet per minute (fpm) rate of descent. PIC transitioned to instruments to stop descent and established climb of 100 fpm, causing overtorque of 118 rpm. Aircraft landed 200 meters from firing position. PIC failed to maintain ground reference points and exceeded aircraft limitations in his attempt to stop excessive rate of descent.

S series - A light fire team had passed the first checkpoint on an NVG cross-country navigation training mission. The second checkpoint was a grass strip located at the base of a ridgeline and about one-quarter mile from a set of high-voltage power lines. As the team approached the checkpoint, the pilots began experiencing decreasing visibility through their goggles due to haze, and they could not identify the checkpoint or the high-voltage lines they knew were there. The lead aircraft, with the AMC aboard, called for a left 180-degree turn, heading back into the valley in order to allow the pilots to reorient themselves and to visually locate the wire hazard. After the lead OH-58 completed the turn, the AH-1 began a left descending turn and struck the top wires of the wire hazard, breaking one of the high-voltage wires. The crew twice attempted to land in the immediate area but were unsuccessful due to extremely dusty conditions. The aircraft returned to home base, where it made an uneventful landing.

AH-1 Class D mishaps

F series - During hover fire at 45 feet agl, the pilot fired a pair of rockets, and the crew heard a loud bang from the stores area. The IP, in the front seat, confirmed one rocket had not completely left the pod. The aircraft landed, and the damaged rocket pod was removed. The rocket motor had exploded while the rocket was still in the tube.

F series - Fuel handler attempted to disengage CCR nozzle with an up-and-down rocking motion, causing retainer ring rivets to shear.

AH-1 Class E mishaps

E series - During postflight, a 12- by 18-inch section of main rotor blade skin was found missing. Suspect when aircraft was run up for flight, cooling action following period of high temperatures caused skin to separate.

E series - During last 50 feet of approach, rotor rpm bled off to 70 percent and remained there until aircraft was on ground. After aircraft was on ground, collective was lowered to full-down position, and N2 and rotor rpm increased to 100 percent. When collective was increased, N2 and rotor rpm bled off again. Governor switch was placed in emergency position, and aircraft was hovered to parking area. After parking, governor switch was placed back in auto position, and N2 and rotor rpm returned to 100 percent. When power was reapplied, bleedoff could not be duplicated.

F series - After experiencing a transmission oil bypass light, aircraft was cleared for one-time flight from field site. When switch was tapped, light had gone

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	July	2	5
	August	3	1	1-5 Aug	2	0
	September	2	2			
	Total for Year	34	27	Total to Date	32	41

out. During flight, transmission oil temperature began slow rise to 110° C., transmission oil hot light came on, and aircraft landed. Cause is unknown.

F series - Aircraft completed successful runup and HIT check in preparation for ferry flight. While hovering in takeoff position, aircraft experienced two moderate compressor stalls. Egt rose 100°, and N1 and torque fluctuated. Possible cause was compressor blade erosion.

F series - During engine troubleshooting for high HIT test, aircraft was flown to 10,000 feet msl for TEAC. Aircraft had been refueled 30 minutes prior to flight. As it passed through 6,000 feet during descent, master caution light flickered with no segment light. Then low fuel light came on, and the gauge showed 280 pounds. Cause unknown.

F series - While hovering at 15 feet agl during route recon, aircraft engine had severe compressor stall, and engine rpm dropped from 100 to 87 percent. Engine recovered at about 5 feet, and aircraft landed safely. Cause unknown.

F series - During hover fire under NVG, display unit went off line. PIC, in back seat, was on controls. While his attention was diverted inside cockpit to identify why rockets would not fire, the aircraft started to descend. Torque indicated 104 rpm for 1 second as power was applied. PIC did not properly divide attention between firing and flying.

F series - While returning to FARP as single ship in NOE flight, pilot became disoriented. While he was attempting to orient himself on the map, low fuel light came on. Aircraft was two minutes from FARP, but PIC decided to land immediately. Caused by failure to properly manage fuel usage.

F series - Engine compressor stalled during landing. Crew heard one loud bang, and tgt was 810° to 860° C. No other indications were noted, and no limitations were exceeded. Maintenance is investigating cause.

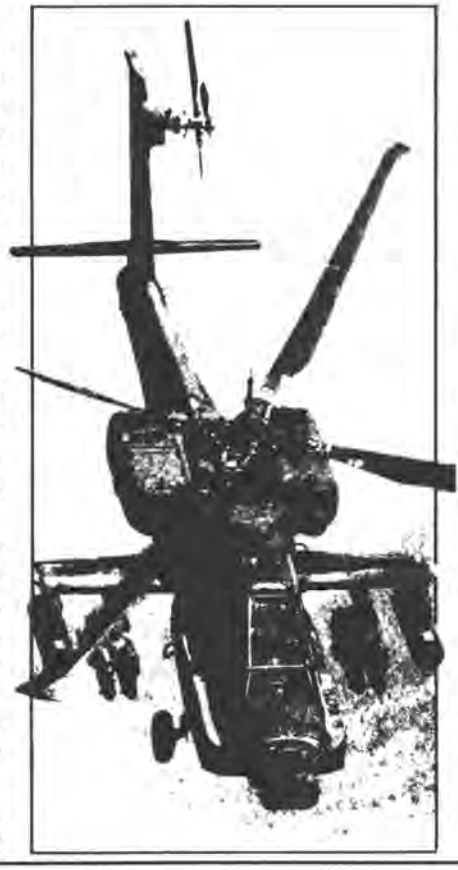
F series - Aircraft was on cross-country training/familiarization flight with crew chief occupying front seat. Pilot landed in a field to wait out a rain shower. After weather cleared, pilot positioned aircraft for takeoff. During maximum takeoff from a hover, crew heard a loud bang and felt severe vibrations in the aircraft and pedals. Pilot reduced power and landed. After landing, pilot noticed tgt dropping through 820° C. ECU and deice were off, and no N1 fluctuations were noted. Maintenance suspects primary cause of compressor stall was dirty engine.

F series - During NOE flight, tail rotor pedals stuck momentarily then returned to normal. Caused by failure of servo cylinder assembly.

S series - During OGE hover check, crew heard three loud bangs. Torque was 48 and tgt was 800° C. Suspect engine compressor stall.

AH-64 Class B mishap

A series - During refueling operations, main rotor blades suddenly flexed full down and contacted top of pilot night vision sensor turret, damaging main rotor blades and shattering top of turret. 8749



AH-64 Class D mishap

A series - During runup, gun light was on. When CPG actioned gun to clear light, barrel slewed to right stop and down, striking the ground. Caused by internal failure of fire control computer.

AH-64 Class E mishaps

A series - During taxi to parking, crew heard loud, high-pitched whine and about a minute later smelled burning odor followed by a shaft-driven compressor (SDC) light. After shutdown, smoke and oil were seen coming from catwalk area. Caused by failure of SDC.

A series - Aircraft was at cruise altitude, 90 KIAS, en route to a field site. Manual stabilator light came on, followed by audio warning. Stabilator was reset, producing only 5 percent trailing-edge-down condition. Manual control could not be effected. Caused by internal failure of No. 1 stabilator controller box.

Cargo helicopters

CH-47 Class C mishap

D series - Aircraft was being run up with both engine condition levers (ECL) in flight position. Normal engine beep was activated to increase rotor rpm to 100 percent. No. 1 engine failed to respond. PIC attempted to increase No. 1 engine by using emergency engine trim. No. 1 engine accelerated to 105 percent N1, and copilot pulled No. 1 ECL to stop. No. 1 engine shut down normally, and No. 2 engine ECL was placed in ground position for cool down. During cool down, rotor continued to decay to below normal ground rpm. Copilot pulled No. 2 ECL to stop, and the crew heard a loud crunching sound as rotor stopped. Postflight revealed No. 2 engine cross shaft had twisted into two pieces. Suspect failure of No. 2 engine transmission sprag clutch. Reason for No. 1 engine highside is undetermined.

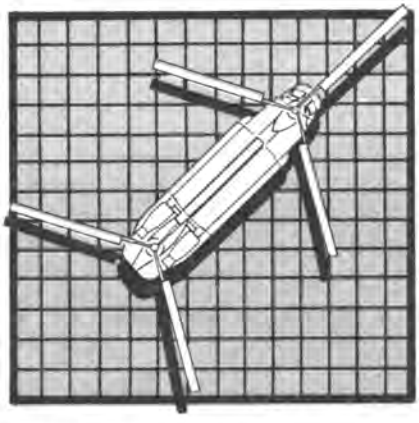
CH-47 Class D mishaps

D series - During postflight, a 7- by 10-inch hole was found in belly of aircraft. Suspect aircraft landed on small stump while operating in unimproved area of tall grass.

D series - During external hookup operation, crew chief called aircraft into

Mishap briefs

position for forward hook. He told pilots forward hook was hooked and to continue forward and down to reposition aircraft for aft hook. While repositioning, the forward sling came off the forward hook, and the hookup man tried to rehook the forward sling. The crew chief was not aware of what was happening because he was looking at the aft hook. The forward hookup man was slightly injured when the aircraft settled on top of him.



CH-47 Class E mishap

D series - During engine runup, No. 2 engine started to run away above 63 percent. Engine was shut down at 75 percent N1. Cannon plug and actuator were checked and appeared to be functioning normally. Restart was attempted, and engine stabilized at 62 percent N1. No. 1 engine was started, and engine condition levers were moved to flight position. No. 2 engine began to run away, and engines were shut down. Caused by failure of N1 actuator.

Observation helicopters

OH-58 Class E mishaps

C series - During straight-and-level flight at 90 KIAS, both crewmembers noted decrease in engine noise, and N2 dropped to 94 percent. Increase/decrease switch was beeped up with no effect, and N2 remained at 94 percent. Pilot began power-on autorotation and made a running landing. Maintenance suspected linear actuator malfunction but could not duplicate problem.

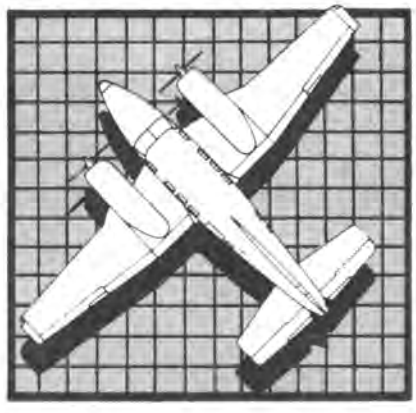
C series - During hover check, turbine outlet temperature (TOT) gauge went to 1,000° C., and remained there. All other instrument indications were normal. Internal malfunction of temperature indicator caused abnormal TOT indication.

A and C series - Fuel boost pumps failed on eight aircraft.

Fixed wing

C-12 Class E mishap

C series - During flight, crew heard a muffled pop, and white smoke began coming from left corner of overhead panel. Smoke subsided when generators and battery were turned off. Resistor for fluorescent lighting system had burned out.



U-8 Class E mishaps

F series - When gear switch was placed in up position on takeoff, aircraft experienced total electrical failure. Gear was handcranked down, and aircraft made uneventful landing. Caused by failure of voltage regulator.

F series - When landing gear was lowered, nose and left main gear indicated down and locked, but right main gear showed in transit. Recycling had no effect, and emergency gear extension was performed. Landing gear downlock switch was out of adjustment.

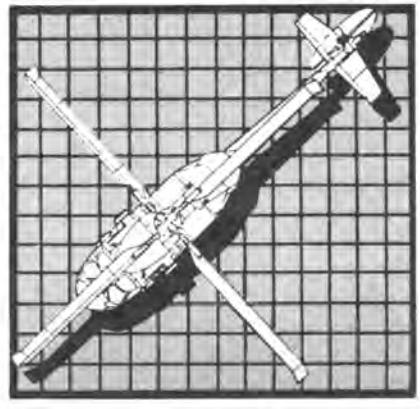
U-21 Class E mishap

A series - After No. 2 engine was started, N1 would not idle lower than 72 percent. Caused by failure of fuel control unit.

Maintenance

UH-60 Class E mishaps

A series - While returning to FARP for fuel and sling pickup, master caution, No. 2 reservoir low, boost, flightpath stabilization, trim and stability augmentation system lights came on. Left cannon plug had been left loose, causing false indications.



A series - During engine runup, No. 2 generator caution light came on and would not reset. Wire bundle to generator control unit (GCU) had chafed through insulation, shorting out GCU.

U-21 Class E mishap

H series - Predicted takeoff power could not be obtained on No. 2 engine. Overspeed governor was improperly rigged.

Safety messages

• Safety-of-use operational message concerning use of 10,000-pound apex fitting/clevis, NSN 4030-01-048-4045, with the cargo hook on the UH-60A helicopter (SOU-UH-60A-87-01, 231700Z Jul 87). Summary: During a recent field exercise, a problem occurred with a UH-60A helicopter slingload operation. The sling clevis worked its way under the cargo hook keeper, and this could have resulted in the slingload being inadvertently dropped. The possibility of this occurrence applies to the cargo hook on the UH-60A helicopter only. Contact: Roger Heidenreich, AUTOVON 693-3738, commercial 314-263-3738.

—For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Unqualified for mountain flight

altitude of 11,790 feet msl. The aircraft was 500 pounds over gross weight for the OGE hover attempted. The torque required to perform the maneuver was 38 pounds psi, and the maximum torque available was 35 psi. The crew did not compute the power required, and therefore, they were unaware that power was not available, or that the aircraft was over gross weight for the density altitude.

The PIC failed to follow the proper preflight planning and perform a pre-NOE performance check due to inadequate motivation. As a PIC entrusted to "ensure that the aircraft limitations and capabilities are not exceeded for the entire flight," he elected to conduct the entire flight using maximum power available numbers, based only on data for the departure airfield, which was 5,187 feet msl. While attempting an OGE hover at 9,180 feet msl, the power required to perform the maneuver exceeded the power available from the engine, which resulted in engine/rotor rpm decay and an attendant loss of tail rotor effectiveness and a subsequent crash.

At the onset of the emergency, the PIC thought he had an engine failure and that is what he told the copilot. However, the description of the events that occurred: right yaw, reduction in engine noise, an attendant loss of rotor and engine rpm, and activation of the low rpm visual and audio warning, did not substantiate that. These are indicators of loss of tail rotor effectiveness as outlined in chapter 9, Emergency Procedures, of the operators manual. The aircraft definitely yawed right. The loss of tail rotor effectiveness is attributed to the loss of rotor rpm due to engine bleed down because the power demanded exceeded power available. An engine malfunction, partial or complete, is accompanied by a left yaw.

The mission was improperly approved because of inadequate information provided to the unit operations officer by the PIC. The operations officer improperly approved the mission because of overconfidence in the PIC. He was on full PIC orders, had previously been a UH-1H IP, and was reputed to have performed well above average on all previous evaluation rides. Knowing all of this, the operations officer felt no need to question the route of flight, destination, capabilities, and qualifications before approving the mission.

Although he was the mission approving authority, he did not request additional information on the exact location of the SERE training area because of his overconfidence and trust in the PIC. The PIC was fully aware that the SERE training area was in a mountainous region, but he did not request a "mountain flight." He only asked if the SERE training area was an approved flying area. The operations officer told him that if the SERE training area was within the boundaries of the military reservation, it was an approved area. The fact is, while the SERE training area is located on land leased by the government, it is outside the military reservation boundaries.

The operations officer assumed that the SERE area being discussed was one that he knew to be located on the cantonment area. He based his decision to approve the flight on this assumption. He also knew the unit did not presently have, nor had they recently had, a mountain flying mission. There were no pilots qualified for mountain flying, and the unit IP was not current. This may explain why he did not give consideration to the area under discussion being in a mountainous area. ■

U.S. ARMY SAFETY CENTER

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Report of Army Aircraft Mishaps

Followups

Additional information on mishap briefs previously published

UH-1 Class A mishap in 23 Jul 86 issue (8637) □ While attempting an out-of-ground-effect hover in an over-gross-weight condition, 60 feet agl, at a field elevation of 9,180 feet, with zero airspeed, the aircraft entered an uncommanded right turn. The right turn was immediately followed by a low rpm audio and light and a corresponding decrease in engine noise and rpm. The pilot, unable to stop the turn, followed the turn with cyclic for 360 degrees, leveled the aircraft, and applied cushioning pitch at treetop level. The aircraft hit the ground in a right nose-low attitude and was destroyed. Five of the seven occupants received minor injuries.

UH-1 Class A mishap in 20 Aug 86 issue (8645) □ The aircraft was in cruise flight at 1,200 feet agl, 110 KIAS, when the crew heard a loud grinding noise, and main rotor rpm decayed. The input pinion gear of the main transmission had failed. The crew initiated a precautionary landing, and before the aircraft reached the ground, the transmission chip detector light came on. The copilot, who was on the controls, placed the aircraft in a 60-knot deceleration attitude. At about 200 feet agl, the aircraft began to fall vertically, and the helicopter struck the ground in a slightly nose-low, left-side-low attitude. The aircraft remained upright after initial impact. The grinding noise had increased throughout the descent, accompanied by a yawing motion. The rebuild facility had installed a shim for the bevel-driven gear, which was too thick and was overtorqued to a point where it lost dimensional integrity. This resulted in undesirable wear and eventual fatigue failure of the input pinion. During the impact, the unauthorized crew/cargo assist steps installed on this aircraft increased the forces to which the occupants were exposed and rendered the left cargo door inoperative. The steps did not allow the landing gear and airframe to collapse as they are designed to do, thereby attenuating impact forces. In addition, when the left step failed, the support arms were driven through the cargo door, pinning it in the closed position.

AH-64 Class A mishap in 23 Jul 86 issue (8640) □ The aircraft had landed to wait out a rainshower, which was approaching the field from the south. The engines were running with the rotor operating at 100 percent rpm and full-down collective applied. The intensity of the storm rapidly developed into unforecast severe weather consisting of torrential rain, hail, and extreme downdraft-induced, diverging horizontal wind gusts (microburst) to over 80 knots. Winds were turbulent and erratic with rapid shifts of 180 degrees. These conditions caused extreme flexing of the main rotor blades, which then struck the aircraft at the front cockpit and tailboom. Both pilots received head injuries from being violently jolted against the interior of the cockpits during the accident sequence. The IP, in the front cockpit, shut down the engines and got out of the aircraft unassisted. The student pilot, in the rear cockpit, was assisted from the aircraft by crash rescue personnel. The aircraft was totally destroyed.

T-41 Class A mishap in 24 Sep 86 issue (8651) □ The pilot was attempting to land at a civil airport with a long, narrow, upsloping runway. His first attempt resulted in a bounced landing and go-around. On his second attempt, after rounding out, the aircraft began drifting left, and the pilot applied full power to go around again. He failed to reduce pitch attitude and properly counter the effects of engine torque in accordance with the T-41B ATM, Task 3005: Perform Stalls and Recoveries. The aircraft pitched up and rolled left off the runway. The left wing struck the ground, and the aircraft cartwheeled out of control, coming to rest upright. The pilot and both passengers were injured. The pilot failed to lower the nose and apply rudder because he had not been trained to recognize and recover from accelerated and/or takeoff configuration stalls; conditions that most closely approximate his situation during the attempted go-around. In addition, the pilot's failure to reduce pitch attitude was probably influenced by his close proximity to the ground and he could not overcome his natural desire to get away from the terrain by pulling back on the yoke to climb, rather than lowering the nose to a level position toward the ground.

RG-8 Class A mishap in 24 Sep 86 issue (8650) □ During climbout at approximately 150 feet agl, the crew allowed an excessive angle of attack to develop. As a result, the aircraft encountered wing rock, departed controlled flight, and impacted the ground in a left-wing-low attitude. The crew failed to notice the degrading flight conditions; i.e., decreasing airspeed, in sufficient time to maintain control of the aircraft.

T-42 Class A mishap in 16 Jul 86 issue (8636) □ Upgraded from Class B. During final approach, the IP received clearance from the tower for the "option." The pilot heard the clearance, which can mean a landing or go-around. The IP

(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 - Shudder was felt in airframe, accompanied by engine compressor stalls. Engine rpm dropped, and aircraft was autorotated to landing. Caused by engine failure.

H series - Crew smelled odor and landed. Smoke was seen coming from battery vent and compartment. Caused by overheated battery.

H series - N2 tachometer indicator went to zero. Caused by failure of indicator.

H series - Master caution and chip detector lights came on. Caused by failure of 90-degree gearbox.

H series - During hover, fuel was seen dumping overboard with auxiliary pump on. Wiring on auxiliary forward cutoff relay was replaced.

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

UH-60 Class D mishaps

A series - Crew chief heard noise and thought passenger had dropped something on the floor. Postflight inspection revealed left step access panel had separated from aircraft. Suspect fastener on fuselage access panel vibrated loose in flight.

A series - Main oil temperature rose to 105 degrees, and oil pressure dropped to 30 psi. Caused by overheated main transmission accessory gearbox and input module.

A series - As aircraft touched down, tail wheel struck tree stump, cracking tail yoke assembly and deflating tire and strut assembly.

A series - Aircraft crossed ridgeline and began descent to valley floor. As closure rate increased, power was applied. Tail wheel hit the ground as aircraft fell through. Tail wheel assembly was damaged. Copilot allowed aircraft to build up excessive sink rate and could not recover in time. PIC was on the map and did not realize what was happening until aircraft hit the ground. Crews were not briefed on the weather advisory concerning light to moderate turbulence from surface to 10,000 feet for category 2 aircraft.

UH-60 Class E mishap

A series - When collective pitch was reduced for landing, pilot noticed No. 1 torque indicated zero. Caused by broken No. 2 load demand spindle bracket on accessory gearbox.

Attack helicopters

AH-1 Class E mishaps

S series - Transmission oil pressure rose to 71 psi for 1 minute. Caused by malfunction of oil pressure transducer.

F series - IP told pilot to terminate with power from autorotation. Pilot rolled throttle on too rapidly, causing tgt to exceed 1,000° C. for 1 second.

F series - Transmission oil bypass light came on. Caused by failure of oil bypass valve.

F series - Engine oil pressure light came on. Oil pressure was 90 psi, and temperature was 70 degrees. Caused by failure of oil pressure switch.

F series - Engine oil pressure fluctuated during hover. Caused by failure of oil pressure relief valve.

AH-64 Class E mishaps

A series - Aircraft started to spin to right during hover. IP put in full left pedal

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	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	July	2	5
	August	3	1	1 – 12 Aug	3	0
	September	2	2			
	Total for Year	34	27	Total to Date	33	41

to stop the turn, but it had no effect. IP maneuvered aircraft to hard surface, touched main and tail gear down at the same time, and aircraft skidded to a halt. Investigation revealed that nonrotating tail rotor swashplate had seized near the neutral position on drive shaft, although pilot confirmed he had full left pedal applied. Bearing cage in rotating swashplate also failed, contaminating what bearings were left in the race with chunks of metal and causing severe binding.

A series - Loud buzzing noise was heard from transmission area. Crew then smelled something burning, and shaft-driven compressor light came on. Caused by failure of shaft-driven compressor.

A series - As aircraft was taxiing for departure, tower personnel told crew smoke was coming from No. 1 engine area. Caused by failure of shaft-driven compressor.

A series - Master caution and primary hydraulic psi lights came on. Primary hydraulic gauge indicated zero. Failure of pressure hydraulic hose caused loss of hydraulic fluid.

A series - No. 1 generator, manual stabilator, missile, and automatic stabilization equipment lights came on. Strong burning odor was detected in cockpit. Caused by malfunction of No. 1 generator.

A series - Fumes were detected in cockpit, followed by smoke from environmental control unit (ENCU) duct. Although ENCU was set on full cold, extremely hot air was emitted. Canopy door was opened to clear smoke from cockpit, and aircraft was landed. Caused by malfunction of ENCU.

Cargo helicopters

CH-47 Class E mishaps

B series - Transformer rectifier caution light came on, followed by both generator lights and loss of No. 2 flight boost. Caused by sheared generator shafts.

C series - As aircraft was touching down from hover, dual high-side engine failure occurred. Both engine condition levers were brought to stop. N2 reached about 260 rpm for 1 second. Suspect electromagnet relay failed.

CH-54 Class E mishap

B series - Flight engineer saw hydraulic fluid dripping down side of aircraft just before takeoff. First-stage tail rotor servo caution light came on, followed by loss of all utility hydraulic oil pressure. Caused by failure of hydraulic pump.

Observation helicopters

OH-58 Class D mishaps

C series - Left engine exhaust stack separated from aircraft during flight and struck horizontal stabilizer and both tail rotor blades. Failure of engine exhaust clamp allowed exhaust stack to fall from aircraft.

C series - Aircraft was parked in open field with doors open. Rotorwash of AH-1 approaching field site ripped unsecured door from OH-58.

C series - Aircraft hit tree during NOE flight, breaking left FM homing antenna.

OH-58 Class E mishaps

C series - Aircraft yawed left during hover, and low rpm audio was heard. Engine and rotor rpm bled off. Caused by failure of main fuel control.

C series - Postflight inspection revealed white main rotor blade grip was leaking excessively. Main rotor hub assembly was replaced.

A series - Engine-out light came on, and low rpm audio activated during hover. Caused by failure of tachometer generator.

A series - On short final, pilot noticed resistance when control inputs were applied to cyclic. Caused by failure of magnetic brake.

Fixed wing

C-7 Class E mishap

A series - When No. 2 engine mixture lever was brought to auto lean position, engine backfired, and rpm dropped 200. No. 2 engine carburetor temperature began to rise quickly. Backfire drew carburetor heat door wide past the stops. Carburetor heat lever could not be moved from full hot position. Engine was running rough. PIC feathered and secured engine and landed. Caused by malfunction of No. 4 cylinder.

U-21 Class E mishaps

H series - During engine runup, No. 2 prop failed the secondary idle stop check. Caused by broken wire on circuit card of low pitch idle stop proximity switch.

H series - No. 1 engine fire light came on during runup. Suspect moisture from heavy rain induced fire warning.

H series - Predicted takeoff power could not be obtained on No. 2 engine. Takeoff was aborted. Bleed air was leaking from compressor bleed valve.

C-12 Class E mishaps

D series - Left engine oil pressure gauge fluctuated and pegged out on the high side. Caused by failure of oil pressure transmitter.

F series - During climbout with ice vanes down, No. 1 engine oil temperature rose to 95 degrees. After level-off, pressure fluctuated from 80 to 120 psi. Power was reduced and descent initiated. Oil temperature and pressure returned to normal. Caused by failure of thermostatic bypass valve.

F series - Landing gear did not retract, and nose gear light indicated unsafe. Recycling and manual extension did not affect condition. Uneventful landing was made after tower reported landing gear were down. Caused by malfunction of nose gear actuator.

Maintenance

UH-1 Class E mishap

H series - Master caution and hydraulic pressure lights came on. Feedback in controls was felt. Running landing was made. Caused by chafed hydraulic line.

AH-1 Class E mishap

F series - High-frequency vibration was felt during hover. Inspection of main drive assembly revealed O-ring was incorrectly installed and had become pinched, allowing grease to escape from main drive shaft assembly and cause overheating of drive shaft.

AH-64 Class E mishap

A series - No. 1 engine would not go to lockout during lockout check. Connecting link was out of adjustment.

(continued on back page)

Mishap briefs

CH-47 Class C mishap

C series - During torque differential check, as No. 2 engine condition lever was advanced from ground to flight position, N1 and torque fluctuated, and PTIT increased to 900 degrees. Engine was secured. Damage was seen in first- and second-stage compressor blades. Investigation revealed missing hinge wire from piano hinge on engine transmission cowling. It is assumed this caused the damage. The hinge wire in an identical hinge on the same cowling was not secured correctly and could be pushed out with light pressure. Inspection of other aircraft revealed several wires that were not secured.

OH-58 Class E mishaps

C series - Transmission oil temperature light came on during NOE flight. Transmission oil pressure dropped during touchdown. Transmission was overfilled with oil.

C series - While aircraft was at engine idle, another pilot noticed fuel coming from engine compartment. Aircraft was shut down, and 1 inch of fuel was found on engine deck. Aircraft had come out of phase inspection 15 hours earlier. Filter cap was not torqued correctly.

U-21 Class E mishap

H series - Flaps would not extend beyond approach position during engine runup. Caused by sticking microswitch.

OV-1 Class D mishap

D series - As landing gear handle was placed in up position during takeoff, aircraft began sudden uncommanded roll to right. Pilot was told by tower personnel that left drop tank had fallen from aircraft. Pilot continued to fly for 1 hour to empty fuel in right tank. Aircraft returned to base and landed. Stores jettison button on control stick was connected incorrectly, causing drop tank to jettison when landing gear handle was placed in up position.

—For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Followups

executed all prelanding checks: power adjustments, flaps and gear down, and initiated a simulated engine failure on final approach. Upon initiation of the simulated engine failure, the pilot allowed the aircraft to begin drifting to the right of the runway. Simultaneously, the pilot reacted to the engine failure by initiating procedures for a single engine go-around. The IP was distracted by the aircraft's continued drift to the right of the runway as the pilot applied power to the remaining engine. The IP assisted the pilot to return to the center line of the runway but failed to recognize that the pilot had retracted the landing gear. When the IP saw that the pilot was retracting the flaps, he stopped the procedure and told the pilot to reduce power for landing. The pilot immediately went into the landing sequence, but neither pilot realized that the landing gear was in the up position until the propeller contacted the runway. The aircraft slid down the runway on its belly. A small post-crash fire was put out by the fire department. The aircraft was destroyed, but neither crewmember was injured. ■

U.S. ARMY SAFETY CENTER

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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 mishaps

H series - Aircraft was on approach at 30 feet agl, 40 KIAS, under the following conditions: density altitude, plus 11,000 feet; pressure altitude, plus 8,200 feet, temperature at 22° C.; and gross weight of 8,410. The pilot failed to anticipate the effect a downwind condition would have on the aircraft at low airspeed and high-density altitude. After initiating approach to landing on a large, grass-covered knoll, the pilot observed a smoke marker and saw that he would be landing downwind if he continued on his present approach path. The pilot elected to turn to the right, which put the aircraft facing rising terrain. When power was applied, the aircraft experienced loss of tail rotor effectiveness and loss of main rotor rpm. The pilot decided he would be unable to regain control of the aircraft and elected to land. The aircraft impacted the ground slightly nose low, with about 10 knots of groundspeed, and 10 to 15 degrees of nose yaw to the right. The landing gear was deformed in the initial impact. The aircraft bounced into the air, rotating to the right about 90 degrees and struck the ground again. The landing gear collapsed. The pilot had failed to accurately compute the aircraft gross weight causing the PPC data to be invalid for the enviromental conditions at the landing site. The pilot incorrectly estimated fuel in the auxiliary tank at 40 gallons instead of the actual 92 gallons it contained. This error led him to think the aircraft could carry a greater passenger load.

H series - When collective was lowered to begin descent, aircraft began vibrating and yawing 4 or 5 degrees left and right of centerline. Crew heard rumblings from engine compartment, and rpm fluctuated rapidly several times. Trail aircraft reported flames coming from exhaust. Caused by failure of variable inlet guide vane actuator.

M series - When the CE attempted to close the left cargo door during flight, it slid forward about 12 inches and then separated from the aircraft. The CE had attempted to contact the pilot on "private," but the pilot and copilot were on intercom and did not hear the communication. The CE unpinned the door without receiving clearance.

UH-1 Class E mishap

H series - During MOC, pilot placed governor switch in emergency position while rpm was at 6400. Engine rpm increased to about 6900 for 2 seconds.

UH-60 Class D mishap

A series - After touchdown, during roll-on landing, pilot saw traffic inbound from opposite direction. UH-60 pilot brought aircraft to a hover and decelerated to a stop. The other aircraft landed short of the airfield to a field site. During preflight next day, pilot noticed aft portion of stabilator was bent and scraped. Pilot misjudged aircraft's attitude when ►

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	July	2	5
	August	3	1	1 – 19 Aug	3	0
	September	2	2			
	Total for Year	34	27	Total to Date	33	41

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Mishap briefs

picking up to a decelerating hover and applied excess aft cyclic.

Attack helicopters

AH-1 Class C mishap

F series - Aircraft was in firing position to engage tracked vehicles. IP was looking at targets through the telescopic sight unit, and the pilot, in the back seat, was trying to align the aircraft into prelaunch constraints. Pilot directed his attention inside the cockpit and failed to notice aircraft was drifting into tree at left front. Main rotor blades struck the tree. IP took controls and landed.

AH-1 Class D mishaps

F series - Aircraft was flying up a valley. The copilot was on the controls, and the pilot was navigating from the rear seat. The aircraft struck three strands of wire that hit just aft and on top of the telescopic sight unit. The wires were severed by the wire cutter, and the crew felt no vibration or unusual movement in controls. The copilot did not see the wire until impact.

F series - During postflight, after tactical mission, crew discovered minor damage to both main rotor blades from tree strike.

AH-1 Class E mishaps

F series - During OGE hover with tailwind, aircraft began to settle with power. To stop settling, pilot increased torque to 101 percent for 2 seconds. Pilot failed to anticipate effects of downwind condition on a heavily loaded aircraft while hovering OGE.

F series - During shutdown for refueling, hydraulic fluid could be seen draining from underside of aircraft. Caused by loose nut on hydraulic coupling.

F series - Aircraft was 1,500 feet agl at 100 KIAS. Master caution light came on for about 60 seconds, with no segment light. Water in engine wiring harness cannon plug receptacle caused short in caution light.

AH-64 Class C mishap

A series - Crew had completed a training mission using pilot night vision sensor. While hovering to parking position at field site, aircrew was waved off by ground guide. Main rotor blades were damaged from contact with tree branches in the parking position.

AH-64 Class E mishaps

A series - During runup, crew chief saw smoke coming from catwalk and hydraulic heat exchanger area. Postflight revealed oil coming from shaft-driven compressor.

A series - While aircraft was taxiing to parking to check on a communication failure, shaft-driven compressor light came on. During postflight, transmission oil could be seen dripping from rear deck.

A series - During approach at 40 feet agl, No. 2 engine developed a high-pitched whine and made a popping sound like a compressor stall. Torque gauge for No. 2 engine pegged out, and NP was at 104 percent. The IP continued approach and brought the power levers to ground idle position as the wheels touched the ground. Black smoke could be seen coming from No. 2 engine. No. 2 engine had ingested the jack leveler on No. 2 engine nacelle. Jack leveler assemblies on all AH-64s at the installation were inspected. Nine were found to be loose and were removed.

A series - During night, low-level, contour flight, pilots heard whining noise. Master caution and shaft-driven compressor (SDC) lights came on, and approach was begun to an open field. During approach smoke could be seen in rear cockpit. Caused by internal failure of shaft-driven compressor.

Cargo helicopters

CH-47 Class D mishap

D series - Cargo hook was armed on approach according to normal procedure. Fuel blivet was released, and hook light came on. Similar incident had occurred previously, but system was found serviceable. Suspect electrical malfunction in release circuit.

CH-47 Class E mishaps

C series - During hover, No. 2 flight boost indicated 1600 to 1700 psi. No. 2 hydraulic boost system guage was replaced.

D series - During takeoff, No. 2 engine would not respond to normal engine trim inputs. When emergency engine trim switch was placed in manual position, engine responded. Caused by internal failure of N2 actuator.

Observation helicopters

OH-58 Class E mishaps

C series - During NOE flight, rotor rpm light and low rpm audio came on, and aircraft landed. Maintenance could not duplicate problem.

C series - Transmission oil light came on during NOE flight. Transmission thermostatic switch was replaced.

D series - Aircraft was at 50- to 60-foot hover over field, at edge of tree line, when crew noted decrease in engine noise, and aircraft yawed left. Caution light and audio came on, and IP took controls, lowered collective, and began OGE hovering autorotation. About halfway down, engine recovered and began surging. An uneventful landing was made. Caused by fuel control failure.

D series - During flight, transmission oil pressure fluctuated from 20 to 30 psi with no caution lights or audio. Caution message came on during shutdown when oil pressure reached 5 to 10 psi. Caused by failure of oil pressure transducer.

Fixed wing

C-12 Class E mishap

C series - During flight, No. 2 engine oil pressure gauge registered zero. Caused by failure of oil pressure transducer.

Mishap briefs

OV-1 Class D mishap

D series - Aircraft was parked and chocked during MOC. Unforecast wind gusts of 25 to 30 knots, quartering from rear of aircraft, caused rudder pedals to deflect rapidly several times to the left and right. Mechanic attempted to stop deflection by applying force to rudder pedals with his feet, causing him to strain his lower back.

OV-1 Class E mishap

D series - No. 1 propeller would not come out of reverse during taxi. Caused by failure of auxiliary motor on No. 1 propeller.

U-21 Class C mishap

H series - During flight, crew saw bright flash on left wing pod, and No. 1 generator light came on. Crew suspected lightning strike and returned to home base. Postflight inspection of antenna pod revealed evidence of heat buildup and extensive electrical damage to left antenna pod and internal components.

U-21 Class E mishap

H series - No. 2 engine fire light and audio came on during flight. No smoke or fire could be detected, and all engine instruments remained normal. Aircraft was flying in rain. Suspect moisture activated engine fire detection system.

Maintenance

OV-1 Class D mishap

D series - Aircraft had made uneventful landing, rollout, and taxi. Just before entering parking area, crew heard a loud bang, and aircraft yawed right. Bolt holding right wheel halves had broken and damaged wheel brake assembly and disks. Caused by contractor maintenance error during overhaul.

Safety messages

• Safety-of-flight maintenance mandatory message concerning revision of one-time and recurring inspections for proper grounding of fire-warning detector installation on all UH-1/EH-1 series aircraft (UH-1-87-09, 071300Z Aug 87). Summary: Field personnel have reported that when the electrical ground check is performed with the engine cowlings locked in the open position with the support brace, an adequate ground is usually present. However, when cowl doors are closed, the hinges and latches alone do not always provide proper grounding. Purpose of this message is to direct installation of a ground jumper wire to ensure proper fire-warning detection operation. Contact: Leo Smith, AUTOVON 693-3738, commercial 314-263-3738.

• Safety-of-flight technical message concerning recurring inspection of forward and aft transmission on CH-47A, B, and C helicopters (CH-47-87-09, 101400Z Aug 87). Summary: TB 55-1520-241-20-41, dated 19 Jan 87, required a one-time inspection of CH-47A, B, and C helicopter forward and aft transmissions. The transmission inspection was to determine if the spiral bevel ring gear bolted connection was properly torqued. A loose connection could lead to failure of the gear and possible loss of the aircraft. The inspection identified 13 transmissions with nuts having less than adequate torque. Subsequent to this inspection, evidence has indicated that, after a period of time, the torque on the spiral bevel ring gear may loosen. The purpose of this message is to require a recurring inspection of the spiral ring gear. The initial inspection will be performed by depot-level teams. Assistance is required from AVIM/AVUM units who must remove/reinstall sumps and provide maintenance facilities and support. Contact: Roger Heidenreich, AUTOVON 693-3738, commercial 314-263-3738. During nonduty hours, contact AVSCOM Command Operations Center, AUTOVON 693-2066, commercial 314-263-2066.

—For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Electrical fire in AH-64

A recent incident has been reported regarding a fire in the electrical harness of the aircraft interface assembly (AIA) of an AH-64 aircraft.

The aircraft had been flown for a little over 2 hours and had expended 28 rockets and 100 rounds of 30mm ammunition. During a hover engagement, the target acquisition and designation sight (TADS) began uncommanded left and right movements. Switches and circuit breakers were checked, but the crew was unable to correct the problem. The aircraft returned to the rearm point and landed.

During shutdown, armament personnel saw smoke and flames behind the TADS assembly. The fire was extinguished. Because of the fire, it was necessary to download the weapons. The aircraft was shut down, and the auxiliary power unit (APU) was turned on to provide required power for downloading. However, when the APU was turned on, the fire started again. The APU was turned off, and armament personnel pulled the cannon plugs from the TADS power supply and electronic unit. However, when the APU was turned on again, the fire started again. The APU was again turned off, the eyebrow panels were taken off, and all cannon plugs were removed from the TADS turret bulkhead. There were no further problems, and downloading of the weapons was completed.

The fire was caused by chafing of the AIA wiring harness against the TADS assembly. This harness has been previously identified as a problem because of its tendency to chafe and short out.

The AIA will be exchanged by the manufacturer, and Martin Marietta will conduct an investigation to determine the exact cause of this problem.■

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The radar altimeter... its use and limitations

The following article was written by Major James A. Fitzpatrick and CW4 Gary W. Dombroski, Maintenance Management Division, Department of Aviation Systems Training, U.S. Army Aviation Logistics School, Fort Eustis. This article was prepared in response to a finding in an AH-64 accident investigation.

The AH-64 was chalk 2 in a night, low-level flight of eight aircraft using the pilot night vision sensor (PNVS) for navigation. The pilot was attempting to maintain 150 feet agl over changing terrain at approximately 80 knots by using the radar altimeter. When the pilot saw that he was on a collision course with a 170-foot steel tower supporting electrical transmission lines, he attempted evasive action by making an abrupt climbing left turn. The aircraft struck two 7/16-inch steel support cables, causing major damage to the helicopter. The pilot leveled the aircraft and began an immediate descent for landing. During the landing sequence, the tail rotor struck a tree, and the aircraft also struck two small support cables. The AH-64 landed upright, but damage amounted to more than a million dollars.

Investigation of this accident revealed there may be some misunderstanding among pilots concerning the limitations and proper use of the radar altimeter during contour flight, particularly at night.

The radar altimeter system is a high-resolution pulse radar that provides a measurement of absolute clearance over terrain. The system's operation is based on precise measurement of the time it takes an electromagnetic energy pulse to travel from the aircraft to the terrain and return. The time of pulse transmission is compared to the time of pulse arrival, and the difference in time is processed to provide the range information. Because the pulse travels at a rate of approximately 2 nanoseconds per foot (10^{-9}) and because the digital display on the altimeter is updated approximately two and one-half times per second, the display is available to the pilot almost instantaneously. For example, in an aircraft traveling at 120 knots ground speed, a display update should occur approximately every 81 feet (roughly the length of the AH-64). Note that **radar altitude** is **always altitude just past** for all airspeeds above a hover.

The radar altimeter has some operational characteristics that are of major concern to pilots of all types of aircraft.

• **Slingload operations.** Small loads on short slings present no major problem. There is, however, a possibility that with large loads on long slings, the altimeter may constantly track the distance to the load rather than absolute altitude above the ground.

• **Wooded area operations.** The ability of the altimeter to track absolute altitude above obstacles on the ground is affected by tree density and airspeed. For example, at high airspeeds over sparse-density trees, such as tall pine trees, the altimeter is likely to read a distance to one-half tree height. At slower airspeeds, the altimeter is likely to read the distance to the ground unless directly over a tree. During operations over thick foliage, the altimeter will read the distance to treetops.

• **Flight maneuvers.** Pitch and roll maneuvers up to ±45 degrees pose no degradation of altitude information accuracy. The system typically remains in track up to +55 degrees of either pitch or roll. At angles above +55 degrees, the indication would be similar to that presented when climbing to altitudes above 1,500 feet.

The components of the AN/APN209 electronic altimeter (radar altimeter) mounted in the AH-64 are typical of the installation configuration in all Army aircraft. The system consists of:

• **Receiver/transmitter**—located in the aft avionics compartment; provides signals and processing of data.

• **Remote indicator**—located at the pilot's station; provides visual display and control functions.

• **Two antennas**—located in the aircraft's belly; rear antenna transmits radar pulse and forward antenna receives return pulse.

The AH-64 pilot uses radar altitude primarily during PNVS flight and during weapons engagement. There are up to five ways in which radar altitude information is presented to the pilot:

• Digital display from the radar altimeter with a range display from zero to 1,500 feet.

• Analog display from the radar altimeter, which is an edge-lit pointer with a range display from zero to 1,500 feet agl.

• Symbolic display on any video display.

• Tape display on the pilot's video, which has a range of zero to 200 feet agl.

• Repeat of the copilot/gunner's video altitude display.

In the AH-64 Aviator Qualification Course (AQC) flight training, Task 5004 (Perform Contour Flight) states, "Use composite video to maintain obstacle clearance while generally conforming to the contours of the earth (radar altitude symbology)." This is an accurate statement of the technique an AH-64 pilot should use to perform contour flight. There may be some confusion about the degree to which the radar altimeter guarantees terrain clearance. The system gives relatively fast, accurate measurements of range; *however*, the radar altimeter is just one of the altitude maintenance aids available to the pilot. The indications on the radar altimeter must be considered in concert with PNVS visual cues, known terrain conditions based on visual recons, or estimated terrain conditions

based on map recons. The radar altimeter plays essentially the same role for the AH-64 pilot operating with the PNVS as the barometric altimeter plays for the UH-1 pilot operating under night vision goggles. The AH-64 pilot simply has the advantage of information that is extremely more accurate and timely concerning absolute altitude.

Obviously, looking straight down to determine your absolute altitude tells you very little about the terrain conditions that will be beneath the belly of your aircraft in 30 seconds. The only indications that sloping terrain lies in your direction of flight are visual interpretations of the terrain, contour lines on a map, or known terrain conditions based on previous reconnaissance.

The basic principle for any type of contour flight at night—aided or unaided—is **"Don't overfly your ability to see and avoid obstacles."** Airspeeds and altitudes must be adjusted to ensure the capability to visually avoid obstacles and terrain. ■

STACOM 124 19 August 1987

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JOHN C. SHAW, JR.
Colonel, Aviation
Director, DES

Attaboy

The IP in the following mishap deserves special recognition for his ability to react quickly and skillfully to avoid what could have been a major accident. This incident also serves as a reminder of the possible consequences from inadequately secured objects in an aircraft.

The UH-1H was on a local VFR training flight. About 5 seconds after the IP entered a standard autorotation, the crew heard a loud pop followed by strong vibrations lasting approximately 5 seconds. The IP maintained the aircraft in the autorotation profile and declared an emergency.

As the IP began decelerating the aircraft, another IP, who was in an aircraft on the ground, reported by radio that the UH-1's tail rotor had stopped turning.

The aircraft began a slow turn to the right, and as the aircraft passed the 90-degree point, the IP applied collective to cushion the landing. The aircraft continued turning and impacted the ground hard. It was approximately 180 degrees from the intended landing direction.

During a student change, the IP had maintained the aircraft at flight idle. When the student boarded, he stowed his helmet bag, book bag, and hat under the right seat, securing them by using the seat belt. His kneeboard and hearing protectors were in the helmet bag.

At some point, while the aircraft was in the traffic pattern, the helmet bag came unsecured. Unnoticed by the crew, it blew out the right cargo door and was struck by one of the tail rotor blades. When the IP began the standard autorotation, he was unaware that the tail rotor drive shaft had failed, and the rotor was not turning. It was not until the aircraft began its slow turn to the right, with a nose-low attitude, and he received the radio report from the aircraft on the ground, that he realized he had an emergency on his hands.

The IP showed exceptionally good judgment by not attempting a go-around for another approach and running landing. Instead, he attempted to maintain as much control as possible over the aircraft and landed. There was less than $10,000 damage to the aircraft and no injury to crewmembers. ■

Although the UH-1's drive shaft failed (see inset) after helmet bag was struck by tail rotor, the IP autorotated and landed with minimal damage to the aircraft and no crew injuries.

Recertification of chest-mounted regulators

Army aviation units that use chest-mounted regulators manufactured by Sabre Industries, P/Ns 900-002-134 and 900-002-154, on their helicopter-mounted oxygen systems can have these items recertified at Fort Carson, CO. All Sabre Industries chest-mounted regulators bearing these part numbers are required to be recalibrated and recertified every 150 days after initial use.

Fort Carson has established a provisional repair/recertification facility for these chest-mounted regulators. This will preclude units using these regulators from having to return them to the manufacturer for maintenance. Cost for recalibration and recertification is $40 each and $160 for regulators that require rebuilding before they can be recertified.

Field units interested in using this service should direct inquiries to Commander, 4th Infantry Division (Mech) and Fort Carson, ATTN: AFZC-RM-PA (ISSA), Fort Carson, CO 80913-5000, or call Felix Gonzales, AUTOVON 691-2040/4360.

Point of contact at AVSCOM is Jim Dittmer, AUTOVON 693-3215, commercial 314-263-3215.■

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 Army aviators. USAARL needs you to volunteer to take part in aviation research projects. Your flying expertise and aviation knowledge are needed to answer the tough research questions that must be investigated to aid the aviators of the future. If you volunteer, and your commander agrees, USAARL will fund all TDY costs.

You must be an Army aviator and possess a current flight physical and upslip. If you have previously volunteered, had a permanent change of station, and have not heard from us recently, please contact us. For more information, please call USAARL at AUTOVON 558-6864, commercial 205-255-6864, and ask for the research aviator representative. ■

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Report of Army Aircraft Mishaps

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Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps

H series - Aircraft was on short final when crew saw wires in the flight path and flared aircraft to avoid wires. Tail rotor struck the ground. Crew chief was injured, and aircraft drive shaft, tail rotor gearbox and blades, skids, and greenhouses were damaged.

H series - During a low-level autorotation, student pilot touched down at faster than normal speed. Student asked IP for assistance, and IP came on controls and added collective pitch and aft cyclic. Aircraft went into pylon rock due to low rotor rpm, causing damage to transmission dampeners and support mounts. Test pilot was dispatched to recover the aircraft. Suspected pylon rock and broken aft friction dampeners led the test pilot to suspect unseen damage, and he refused to recover the aircraft by flight. Subsequent inspection revealed that in addition to both aft transmission friction dampeners being broken, the engine drive shaft was damaged, and the box beam around the transmission engine block was cracked. There was also damage to a tail rotor blade and the FM antenna and some evidence of mast bumping. A collateral investigation is being conducted. Estimate of damage is $86,500.

UH-1 Class E mishaps

H series - Aircraft was at 2,500 feet agl at 80 KIAS. A descending right turn was initiated, and as torque was reduced to 17 psi, crew heard two loud reports, accompanied by a left yaw. Rotor and engine tachometer needles split. The IP took controls and maneuvered the aircraft in a needles-joined autorotative glide to an open field. When cushioning pitch was applied, needles split again, and low rpm audio came on. The aircraft landed with minimal ground run and no damage. Cause has not been determined.

H series - During preflight, pilot noticed main transmission reservoir was low. Crew chief filled reservoir to appropriate level. During postflight, pilot again noticed main transmission oil level was low. Input quill was leaking excessively.

H series - During hover taxi, smoke could be seen coming from engine area. Oil was found in engine compartment. During test flight, oil was leaking from bleed band and top half of compressor housing. Maintenance replaced engine.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
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	December	1	1	December	4	6
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	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	July	2	5
	August	3	1	1-26 Aug	5	1
	September	2	2			
	Total for Year	34	27	Total to Date	35	42

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Mishap briefs

UH-60 Class B mishap

A series - Aircraft was being operated on ground during rappelling mission. The rappel master threw a rope into the rotor system, and rappeller was injured when dragged by the rope into the aircraft. There was some damage to the aircraft. 8749

UH-60 Class D mishap

A series - Tail rotor contacted small trees during takeoff.

UH-60 Class E mishaps

A series - When APU was started prior to landing, APU fire handle and master fire light came on. Fire lights went out when APU switch was placed in off position.

A series - Tail rotor servo, backup, and hydraulic pump lights came on during flight. Caused by failure of No. 1 hydraulic pump.

A series - During short final, boost off, stability augmentation system, flightpath stabilization, trim, and No. 2 reservoir low lights came on accompanied by collective and pedal boost hardening of controls. Aircraft made uneventful landing. During postflight, No. 2 reservoir showed normal level. Caused by moisture on back of electrical connector for reservoir-low switch.

A series - When aircraft was picked up to a hover, crew felt severe vibration. Caused by stuck antiflap.

Attack helicopters

AH-1 Class C mishaps

S series - Crew was conducting training in support of a project to determine effectiveness of training touchdown emergency maneuvers in a simulator. The maneuver, a simulated antitorque landing, was uneventful down to about 3 feet agl. At this point, the aircraft started turning right, and the IP, in the front seat, reduced throttle and increased collective to cushion landing. The SIP, in the rear seat, took controls, blocked collective, applied left pedal (without response), then increased throttle to attempt power recovery. Again, the aircraft failed to respond and continued in a right spin. The SIP retarded throttle for hovering autorotation. The aircraft hit tail skid first, bounced, and hit again, left front low. The aircraft came to rest upright on a heading of 310 degrees from an original heading of 360 degrees. Damage to both main rotor blades, pitch control links cowling around transmission, top and bottom wire cutters, top of canopy, tail skid, gun turret, crosstubes, and left skid is estimated at $54,298.

S series - Crew was conducting NVG training. As the aircraft neared the ground during approach for landing, the crew felt a jolt. The aircraft was brought to a hover, but the crew could see nothing on the lane. After landing, the PIC inspected the aircraft with a flashlight. The 20mm gun was fully depressed, and there was dirt on the ends of the barrels. The crew stowed the gun manually and returned to the airfield. Inspection the next morning revealed about $30,000 damage to the turret and 20mm gun assembly.

AH-1 Class E mishaps

E series - During final approach to a confined area, master caution and transmission oil temperature lights came on. Transmission oil pressure and temperature indications were normal. Postflight revealed loss of transmission oil from unknown source.

F series - Pilot encountered brownout during landing into loose sand and lost visual reference. A go-around was initiated and torque went to 110 percent for 3 seconds. Brownout was caused by improper approach to dusty landing area. Overtorque resulted from improper application of power.

P series - During NOE deceleration, pilot heard about 20 sharp reports. Tgt rose to 900° C., rpm drooped to 91 percent, low rpm audio sounded, and pilot noted left yaw. Suspect compressor stall.

S series - Transmission oil bypass light came on during NOE flight. Caused by failure of transmission oil bypass pressure switch.

S series - Transmission oil bypass caution light came on during approach. Transmission oil hot light came on, and temperature climbed to 105°C. for 2 minutes. Caused by failure of transmission oil thermostatic valve in cooler.

AH-64 Class A mishap

A series - During qualification training, crew was conducting engine control unit (ECU) lockout at 900 feet agl. Rated student pilot inadvertently activated the chop collar, which brought both engines to flight idle. IP made an unsuccessful attempt to autorotate to a nearby clearing. The aircraft was destroyed when it impacted in a heavily wooded area. The two crewmembers were treated for minor cuts and bruises and released. 8750

AH-64 Class E mishap

A series - Aircraft was in straight and level flight at 145 KIAS. IP felt high-frequency vibration in the pedals, and airspeed was reduced to 120 KIAS. Pilot felt severe feedback in pedals and landed. Caused by failure of tail rotor pitch link.

Cargo helicopters

CH-47 Class E mishaps

C series - Aircraft was in trail position in flight of four. During hover for takeoff, No. 2 engine fire light came on, and aircraft landed. Caused by failure of fire-detection sensing element.

C series - Aircraft was at 100-foot hover while conducting hoist operation training over water. Crew chief smelled hot hydraulic fluid and saw hydraulic fluid leaking from forward control closet. At the time the leak was detected, an individual was being recovered in the rescue basket. The individual was moved to shore, lowered, and released, and the rescue basket was recovered. The aircraft landed, and during normal shutdown, utility hydraulic pressure dropped to 1,800 psi. Caused by failure of hydraulic tube assembly.

C series - During landing, severe leak was seen on No. 2 flight boost hydraulic pump. Maintenance replaced reciprocating pump.

D series - During runup at a field location, flight engineer noted smoke coming from combining transmission area. Pilot pulled both engine condition levers to stop; however, No. 2 engine remained at normal operating speed and had to be shut down by using No. 2 fire pull handle. During coastdown, both main and auxiliary debris screen and magnetic indicators for the combining transmission on the maintenance panel popped. Suspect combining transmission failed, and No. 2 engine condition lever malfunctioned.

Observation helicopters

OH-6 Class D mishap

A series - During practice autorotation and termination with power, pilot allowed aircraft to descend in a nose-high attitude. IP failed to correct aircraft attitude before tail skid touched the ground, resulting in damage to lower vertical stabilizer bottom tube and upper edge of stabilizer mounting point.

OH-58 Class A mishap

A series - The aircraft was in low-level contour flight at 80 KIAS. The aircraft was completely destroyed when it struck a Heavy Expanded Mobility Tactical Truck (HEMTT). Total cost of the mishap was approximately $303,530. 8751

OH-58 Class D mishap

A series - During flight, crew heard loud, whining sound for about 10 seconds, followed by a loud bang. There were no abnormal instrument indications. Pilot entered autorotation and landed in a field. Caused by internal engine failure.

OH-58 Class E mishaps

A series - During cruise flight, N2 dropped to 96 percent. Reduction in collective failed to bring N2 to tolerance. After pilot entered autorotation, N2 stabilized below 94 percent and N1 stabilized below 84 percent at flat pitch. Caused by failure of governor assembly.

A series - Crew was performing night;terrain flight traffic patterns when both crewmembers felt binding in left rear quadrant of the cyclic control. Maintenance found swashplate uniball friction was out of adjustment.

C series - As aircraft became light on the skids, there was a slight binding in the pedals. Caused by binding of push-pull tube on phenolic blocks in tailboom.

C series - Aircraft was at OGE hover along a ridgeline when low rotor rpm and audio came on. N2 and rotor rpm were at 90 percent. Pilot made a right pedal turn to find a suitable landing area while copilot placed linear actuator switch in full-increase position. Aircraft made uneventful landing. Caused by clogged engine fuel filter.

C series - During terrain flight at slow airspeeds, master caution and hydraulic pressure lights came on intermittently. Hydraulic pressure switch was replaced.

Fixed wing

C-12 Class D mishap

C series - During rollout from power approach/precision landing, right tires locked up and blew out. Aircraft drifted slightly right of center line and stopped. Hot brake manifold was damaged from contact with runway.

OV-1 Class E mishap

D series - During takeoff, No. 2 propeller went to 1820 rpm. Rpm decreased when power was reduced. Caused by failure of No. 2 engine prop control.

U-21 Class E mishap

A series - Aircraft was in traffic pattern at about 1,500 feet agl, 140 KIAS. When flap switch was placed in approach position, flaps did not move. Recycling of flap switch and flap circuit breaker had no effect, and aircraft made uneventful landing with flaps up. Caused by failure of flap motor.

Maintenance

UH-1 Class E mishap

H series - Aircraft would not crank during engine start. Ignition switch was on, and battery voltage was within limits. Mechanic failed to fully connect cannon plug to fuel switch console after maintenance.

UH-60 Class D mishap

A series - During taxi from parking to mission lineup, PIC noticed power requirements were greater than normal. Crew chief was asked to check the tires to ensure they were turning. Crew chief checked the right side and reported everything was okay. The tire on the left side was not turning because the brake was locked, and the tire blew out. Caused by lack of by-the-book maintenance by crew chief and attention to detail by PIC.

UH-60 Class E mishap

A series - When hydraulic leak test was conducted during runup checks, advisory segments of the caution advisory did not illuminate. While installing new bulbs, the crew chief bent contacts. Arcing caused system to short out.

C-12 Class E mishap

C series - While completing cruise checklist, pilot noticed No. 1 engine cowling was loose and had popped up about 2 inches at rear of cowling. Suspect maintenance personnel failed to adequately secure rear portion of engine cowling.

Safety messages

• Safety-of-flight technical message concerning cyclic stabilator slew switch on UH-60A/EH-60A series aircraft (UH-60-87-09, 111300Z Aug 87).

(continued on back page)

Six receive Broken Wing awards

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.

• **WO1 Hugh D. Odum, 45th Aviation Battalion, Oklahoma Army National Guard, Sperry, OK.** WO1 Odum was IP of an OH-6A aircraft that was engaged in mission qualification training. The crew of the other aircraft in the multi-ship low-level NVG flight formation was conducting continuation training. The aircraft were about an hour into the flight and had departed from the target area and turned to the new on-course heading. Both aircraft were in level, cruise flight at 80 KIAS. The mission called for a lead change to be executed after the aircraft were established on the new heading. The lead change was to facilitate contingency and flight lead training. The OH-6, with the rated student pilot on the controls, was lead aircraft when the change was initiated. The aircraft were about 300 feet agl over a flat, swampy area. After the code word for lead change was transmitted, the pilot of the lead aircraft reduced airspeed by 10 knots and maintained the established heading. About 5 seconds later, both pilots in the OH-6 heard and felt what they thought was an explosion from the engine area of the aircraft. (It wasn't until their aircraft was on the ground that they learned the trail aircraft had collided with them in flight, tearing the left skid from the OH-6 and severing the combustion section from the engine.) WO1 Odum took the controls, declared an emergency, and told the pilot to shut the main fuel off and turn on the infrared (IR) landing light. WO1 Odum entered autorotation, intending to attempt a landing on a four-lane highway. When the aircraft was about 50 feet agl, the IR landing light became effective, and the IP saw his intended touchdown point was a shallow ditch instead of the level terrain he had expected. As he

decelerated and maneuvered the aircraft to the center of the ditch, the aircraft touched down on its one remaining skid, slid about 5 feet, and rolled onto its left side. Both pilots got out of the right door, then noticed there was a small postcrash fire resulting from the in-flight explosion of the engine. They retrieved the aircraft fire extinguisher and put out the fire. The other aircraft was destroyed, and the two crewmembers were killed.

• **1LT Michael K. Haider, 4th Attack Helicopter Battalion, 4th Infantry Division (Mechanized), Fort Carson.** LT Haider was PIC of an OH-58C on a service mission in a desert environment. The aircraft was in cruise flight at 300 feet agl, at about 80 KIAS, when the engine failed. The pilot checked his instruments to confirm that the engine failure was in fact total and told the crew chief, who was in the left seat, to prepare for a crash landing. As the aircraft yawed left, LT Haider reduced collective pitch to initiate an autorotative glide. The crew chief warned the pilot there were wires straight ahead and below. LT Haider made a 90-degree, left turn and chose a level area about 40 feet square in the dense desert vegetation in which to terminate the autorotation. He decelerated to minimize ground run and, just prior to touchdown, applied pitch and positioned the cyclic to make a vertical, final descent. LT Haider completed the landing with an undamaged aircraft, making a final ground run of less than half a foot. Probable cause of the emergency was failure of the governor assembly and fuel control.

• **WO1 James T. Ybarra, 245th Combat Aviation Company, 2d Armored Division, III Corps, Fort Hood.** WO1 Ybarra was PIC of an OH-58A being operated in support of a field exercise. The aircraft had refueled and was en route back to a tactical operations center about 30 km away. The aircraft was cruising over trees at about 200 feet agl, 80 KIAS, when the pilot heard the engine noise decrease and saw the N2 was dropping through 100 percent. There was a set of wires located to the pilot's right. Ahead were more trees, an open field, then a highway and more wires crossing the aircraft's flight path. WO1 Ybarra used slight aft cyclic and traded off airspeed to maintain altitude in order to clear the trees. His airspeed dropped to 45 or 50 knots, and, sensing he had a partial power condition, he began initiating an immediate landing. As the aircraft cleared the tree line, he turned into the wind, lowered the collective slightly, and prepared to land in the field. When the aircraft was approximately 20 feet agl, N2 decreased below 90 percent, N1 continued to decrease, and WO1 Ybarra prepared for a no-power landing. He pulled collective to soften the landing and minimize damage to the aircraft. Touchdown was slightly hard, but the aircraft landed level on its skids. The compressor diffuser threads at attaching points had stripped out at the scroll assembly, causing the engine power loss.

• **CPT Blakely A. Deal, 7th Aviation Training Battalion, Aviation Training Brigade, U.S. Army Aviation Center, Fort Rucker.** CPT Deal, an IP, was occupying the copilot/gunner seat of an AH-1S while conducting simulated engine failure training from altitude with a student in the Aircraft Qualification Course. After the maneuver had been completed three times, CPT Deal directed the student to make a fourth attempt, commencing power recovery at about 400 feet agl. The student

advanced the throttle from engine idle to the full-open position, 100 percent N2, and initiated a climb. Suddenly, the crew heard a loud, sharp report from the engine area. CPT Deal analyzed the cockpit indications and noted N1 and N2 were both rapidly deteriorating, and engine noise was decreasing. He correctly determined the aircraft had experienced an engine failure and immediately entered autorotation from about 300 feet agl. He maneuvered the aircraft to a cultivated field and landed. His skill in holding the ground run to a minimum on the soft surface prevented the landing gear from tearing away and the aircraft from rolling over. Cause of the engine failure has not been determined.

• **Mr. James V. Raymond, Pan Am Support Services, Inc., U.S. Army Aviation Center, Fort Rucker.** Mr. Raymond is an IP for primary helicopter training in the TH-55A. The student was on his first flight. The aircraft was in cruise flight at about 1,000 feet msl when Mr. Raymond felt a slight engine roughness. After checking the engine instruments and ensuring the student had done nothing to cause the problem, the IP turned the aircraft in the direction of the only available open area. He rolled the throttle to 2900 rpm, the engine surged twice, then rpm dropped back to 2700. Mr. Raymond began a normal approach, lowered the collective, and the engine failed. The engine needle split downward, hesitated at about 1500 rpm, and then dropped to zero. With an assist from a 20-knot headwind, the aircraft reached an open area, and autorotation was initiated. Seeing his intended landing area sloped downhill, Mr. Raymond decelerated and applied collective, avoiding the sloped area and completing his landing in the only available level area. The aircraft was undamaged. Cause of engine failure was a fuel control cable out of rig.

• **CW3 Anthony W. Adams, 56th Aviation Company, 70th Transportation Battalion (AVIM), 21st Support Command, APO New York 09028.** The UH-1H which CW3 Adams was piloting was on a routine service mission. The aircraft was in cruise flight at 1,000 feet msl over open water, about 40 km from land. The pilot noticed a slow decrease in engine oil pressure, accompanied by an increase in engine oil temperature. While closely monitoring his instruments, CW3 Adams turned from his planned route and selected the shortest route to land. Engine oil pressure continued to slowly decrease and engine oil temperature reached 93° C. Land was sighted, and the aircraft continued to fly over gently rolling pasture and wooded areas en route to an airfield. A few minutes later, engine oil pressure dropped below 80 psi, and engine oil temperature rose above 93° C. CW3 Adams began preparing to land at the nearest suitable area. The aircraft was about 800 feet agl when the engine oil pressure dropped to zero, the engine chip light came on, and the crew heard a loud bang from the engine compartment. The engine had failed. CW3 Adams initiated autorotation, maneuvered the aircraft into the wind, and landed with zero airspeed on a wet, marshy field. There was no damage to the aircraft or injuries to the crew. Suspected cause is internal failure of the accessory gearbox. ■

Recertification of chest-mounted regulators

Army aviation units that use chest-mounted regulators manufactured by Sabre Industries, P/Ns 900-002-134 and 900-002-154, on their helicopter-mounted oxygen systems can have these items recertified at Fort Carson, CO. All Sabre Industries chest-mounted regulators bearing these part numbers are required to be recalibrated and recertified every 150 days after initial use.

Fort Carson has established a provisional repair/recertification facility for these chest-mounted regulators. This will preclude units using these regulators from having to return them to the manufacturer for maintenance. Cost for recalibration and recertification is $40 each and $160 for regulators that require rebuilding before they can be recertified.

Field units interested in using this service should direct inquiries to Commander, 4th Infantry Division (Mech) and Fort Carson, ATTN: AFZC-RM-PA (ISSA), Fort Carson, CO 80913-5000, or call Felix Gonzales, AUTOVON 691-2040/4360.

Point of contact at AVSCOM is Jim Dittmer, AUTOVON 693-3215, commercial 314-263-3215.■

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 Army aviators. USAARL needs you to volunteer to take part in aviation research projects. Your flying expertise and aviation knowledge are needed to answer the tough research questions that must be investigated to aid the aviators of the future. If you volunteer, and your commander agrees, USAARL will fund all TDY costs.

You must be an Army aviator and possess a current flight physical and upslip. If you have previously volunteered, had a permanent change of station, and have not heard from us recently, please contact us. For more information, please call USAARL at AUTOVON 558-6864, commercial 205-255-6864, and ask for the research aviator representative. ■

Mishap briefs

Summary: Safety-of-flight operational message UH-60-87-05, 112000Z Apr 87, regarding stabilator operational procedures placed an 80 KIAS limit on H-60 series aircraft in flight below 3,000 feet agl. The restriction was the result of an uncommanded pitchdown incident while the stabilator was in the automatic mode. Current assessments have indicated that pilots should be made aware that flights near microwave antennas or shipboard radar may cause uncommanded attitude changes. Testing has shown that the master caution light may illuminate before or simultaneously with any uncommanded stabilator trailing edge movement, with 4 to 5 degrees of movement being the maximum. The purpose of this message is to lift the restrictions imposed by the referenced message after the installation of cyclic stabilator slew-up switches per MWO 55-1520-237-50-46 and viewing of a videotape produced specifically for this purpose. Contact: Leo Smith, AUTOVON 693-3738, commercial 314-263-3738. After duty hours, contact AVSCOM Command Operation Center, AUTOVON 693-2066, commercial 314-263-2066.

• Safety-of-use message concerning use of AVSCOM-managed containers for external slingload operations (SOU-GEN-87-01, 101930Z Aug 87). Summary: A recent Army mishap involving a CH-54 helicopter was the result of a dropped external load. The external load was an AVSCOM-managed, shipping container in which the lifting points failed. Further investigation has revealed that these shipping containers were not designed for helicopter external load operations. The purpose of this message is to alert units of the possible danger of transporting AVSCOM-managed containers by means of external slingload operations. Contact: MAJ Mosher, AUTOVON 693-3738, commercial 314-263-3738.

• Maintenance information message concerning extension of service life on crew seatback covers (MIM-UH-1-87-XSOF-06, 032130Z Aug 87). ■

For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Learn, don't burn—commercial flightsuit hazard

There are several commercially available flightsuits that look just like the Army-issued Nomex flightsuits. However, many of these commercially available flightsuits are neither fire resistant nor manufactured from Nomex material.

Check the flightsuits you are using, and ensure that they are fire resistant and manufactured from Nomex material. It is too late once you have been burned to determine that the "protective equipment" that you were wearing could not really provide you any protection at all! **Learn—don't burn.**

—MAJ Ron Isbel, Aviation Safety Branch, U.S. Army Safety Center, AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Note: More information about Nomex can be found in the 4 Dec 85 issue of *Flightfax.*

U.S. ARMY SAFETY CENTER

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Commander, Army Safety Center

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Report of Army Aircraft Mishaps

Seat belts save lives.

"Can you see? Are you sure?"

Night vision devices greatly enhance our ability to fight at night, but we must understand their limitations.

Have you ever driven your car at night in a heavy rainstorm, wanting to get home but feeling a little uneasy because the windshield wipers were not keeping up with the rain, and you really could not see too well? There you were, zipping along at 50 to 55 mph, hoping that the road was clear ahead and rationalizing that you could see "well enough," that "the rain would stop soon," or that if you kept up your speed you would "drive out of it." Now let's take it a step further. Have you ever flown a helicopter when conditions were such that you really couldn't see very well, and you said to yourself, "I can make it; it really isn't that bad, and in just a few more minutes I'll be there"?

From 1 October 1979 through 10 August 1987 there have been 30 Class A aviation accidents that occurred while night vision devices (NVD) were being used. Of these 30 Class A accidents, 27 (90 percent) occurred when the moon was less than 30 degrees above the horizon, or its surface was less than 23 percent illuminated. Additionally, 36 of the 41 fatalities (88 percent) occurred in these same conditions.

Under illumination conditions that are less than the 23 percent or 30 degrees mentioned above, the AN/PVS-5A night vision goggles' (NVG) electronics are operating at their maximum sensitivity, and the faint image produced is obscured by "sparkles" (video noise). Driving your car in a heavy rainstorm when the windshield wipers are not capable of keeping the windshield clear could be compared to flying with AN/PVS-5A NVGs in these low ambient light conditions—the equipment capabilities are exceeded by the prevailing conditions/requirements. Low light levels and electronic noise produced by the system result in a poor image of far less sharpness or contrast. This results in inability to see some obstructions, depending on the backdrop of the object. Two of the most critical factors for performing safe NVG flight are sufficient contrast and adequate visual cues. Without these, the pilot must rely, to varying degrees, on cockpit flight instruments to maintain aircraft control. When flight is attempted with AN/PVS-5A NVGs during periods of insufficient ambient light, the probability of the crew becoming disoriented and encountering some form of spatial disorientation is greatly increased. This is because in low-light conditions, when the field of view is void of contrast and cues, the pilot does not receive adequate visual information from "through the tubes" viewing to safely fly the aircraft.

In these accidents, there was either very low ambient light, no ambient light, or the terrain was "shadowed" because the moon was less than 30 degrees above the horizon. When the use of AN/PVS-5A NVGs is coupled with these conditions, the stage is set for an accident. This is because the NVGs amplify available ambient light only. They do not "create light." When there is very low or no ambient light, NVGs are not capable of providing the pilot the visual "through the tubes" cues that he needs to safely fly the aircraft. This condition exists both in AN/PVS-5 series NVGs and AN/AVS-6 (ANVIS). However, since ANVIS amplify the available ambient light three to four times more than the AN/PVS-5 NVGs, and their greatest sensitivity is shifted to the near infrared region of the electromagnetic spectrum where dim starlight radiation is very plentiful and usable, they provide the pilot far better visual cues in low ambient light conditions. However, even with ANVIS, when there is no

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"Can you see? Are you sure?"

ambient light the equipment does not provide and, in fact, is not capable of providing the pilot sufficient "through the tubes" visual cues to safely fly the aircraft.

Flying in these low-light conditions, over featureless terrain void of contrast (e.g., rolling deserts, large open areas, snow-covered fields) and large bodies of water without shoreline references, with AN/PVS-5A NVGs may be an unacceptable risk. There is very little, if any, contrast or visual cues. You can't fly a helicopter for very long without adequate cues by which to detect relative motion and to "fix" your position "in space." If flight with AN/PVS-5A NVGs is attempted over these types of terrain, in these ambient light conditions or when there is no visible horizon present, the potential for an accident is very high.

The only way that an aircrew can operate in these types of conditions with reduced risk is to use a combination of flying on aircraft instruments and "through the tubes" viewing. However, the darker it gets and the less contrast there is available to the aircrew, then they must almost exclusively use aircraft instruments to maintain reference in space. Because of this, it is absolutely essential that any missions contemplated with AN/PVS-5A NVGs in these conditions adequately consider the limitations of the NVGs and the significantly increased risk involved. Also, it is important that the aircraft be equipped with adequate NVG-compatible lighting for flight instruments adjusted to their lowest usable level, NVG-compatible radar altimeters, and an external infrared (IR) or pink light filter on a landing or search light. In addition, for any extended flights in these conditions, the aircraft should be equipped with some type of automatic flight stabilization system.

The "bottom line" is that with NVDs in use, the majority of Class A night aviation accidents have occurred when the moon's surface was less than 23 percent illuminated, or it was less than 30 degrees above the horizon. These ambient-light conditions were probably the best that could have been present and do not include any restrictions to visibility (e.g., haze, fog, rain) or cloud cover. Also, most of these accidents occurred with AN/PVS-5A NVGs being used. So if you have to decide whether ambient conditions are adequate to perform an NVG training mission with reduced risk, ask yourself as a minimum the following questions:

- What type of night vision device will be used?
- To the best degree that they can be determined, what will be the ambient-light conditions present for the planned mission?
- Over what sort of terrain will the mission be flown?
- Is the terrain void of contrast and visual cues? (The "darker" it gets, the more important this is.)
- If the terrain is void of adequate contrast, either because of insufficient ambient light or because there are not adequate visual cues available, is the aircraft equipped with NVG-compatible lighting for flight instruments, NVG-compatible radar altimeters, and an external IR light source? Is the crew capable of flying instruments?
- If the mission is planned for flight over a large body of water, is there any other way that it can be accomplished and not involve over-water operations?

Now, after asking these and a multitude of other questions, the most important fact remaining is to decide if you are willing to accept the significantly increased risk involved in AN/PVS-5A NVG training missions in low ambient light conditions over featureless terrain or water. Perhaps the risk is not worth any benefit that may be derived! What do you think? Can you see? Are you sure?

Other points to remember

- When the field of view is void of contrast or visual cues, insufficient data is provided to the brain.
- In low ambient light conditions with poor visual cues, rates of closure are extremely difficult to ascertain.
- Aircrew teamwork is essential.
- Recognition of actual altitude can sometimes be difficult with good contrast and is always difficult with poor contrast.
- Depending on ambient conditions, altitude verification may only be possible by a combination of "through the tubes" and flight instrument information to safely fly the aircraft.
- Low-level, contour, and NOE operations over areas of differing contrast require a series of different visual scan and cue techniques for proper orientation.
- Areas of good contrast provide the aircrew motion cues at a greater distance and altitude, providing additional time to respond and correct for deviations from what is desired. (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 - Aircraft was in straight and level flight when the crew smelled hydraulic fluid. About 30 seconds later, master caution and hydraulic segment lights came on, followed by complete loss of hydraulic power. Hydraulics-off running landing was made. Working of hydraulic line caused fitting to vibrate until it failed:

H series - Master caution, engine chip detector, and engine oil pressure lights came on during flight, and engine oil pressure dropped to 10 psi. As pilot continued approach, engine oil temperature increased to 112° C., and egt increased to about 680° C. Crew heard whining noise from engine, followed by a yaw, loss of power, and bleedoff of N2 and rotor rpm. Pilot made uneventful landing in a field. Caused by engine failure.

H series - Aircraft was in a 30-degree, left bank when pilot noticed loss of hydraulic pressure, and master caution and hydraulic lights came on. Caused by failure of hydraulic hose.

H series - During flight at 600 feet agl, crew heard loud pop, and aircraft began to vibrate severely. Caused by erosion of first-and second-stage compressor blades.

UH-60 Class B mishap

A series - The aircraft was chalk 3 in a flight of three UH-60s, each of which was slingloading an M102 105mm howitzer with an A-22 bag. Extended slings were being used from the M102 to the aircraft cargo hook. Load hookup and takeoff were uneventful. After climbout to 300 feet, the flight crew initiated a slow left turn. During the turn, the crew heard a loud "pop" as the load separated from the aircraft. There was no damage to the aircraft, but the howitzer was destroyed. The extended sling failed due to overload. Rigging personnel used an improper sling leg with working capacity less than the load to be lifted. The improper sling leg failed in flight, causing the load to be dropped. 8752

UH-60 Class D mishaps

A series - Aircraft was at start point for NOE flight. About 5 seconds after deceleration was begun from 80 to 60 KIAS, nose compartment door came open, breaking center windshield, and damaging compartment door and windshield wipers.

A series - During flight, crew noticed intermittent vibration, which the pilot interpreted as turbulence. After landing, vibration was again felt, and pilot suspected antiflap malfunction. Postflight inspection revealed antiflap was broken off, and one main blade was dented. Suspect antiflap became unseated and stuck in incorrect position during flight. Binding caused antiflap assembly to break off and strike main rotor blade.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	July	2	5
	August	3	1	August	5	1
	September	2	2	1 – 2 Sep	0	0
	Total for Year	34	27	Total to Date	35	42

UH-60 Class E mishaps

A series - During low approach into confined area, crew allowed main rotor blades to strike brush, causing minor damage to blade tip caps.

A series - Aircraft was at 3,000 feet, 90 KIAS, when stabilator failed. Position indicator went from zero to 40 degrees, then jumped from zero to 30 degrees. When airspeed was decreased to 50 KIAS, stabilator indicator returned to normal.

A series - During flight, transmission oil pressure dropped from 45 to 32 psi. Power setting was reduced from 70- to 50-percent torque, and transmission pressure dropped to 25 psi. Oil sample showed excessive metal content. Caused by internal failure of main transmission module.

A series - Aircraft was hovering from refueling when crew heard loud banging and popping sound. No. 1 engine tgt was cycling from 775° to 850° C. No. 1 engine power control lever was retarded to idle, but NG continued to fluctuate, and tgt again rose to 775°. Caused by compressor stall due to internal engine failure.

A series - Aircraft was on final while carrying slingload of two fuel blivets. Load released itself when arming switch was placed in the armed position.

Attack helicopters

AH-1 Class D mishap

P series - IP initiated simulated engine failure from altitude with a planned termination with power. As throttle was opened to full-on position, IP noted that rotor rpm was passing through 105 percent. IP loaded rotor system to control overspeed, but rotor rpm of 110 percent was reached before rpm was brought under control and returned to normal. IP failure to correct pilot error in time resulted in rotor overspeed.

AH-1 Class E mishaps

F series - While conducting tactical training, pilot allowed aircraft main rotor blades to contact unknown object. Both main rotor blades received small cuts in erosion guards near blade tip.

F series - Aircraft had taken off and was at 70 feet agl, 60 KIAS, when compressor stalled three times. Tgt went to 920° C., and torque was 70 to 75 percent. Upon termination, compressor stalled two more times, and tgt went to 910° C. Engine was flushed twice, and diffuser bleed air top gasket was replaced.

S series - Aircraft was at 10,000 feet, 80 KIAS, 39 pounds torque, and tgt 800°, with fixed collective. Engine rpm drooped and returned to 6600. The SIP took control of the aircraft to determine if rpm bleedoff was caused by environmental or engine conditions. He was unable to determine cause and decided to return to the airfield, maintaining 30 pounds torque, 60 KIAS, and initiating a climb to clear en route obstacles. At 11,500 feet, rpm drooped to 6000, and emergency procedure for engine underspeed was initiated. With governor in emergency position, rpm stabilized at 6400, with fixed collective, 20 pounds torque, 80 KIAS, and en route obstacles were cleared. Within 1 second, engine N2 fluctuated from 6400, to 6000, to 6700. Descent was continued, and aircraft made a successful running landing. Failure of aircraft boost pump reduced fuel availability; forward and engine pumps could not keep up with the demand. Crew failed to properly identify cause of malfunction.

AH-64 Class D mishap

A series - During hover into rearm point, panel marker, which was concealed by tall grass, blew up and went through main rotor system. One blade was damaged.

AH-64 Class E mishaps

A series - Primary hydraulic caution light came on during flight, and pressure dropped to zero. After landing, leak was found in primary hydraulic pressure line.

A series - During HIT check on No. 1 engine, crew heard a muffled, whining sound, and pilot noticed burning smell. About 30 seconds later, the shaft-driven compressor (SDC) light came on, and smoke could be seen coming from vicinity of SDC. Caused by internal failure of SDC.

A series - During hover, master caution and No. 2 engine nose gearbox psi lights came on. Caused by failure of nose gearbox breather packing.

A series - During engine start for second flight, NG would not go above 16 percent. Shaft-driven compressor was replaced.

A series - During takeoff, primary hydraulic bypass caution light came on. Caused by failure of pressure switch.

Cargo helicopters

CH-47 Class E mishaps

C series - No. 2 engine oil-low caution light came on during flight, but crew chief reported no evidence of oil leakage or spills, and engine oil pressure and temperature were normal. Caused by faulty No. 2

Mishap briefs

engine oil quantity indicator microswitch.

C series - During hover, No. 1 engine oil pressure dropped to 19 psi. Maintenance replaced No. 1 engine oil pressure transmitter.

D series - During unloading of ¾-ton trailer, trailer tongue fell and damaged aircraft cargo floor. Seconds later, FE noticed excessive hydraulic leak in rear of aircraft, and master caution and No. 2 flight control hydraulic pressure lights came on. No. 2 flight control test return line broke when trailer rolled into it.

CH-54 Class E mishap

A series - During hover check, rotor tachometer fluctuated and dropped to zero. Caused by failure of tachometer generator.

Observation helicopters

OH-58 Class D mishap

C series - On first start, igniter circuit breaker was not pushed in, resulting in aborted start. After a wait of about 1 minute, second start attempt was made, and engine temperature rose to 950° C. for 1 second. Starter was motored until engine temperature was below 200° C. IP was distracted while giving instructions to student and failed to fully follow checklist on overhead switches and circuit breakers.

OH-58 Class E mishap

C series - During flight at about 4,000 feet agl, 80 KIAS, and 62 percent torque, pilot noted N2 at 104 to 106 percent. Pilot attempted to decrease governor with increase/decrease switch but with no result. He then increased collective and reduced throttle to reduce N2 to normal limits. Aircraft returned to airfield and landed using manual throttle. Governor failure caused engine to exceed limitations stated in operators manual.

Fixed wing

OV-1 Class E mishaps

D series - During start, No. 2 prop would not come out of feather. Caused by faulty prop control.

D series - During cruise flight, pilot noticed No. 2 engine torque fluctuating between 50 and 130 percent. N1 and egt were normal. Caused by moisture in cannon plug.

D series - During flight, pilot discovered aft fuel boost pump circuit breaker had popped, without associated segment caution light. Attempt to reset was unsuccessful. Caused by internal failure of aft fuel boost pump.

D series - Prior to initiating approach after completing mission, pilot discovered autopilot would not disengage. Inverters were cycled to emergency and autopilot disengaged. Navigation coupler malfunctioned.

U-21 Class D mishap

A series - Right engine failed during approach. Shortly after engine had been secured, left engine also failed. Props were feathered, and aircraft was configured with flaps extended for emergency landing to a dirt road. Minor damage to left inboard flap occurred during landing.

Maintenance

UH-60 Class E mishap

A series - While aircraft was parked, maintenance personnel were troubleshooting stabilator position switch assembly, aft tailboom adjustment, and collective stick position sensor adjustment. After stabilator test had been performed twice, MTP preflighted aircraft in hangar and had ground crew connect an external power source. Stabilator passed check, but then, about 5 minutes later, stabilator was seen three times moving from 37 degrees to 30 degrees and returning to 37 degrees. Stabilator remained in auto mode with no audio or caution light. Suspect No. 1 stabilator amplifier was improperly wired.

CH-47 Class D mishap

C series - The aircraft was on the ground, and was not running, while the crew performed a control hydraulic check. The No. 2 flight hydraulic line developed a leak, and fluid began pouring into the tunnel area and rear of the aircraft. Inspection revealed a 1-inch slit in No. 2 flight hydraulic line. The line, which was made of an improper material, had been fabricated locally because the required part was unavailable.

OH-58 Class D mishap

C series - Aircraft was flying downwind to VFR departure point. Pilot observed gradual decrease in N1, N2 decreased below 20 percent, rotor rpm dropped, and rotor and engine-out lights came on. Crew autorotated to an unimproved field. Problem with depth perception during final stages of autorotation caused crew to allow tail skid to strike a raised portion of the ground, resulting in minor damage to the airframe. Improperly installed pneumatic accumulator may have caused an air leak into engine governor.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

"Can you see? Are you sure?"

One last thought

With the slowness in fielding the ANVIS, what can the aviation community do to enhance its ability to operate more effectively and safely at night? Part of the answer may be in the form of AN/PVS-5B and -5C NVGs. These NVGs have an improved objective lens that gathers 25 percent more of the available ambient light than a new set of AN/PVS-5A NVGs. Since most aviation AN/PVS-5A NVGs are a high-use item, the actual light amplification/intensification and image produced may be only 70 to 80 percent of a new/zero-time system. By replacing the "old" AN/PVS-5A tubes with AN/PVS-5B or -5C tubes, a total increase in light amplification/intensification of 40 to 50 percent could be realized.

The improved AN/PVS-5B and -5C NVGs are being fielded at a substantial rate per month and have been designated for ground units. Aviation unit commanders utilizing the chain of command, through their MACOM, could request authority to switch the tube assemblies from the new full-face plate AN/PVS-5B and -5C NVGs to their cut-away or GX-5 flip-up NVG mounts. The tubes removed from the aviation AN/PVS-5A NVGs could then replace those removed from the full-face AN/PVS-5B and -5C NVGs. In this manner, additional faceplates would not have to be modified for aviation use, ground units would retain their NVG capability, and aviation night vision operations would be significantly enhanced, safer, and better able to support the ground commander.

In approximately 18 months, only the improved objective lens utilized in the AN/PVS-5B and -5C NVGs should be available in the supply system. Then, as required, all AN/PVS-5 series NVGs can be upgraded to the best available tube configuration.

Note: The AN/PVS-5B and -5C faceplates can't be modified or used by aviation units. Once removed from their faceplates, the AN/PVS-5B and -5C NVG tubes operate the same and are identical.■

—MAJ Ron Isbel, U.S. Army Safety Center, CSSC-SPA, AUTOVON 558-4198/3901, commercial 205-255-4198/3901 and DAC Bob Portman, Aviation Training Brigade, ATZQ-ATB-O, AUTOVON 558-4630/4632, commercial 205-255-4630/4632. The views expressed in this article are those of the authors and are not necessarily those of the Department of the Army, the Army Safety Center, or the Aviation Training Brigade.

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Report of Army Aircraft Mishaps

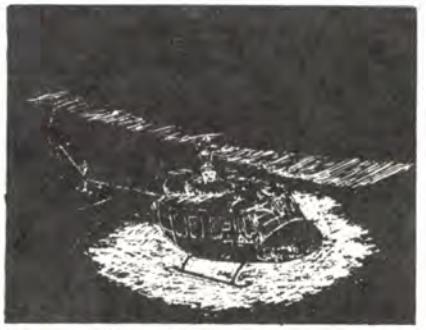
Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 6 Aug 86 issue (8641) □ Downgraded to Class B. Aircraft was on an NVG currency flight and had landed to drop off a package at a desert outpost. The IP decided to reposition from the prepared helipad to facilitate an easterly departure. The aircraft was being hovered at 10 feet agl, approximately 200 feet northwest of the helipad. The IP was taken by surprise when he lost all outside visual reference as the aircraft was engulfed in dust blown up by the rotorwash. The aircraft began drifting left and rearward and descended until its left rear skid struck the ground. As the aircraft rolled left, the main rotor blades contacted the ground, and the helicopter came to rest on its left side. There was major damage to the aircraft but no injuries to the crew.

UH-1 Class A mishap in 20 Aug 86 issue (8644) □ During the eighth lift of a helocasting mission, the aircraft crew received a hand signal from a ground crewmember to discontinue the drop. The pilot and copilot discussed and announced the fact they would be initiating a go-around. The castmaster, who was wearing a headset and had on previous jumps talked with the aircraft crew, began releasing the jumpers while the go-around was



being initiated. Before he could be stopped, the castmaster released six jumpers. A seventh jumper exited the aircraft without a release. The eighth jumper was stopped by the castmaster. The jump was accomplished from approximately 20 to 40 feet above the water, at 30 to 40 KIAS. In the confusion of recovering injured personnel in the water, some of whom had been injured in the previous jump, one jumper was unobserved by ground or air personnel and drowned. Two others were injured during this jump. The castmaster had his attention focused on positioning the eight jumpers and identifying the location of the release point in relation to the aircraft, and he failed to pay attention to commands from the aircrew.

UH-1 Class A mishap in 27 Aug 86 issue (8647) □ During a night approach to an unlighted sodded area on the airfield, the pilot of a UH-1H, who was wearing night vision goggles, made his approach using the position lights of a UH-60A, which was just landing, as a reference point. The UH-1 pilot allowed his approach angle to steepen while his rate of closure became excessive. Upon realizing that his approach was terminating onto the Black Hawk, the UH-1 pilot attempted to simultaneously bank right and slow down his aircraft. As a result, the UH-1's tail rotor struck the tail and main rotor system of the UH-60. The UH-1, whose tail rotor control was lost, landed hard about 75 meters north northwest of the Black Hawk. There were one serious injury and two minor injuries. The UH-1 was damaged, and the UH-60 was destroyed.

UH-1 Class B mishap in 2 Jul 86 issue (8635) □ The aircraft was on final approach to a field location with a crew of three and eight passengers on board. The copilot, who was flying the aircraft from the right seat, conducted a high recon of the intended landing area. During final approach, and a low recon, the copilot determined that the landing area initially selected was unsuitable because of metal stakes obstructing the landing area. He decided that an alternate area to his right, and slightly to the rear, would be acceptable. He began a right cyclic and right pedal turn toward the alternate area while continuing his deceleration for the approach. The copilot evidently did

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Followups

not realize that these control inputs in an OGE situation, below effective translational lift, could cause an uncommanded right spin due to insufficient power available, high temperature, high pressure altitude, and excessive gross weight. The aircraft began an uncommanded nose-low, right spin at an altitude of approximately 35 feet agl. The aircraft made two complete turns, and there was no response to attempts by the copilot to correct the situation with pedal input. The copilot entered autorotation and landed the aircraft upright but with substantial damage. The passengers and crew were uninjured except for the pilot who complained of a back injury.

Attack helicopters

AH-1 Class B mishap in 20 Aug 86 issue (8646) □ During an acceleration/deceleration maneuver while in cruise flight on a training mission, engine N2 decayed to 6000 rpm, with a corresponding decay in rotor rpm. The aircraft was 2,600 feet agl, at 50 KIAS, with 20 psi torque applied. The crew immediately attempted to regain rpm by lowering the collective and using governor increase/decrease switch. They were able to regain rotor rpm, but engine N2 remained at 6000 rpm. The PIC diagnosed the malfunction as an engine underspeed and began emergency procedures. The engine failed when the throttle was rolled to the engine-idle position. The pilot then turned to a suitable forced-landing area and increased airspeed to 70 knots to maintain rotor rpm and provide an acceptable rate of descent and glide distance. An autorotative landing was made; however, the left skid broke off during initial ground contact, causing the right skid and crosstube assembly also to fail. The aircraft came to rest upright on its fuselage, sustaining major damage. Neither crewmember was injured.

Cargo helicopters

CH-54 Class B mishap in 24 Sep 86 issue (8649) □ The aircraft was attempting to pick up a destroyed armored personnel carrier (APC) that had been used as a bombing range target. As the load, which weighed approximately 16,000 pounds, was attached to the aircraft's cargo hook, the rigging cable became entangled with a protruding roadwheel axle on the APC. As the helicopter started lifting the load, the load began to shift, causing the rigging cable to slip free of the axle. This caused the load to drop about 2 feet, and the rigging cable was pulled over the two square corners of the helicopter's cargo hook. The excessive download forces, together with the associated binding and pulling of the rigging cable over the cargo hook, caused the cable to fray and subsequently fail. The cargo hook was suddenly relieved of its load, causing it to spring upward and to the right, impacting the underside of the main rotor blade, and striking the top of the right main landing gear. The aircraft landed with no further damage.

Observation helicopters

OH-58 Class A mishap in 17 Sep 86 issue (8648) □ Downgraded to Class B. Aircraft was in OGE hover at 10 to 15 feet above 35-foot trees, during a search and rescue mission. The pilot was concentrating on searching the ground instead of maintaining aircraft tail rotor clearance. As a result, the tail rotor struck an obstacle, causing separation of the tail rotor gearbox from the aircraft. The crew heard a loud bang from the rear section of the aircraft, and simultaneously, the aircraft began a rapid, uncontrolled spin to the right, and the aircraft's nose pitched down. The aircraft continued to spin to the right and impacted the trees in a 65-degree, nose-down attitude. It came to rest perpendicular to the ground, about 90-degrees nose down, supported by trees. Although the copilot received minor injuries, he and the pilot were able to leave the aircraft without assistance.

OH-58 Class B mishap in 13 Aug 86 issue (8642) □ While the aircraft was in an OGE hover during a tactical training mission, the crew heard a loud explosion from the aft section. Thinking he had a blade strike, the pilot turned the aircraft toward a road about 50 to 75 yards away, intending to land. A massive compressor failure caused engine and rotor rpm to decay, and the aircraft descended vertically into dense brush. The main rotor cut through a 35-foot tree, and the main spar broke when it hit the tree trunk. The aircraft settled into the trees nearly level and came to rest wedged into the thick growth of 10- to 15-foot brush. Both the pilot and observer were momentarily stunned. When the observer got out to check the aircraft, he saw flames coming from the exhaust stacks and put out the blaze with a fire extinguisher. The pilot had to exit from the copilot's door because of the brush blocking his door. ■

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps

H series - The copilot, in the left seat, was flying an unaided night approach to a tactical inverted "Y." Rate of closure and vertical speed were higher than normal, resulting in abrupt ground contact. The copilot increased collective after impact, and aircraft became airborne, climbing to about 5 feet agl. After initial ground contact, PIC came on controls without a normal transfer of controls. PIC lowered collective to full-down position, and aircraft landed hard. Aft crosstube severed at right strap attaching point, and aircraft came to rest upright. Total damage amounted to about $65,000.

H series - During flight with outside ambient temperature at 34° C., engine oil temperature rose to 105° C. Aircraft flew about 45 minutes under these conditions. Egt remained constant at 580° C. On touchdown, engine oil temperature rose to 110° C.

UH-1 Class E mishaps

H series - Aircraft was on instrument training flight, with copilot under the hood and on the controls. At 29 pounds torque, crew heard six to eight reports from the engine section, and aircraft yawed left. Pilot took controls, reduced power, verified bleed air switches were off, and began descent to nearby airport. Bleed band actuator was out of adjustment.

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	July	2	5
	August	3	1	August	5	1
	September	2	2	1-9 Sep	0	0
	Total for Year	34	27	Total to Date	35	42

H series - During final approach, master caution and transmission oil pressure lights came on. PIC found transmission oil pressure gauge read zero. After power-on landing, transmission was found to be empty of oil. Caused by failure of transmission oil filter seal.

H series - After completing TEAC, pilot began reducing engine power. As collective was lowered, engine rpm surged from 6400 to 6700 about five times. Further power reduction eliminated the surges, and aircraft landed.

H series - During flight at 75 KIAS, pressure altitude of 10,500 feet, and temperature at 15° C., aircraft vibrated severely, yawed, and lost rpm. Engine sputtered, and crew began descent and landed aircraft. Cause of engine malfunction is unknown.

M series - N1 fluctuated during flight and dropped to zero. Caused by failure of tachometer generator.

UH-60 Class D mishaps

A series - Crew was releasing external load consisting of M102

howitzer and an A-22 bag. Because of dust, pilot lost sight of ground guide after bag was on the ground and made an improper decision to continue to release the M102. When the crew chief told the pilot the M102 was on the A-22 bag, the pilot attempted to reposition the M102. A wheel on the M102 became snagged in the A-22 bag, and the weight of the bag caused the axle on the M102 to break. Caused by inadequate crew coordination. The crew chief failed to recognize his increased responsibility in giving the pilot timely aircraft and load position reports, and the pilot allowed the aircraft to descend, thinking the M102 was clear of the A-22 bag.

A series - The crew was attempting to lift a slingloaded M102 howitzer. The load appeared to be rigged incorrectly and was set down and rerigged by the ground crew. When the load was lifted the second time, one leg of the sling disconnected from the load at the left rear. The howitzer rolled over and came to rest inverted. There was no damage to the aircraft.

UH-60 Class E mishaps

A series - Main transmission module failed during flight. After placing load on the ground, crew made uneventful landing.

A series - During cruise flight, left accessory module chip light came on. Maintenance found large steel chips on detector and replaced accessory module. Suspect internal bearing failure.

A series - During flight at 4,500 feet msl, 120 KIAS, aircraft yawed. Torque indications on both engines were erratic, causing rotor to bump against overspeed system. Caused by failure of No. 1 engine hydromechanical unit.

A series - Stabilator failed during simulated instrument takeoff at 45 KIAS, 500 feet agl. Aircraft landed and during shutdown, with APU on and power control levers at idle, stabilator automatically reset itself.

A series - Aircraft was preparing to depart refueling point when master caution and No. 2 reservoir-low light came on. Boost-off and stability augmentation system lights also came on. Caused by internal failure of hydraulic transfer module.

A series - Aircraft was hovering out of refueling point when crew felt abnormal vibration in the controls. Caused by broken anti-flap assembly.

A series - During descent, cyclic made several small lateral jerks to the left, followed by a movement of about 6 inches to the left. Descent was continued, trim was turned off, and aircraft made uneventful landing. Suspect impending failure of stability augmentation system actuator.

Attack helicopters

AH-1 Class D mishap

F series - During cruise flight at about 120 KIAS, pilot noted abnormal 10-degree nose pitchup, without any control input. About the same time, chase aircraft reported No. 5 tail rotor drive shaft cover was open. Four of the five Dzus fasteners had pulled through the catches.

AH-1 Class E mishaps

F series - Aircraft was flying NOE up a ravine to assume battle position. Aircraft was brought to an OGE hover, and N2 drooped to about 96 rpm as torque was increased to about 80 percent. Aircraft had a slight tailwind of 3 to 5 knots, pressure altitude was about 3,000 feet, and aircraft gross weight was 8,900 pounds. In about 10 seconds, N2 droop slowly recovered, and aircraft made uneventful landing. Cause is unknown.

F series - While aircraft was on the ground at refueling site, low fuel and engine-driven fuel pump lights came on, and N1 decreased to 41 rpm. Pilot shut engine down. Caused by fuel starvation. Fuel gauge registered 100 pounds, but only one-half gallon could be drained from fuel cells. Fuel system is being recalibrated.

AH-64 Class E mishaps

A series - Pilot night vision sensor (PNVS) was in use during flight at 100 feet agl, 80 KIAS. The system went off line, and the aircrew exited the NOE environment. Crew could not regain use of the PNVS and returned to home base. Maintenance could not duplicate problem.

A series - Aircraft was on base leg at 1,500 feet agl, 90 KIAS, when the pilot heard and felt a thud behind him. The shaft-driven compressor (SDC) light came on, and crew smelled burning transmission fluid. During postflight, No. 2 transmission sight glass showed empty, and transmission fluid was running down the transmission deck and out the drain. Splined drive shaft between the SDC assembly and transmission accessory drive assembly sheared, causing SDC failure.

Mishap briefs

Cargo helicopters

CH-47 Class D mishap

C series - Aircraft was at refueling point when crew chief noticed hydraulic fluid leaking from right forward landing gear. Air-charging valve mount was broken, and brake line was severed. Due to lack of visual references, aircraft drifted, and pilot misjudged clearance. Suspect landing gear hit load.

CH-47 Class E mishaps

C series - Aircraft was on downwind for landing, and before-landing check had been completed. IP initiated simulated engine failure on No. 1 engine. Pilot began emergency procedures for the simulated engine failure approximately 10 seconds after No. 1 engine condition lever was brought to ground position by IP. No. 2 hydraulic boost-off caution light came on, and No. 2 hydraulic pressure gauge read normal. CE did not observe any hydraulic leaks. IP took controls and initiated a direct approach to parking area, recovered No. 1 engine, and made uneventful landing. Caused by failure of pressure switch.

D series - During runup at a field location, the flight engineer noted smoke coming from the combining transmission area. The pilot pulled both engine condition levers to stop, but No. 2 engine remained at normal operating speed and had to be shut down by using No. 2 fire pull handle. During rotor coast-down, both main and auxiliary debris screen magnetic indicators for the combining transmission popped on the maintenance panel. Combining transmission failed internally.

D series - After releasing sling-load, pilot noticed No. 2 engine oil pressure reading was substantially lower than it had been during the flight. Pilot landed, and FE checked for oil leaks from engine. At this time, No. 2 engine oil pressure dropped below zero, and engine was shut down. Caused by failure of pressure transmitter.

Observation helicopters

OH-6 Class E mishap

A series - Pilot had taken off and leveled the aircraft at 1,000 feet agl, 85 KIAS. Oil chip light came on, and engine oil pressure indication was above 150 degrees. Pilot turned back toward airfield, and engine began to surge. As approach was initiated, engine rpm dropped to about 80 percent. Pilot rolled the throttle to engine idle and made a successful roll-on landing.

OH-58 Class C mishap

A series - Crew had been performing multiple approaches to a confined area. While repositioning for takeoff, at a 10-foot hover, pilot noticed N2 droop to about 100 percent. As collective pitch was lowered for landing, engine quit. Pilot performed a hovering autorotation, and the aircraft landed hard. There was no apparent damage except for a slight bend in both skid crosstubes. Maintenance officer and TI disconnected and blew out fuel lines, started the engine, and performed extensive ground run and hover checks. Maintenance officer flew aircraft about 18 miles to home base, encountering no problems during flight. Subsequent damage to transmission, transmission pylon and mount, and mast was discovered during required inspection for hard landing.

OH-58 Class D mishap

A series - Crew was performing standard autorotation during qualification training. During termination of the maneuver, SP applied cushioning collective and abruptly applied forward cyclic. Aircraft touched down nose-low, then bounced to aft skids, causing one main rotor blade to strike the tail rotor drive shaft.

Training helicopters

TH-55 Class D mishaps

A series - During power recovery phase of simulated engine failure, at 200 to 300 feet agl, IP felt vibration, and aircraft started yaw to the right. IP entered autorotation and landed in a field with little or no ground run and no further damage to the aircraft. After shutdown, left lower tailboom support bolt was found missing, and tail rotor drive shaft was severed at the opening of the tailboom. Left lower tailboom support tube bolt failed or was lost during simulated engine failure. Lower bolts are installed with head of bolt downward. If the nut comes off during flight, the bolt would fall out, causing tailboom to shift. This shift could cause the edge of the opening to contact and sever the tail rotor drive shaft.

A series - During hover, student pilot allowed aircraft to begin drifting to the left rear. The IP looked over his left shoulder to ensure proper clearance to rear of aircraft. When he looked back to the front, he noticed rearward speed had increased. The IP took the controls, pushed forward on the cyclic, and applied right pedal to stop the drift and slight turn to the left. As he applied collective, left rear skid contacted the runway.

Mishap briefs

Fixed wing

C-12 Class D mishap

C series - Aircraft was IMC while circumnavigating thunderstorms. Onboard weather radar indicated clear ahead. Crew observed lightning flash, and during postflight inspection $5,000 damage was found to one prop blade on No. 2 engine, sheet metal on right inboard flap, and sheet metal on left elevator.

C-12 Class E mishaps

C series - During preflight, pilot found ⅛-inch nick on propeller blade of No. 2 engine and burn mark on trailing edge of right inboard flap. Suspect cause was lightning strike or static discharge.

C series - During flight, engine oil pressure gauge showed zero reading. Caused by failure of oil pressure transducer.

G series - During flight, operator noticed fuel leaking from No. 1 engine nacelle access panel. Pilot secured engine, declared an inflight emergency, and made a single-engine landing. Caused by deteriorated gasket.

U-21 Class E mishaps

H series - After more than 3 hours of high-altitude flight, pilots began feeling symptoms of hypoxia: heaviness in arms and headaches. Check of gauges showed all oxygen bottles were empty. Pilot descended to 12,000 feet until safe descent could be made to level below 10,000 feet.

A series - During an en route climb, No. 1 engine failed without warning. Crew initiated emergency procedure and made an uneventful landing. Caused by internal failure of engine.

Safety messages

- Maintenance information message concerning tail rotor drive shaft spherical couplings on AH-1, UH-1, and EH-1 series aircraft (MIM-AH-1-87-XSOF-04 and MIM-UH-1-87-XSOF-07, 271900Z Aug 87).
- Maintenance information message concerning use of pitot covers on UH-60A/EH-60A helicopters (MIM-UH-60A-87-XSOF-01, 251600Z Aug 87).

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Report of Army Aircraft Mishaps

He lost control of the aircraft

The UH-1H with a three-man crew and two passengers on board was on a local area orientation flight in preparation for a major training exercise. The crew received a weather briefing, completed their performance planning, preflighted the aircraft, and took off at 1055 on a summer morning. They flew down the coast, stopped to refuel, and proceeded to the next stop where they again refueled and had lunch. The crew filed a VFR flight plan for the return flight, with an estimated time en route of 1 hour and 20 minutes. The UH-1H took off at 1620 on a route that would take them over mountainous terrain.

The aircraft was flying over mountains with an elevation of 7,700 feet msl, at an altitude of less than 300 feet above the surface, when the crew spotted what they thought was a downed aircraft. They descended to about 20 to 30 feet above the trees, attempting to identify what they had seen—and experienced a loss of heading control. The aircraft began spinning to the right, and the IP, who had 1,595 rotary wing hours, 1,275 in the UH-1H, told the pilot, who had a total of 345 rotary wing hours, 295 of them in UH-1Hs, "Anytime you run into this problem, this is what you have to do." He then proceeded to lower the nose of the aircraft, followed the right turn, added power, and flew out of it.

The IP flew a circle for another look, encountered another uncommanded right spin, and this time was unable to recover the aircraft. The pilot announced, "We're going in," and the crew chief noted that rotor rpm bled down, and the low rotor rpm audio and light came on just before he and the passengers assumed a crash position.

One of the helicopter's main rotor blades struck a tree, followed by a tree strike by the tail rotor. The tail section was severed just forward of the 42-degree gearbox. The severed tail section lodged in the top of a tree as the remainder of the aircraft pitched nose down and struck the ground.

The aircraft, which was totally destroyed, came to rest on its left side with the engine still running. One of the passengers, who was occupying the left-facing personnel seat, was killed in the impact. He was not wearing a helmet. The pilot and copilot also died from injuries suffered in the crash. The other passenger who, prior to the accident, had loosened his seatbelt so that he could see out of the aircraft better, was injured when he was thrown from the aircraft, and the crew chief received numerous bruises and abrasions. The crew chief was pinned in the wreckage, and the injured passenger was unable to get to him until the next morning because of his own incapacitated condition. The two survivors then attempted to walk down the mountain. They were about three-quarters of the way down when, using their survival radio on the UHF guard frequency (243.0), they made contact with an Air Force aircraft. The injured crewmen were evacuated by helicopter.

Investigators found that the UH-1H aircraft was suitable to perform the assigned mission. Power was available considering forecast environmental conditions in relation to gross weight and planned flight profile. Power *was not* available to perform hover out-of-ground effect maneuvers in the conditions that existed immediately preceding the accident. (The only performance planning card recovered at the accident site was incomplete.)

The accident was caused by human error. When aircraft wreckage was sighted in the mountainous terrain, the IP, who was on the controls, elected to investigate to ensure the wreckage was not a recent crash and that assistance was not needed. In

(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 D mishaps

H series - Aircraft was on turn to final during water bucket load training. Pilot had his hand placed so that the cargo release switch was between the middle and ring fingers of his right hand. UT warned the pilot about the switch, as he had on other occasions. The pilot replied that his fingers were clear of the switch, but he repositioned his hand and inadvertently pushed the switch, jettisoning the load.

H series - Aircraft was parked when a contractor UH-60 approached from the east and landed about 300 meters west of the UH-1. During short final, rotor-wash from the UH-60 blew door off UH-1, causing it to crash into the chin bubble. Ground guide had attempted to divert UH-60 to landing east of the parked aircraft, but he was not seen by the crew. There was no radio communication between the aircraft because the UH-1 was shut down.

UH-1 Class E mishaps

H series - Copilot was flying aircraft when sling with training load fell off. Load and sling were recovered. Hook malfunction could not be duplicated.

H series - Aircraft was being operated on the ground for flight idle adjustments. When throttle was advanced to flight position, No. 2 fuel control failed and engine started to overspeed. Pilot brought the aircraft to a hover in an attempt to control the overspeed and made a hovering autorotation.

FY 87 Class A Mishap Countdown

		FY 86			FY 87	
	Month	Class A Mishaps	Army Fatalities	Month	Class A Mishaps	Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	July	2	5
	August	3	1	August	5	1
	September	2	2	1–16 Sep	1	0
	Total for Year	34	27	Total to Date	36	42

UH-60 Class D mishap

A series - Aircraft was chalk 2 in flight of three under NVGs. Cargo doors were secured in open position during flight. When aircraft was repositioned for refueling, right cargo door was discovered missing.

UH-60 Class E mishaps

A series - Pilot made 30-degree left turn during contour flight at 35 KIAS. During rollout, master caution and stabilator lights and audio came on. Pilot began emergency procedures and made uneventful landing.

A series - Aircraft developed severe vertical vibration while hovering for takeoff. During return to parking, crew heard a loud pop, and the vibration ceased. Postflight inspection revealed missing anti-flap assembly and damage to main rotor blade.

A series - Aircraft was on downwind when reservoir-low and No. 1 tail rotor caution lights came on. Backup pump-on and No. 2 tail rotor advisory lights also came on, and aircraft landed. Caused by moisture in electrical connections.

Attack helicopters

AH-1 Class D mishaps

F series - Outer ring of closed-circuit refueling port was broken off when refueler used excessive force to remove nozzle from port.

F series - During landing at live-fire FARRP, debris was blown up into main rotor system. Damage to erosion guard was found during preflight inspection the next day. FARRP ground crew had failed to secure dunnage from ammo point. During landing by another aircraft at the same type of site, bellmouth guide cover from a spare 20mm ammo can, located next to the rearm point, flew up and struck a main rotor. Cover and rotor blade erosion guard were damaged.

AH-1 Class E mishaps

F series - While aircraft was at engine idle during refueling, pilot noticed transmission oil pressure had dropped to zero. Caused by failure of oil pressure transmitter transducer.

S series - Pilot was hovering aircraft from the front seat. As IP took controls, aircraft rolled 20 degrees left. Cyclic abruptly moved right, and aircraft rolled 30 degrees right. IP attempted to disengage stability control augmentation system (SCAS), and cyclic abruptly moved left. Aircraft again rolled 30 degrees left. Caused by failure of roll SCAS actuator.

S series - Aircraft was trail in flight of four. When the IP, who was on the controls, felt lateral cyclic stiffness but saw no control segment light, he thought the pilot was riding on the controls. After moving the cyclic laterally, the IP realized that was not true and attempted to press the trim release button, but there was no change in lateral cyclic stiffness. IP transferred controls to pilot, and stiffness ceased then returned about 5 minutes later. After landing and shutdown, hydraulic oil was found on lateral servo. Cause is still being investigated.

S series - No. 2 hydraulic light came on during flight, accompanied by sluggishness of pitch and roll channels, but no master caution light. Caused by failure of No. 2 hydraulic pump pressure line.

S series - During flight, pilot noticed transmission oil pressure was fluctuating. Caused by failure of transmission oil pressure transducer.

AH-64 Class A mishap

A series - While hovering at a firing point, approximately 200 feet agl, the aircraft began a right descending spiral and crashed. The IP, who was in the rear seat, was killed, and the rated student pilot was critically injured. The aircraft impacted the ground with a high vertical sink rate and remained upright. 8753

AH-64 Class E mishap

A series - During runup, fireguard noticed hydraulic fluid was pouring over right side of the tailboom. Master caution and utility hydraulic oil-low segment lights came on. Caused by failure of preformed packing in utility pump.

Cargo helicopters

CH-47 Class D mishaps

D series - During offloading of a loaded trailer, guide wheel cocked 90 degrees to direction of movement, and winch cable slackened. As ground crew pulled the trailer, it struck and damaged two seats. Caused by inadequate communication between air and ground crew.

D series - During refueling, crew chief noticed hydraulic fluid leaking from right forward landing gear. Air-charging valve mount was broken, and brake line was severed. During previous slingload mission, aircraft drifted, and pilot misjudged clearance. Suspect landing gear hit load.

CH-47 Class E mishaps

B series - During takeoff, CE noticed hydraulic fluid spraying from forward transmission area. Caused by rupture in hydraulic line.

B series - During level flight at 2,500 feet msl, 100 KIAS, crew felt the aircraft shudder, then the aircraft began to shake in the roll and yaw axis. The IP took controls and began a descent for landing while attempting to isolate the malfunctioning of the hydraulic system. Pilot valve in lower stick boost actuator failed, allowing feedback to yaw controls and viscus dampener arm. Inputs were amplified when No. 2 revet failed.

B series - During taxi to parking, crew smelled smoke, and CE told IP the forward right, outside brake disc was smoking and glowing. Suspect brake cylinder failed, causing brake to bind.

C series - Aircraft was downwind for landing. With before-landing check complete, IP initiated simulated engine failure on No. 1 engine. About 10 seconds after No. 1 engine condition lever was brought to ground position by IP, pilot initiated emergency procedures. No. 2 hydraulic boost-off light came on. Pressure gauge read normal, and CE did not see any hydraulic leaks. IP took flight

controls, recovered No. 1 engine, and made uneventful landing. Caused by failure of pressure switch.

C series - During simulation of in-flight engine failure on No. 1 engine, power turbine inlet temperature (PTIT) began rapid and steady rise about 5 seconds after engine condition lever was placed in ground position. When PTIT reached 890° C., and it was evident that it would have risen higher, No. 1 engine was shut down and engine condition lever placed in stop position. No. 1 engine was secured, and aircraft landed. Maintenance adjusted bleed band and washed engine.

D series - No. 2 generator failed during takeoff, and crew smelled strong electrical burning odor. Maintenance replaced No. 2 generator control panel.

D series - During final approach, master caution light flickered. After external load was set down and aircraft landed, No. 1 hydraulic light came on, and FE noted No. 1 hydraulic flight reservoir was empty. Caused by cracked hydraulic fitting.

Observation helicopters

OH-6 Class C mishap

A series - Aircraft was 1,200 feet agl. The IP was demonstrating a simulated engine failure from altitude, with a planned termination with power at a 5-foot hover over the landing area. Entry airspeed at 80 knots and 1,500-foot altitude were correct, and the aircraft began the steady state portion of the autorotation into a 10- to 12-knot headwind. The IP chose to do the maneuver with the landing light off. Moon illumination was less than 10 percent; however, the training area was a 6,000-foot, fully illuminated runway. Before reaching 200 feet agl, the IP increased throttle to obtain operating rpm. Rate of descent, rotor rpm, airspeed, and position were within limits, and deceleration was normal, but just prior to initial pitch pull at 10 to 15 feet agl, the IP noticed the rotor rpm was approximately 510 to 514 rpm and engine N2 was 101 percent. IP rolled throttle to full open. (Apparently, the throttle was not fully open as he originally thought.) The engine recovered to full rpm as pitch was increased to cushion landing. The aircraft yawed right abruptly and entered a right climbing turn, making approximately 6 revolutions to the right at 30 to 50 feet agl. The IP reduced collective, and the aircraft nosed over and headed for the ground. Just prior to impact, the IP reduced the throttle to idle, and the aircraft struck the ground with little forward motion but with a substantial vertical impact. The aircraft was substantially damaged, and the IP suffered a back injury.

OH-58 Class A mishap

A series - Crew was conducting route reconnaissance training at 25 KIAS, 10 feet above 50-foot trees, when IP noticed a loud squealing sound from the engine area. As he maneuvered the aircraft to an open field, the crew heard a loud report from the engine. The IP executed an autorotation to the uneven terrain. On ground contact the main rotor flexed down, severing the tailboom just aft of the horizontal stabilizer. The aircraft remained upright, and the crew made a normal exit. The engine area was engulfed in flames, but the crew could see shrapnel exit holes on the right side of the engine cowling. The aircraft was destroyed in the fire. 8754

OH-58 Class B mishap

A series - During an ATM training flight, aircraft landed in a gravel pit. The right skid sunk into the gravel, and as the pilot applied power for takeoff, the aircraft began to roll right. As the aircraft rolled, the main rotor blade struck the ground. The rotor blade, hub, and part of the mast broke free. Aircraft came to rest in an upright position. 8755

OH-58 Class D mishap

A series - During start after engine wash, turbine outlet temperature (TOT) rose to 950° C. Throttle had not been rolled on, and fuel switch was turned off. Engine continued to motor with start switch. TOT remained at 950° C. for 3 to 4 seconds before peaking at 1,000° C. Ignition circuit breaker was pulled, and engine stopped motoring after 10 seconds. Cause has not been determined.

OH-58 Class E mishaps

A series - Master caution and fuel boost lights came on during NOE flight. Caused by failure of fuel boost pump.

A series - Aircraft was 500 feet agl while being relocated to parking. Pilot heard loud whistling noise and felt the aircraft vibrate. Caused by debonding and separation of blade tip cap.

Mishap briefs

Training helicopters

TH-55 Class C mishap

A series - While executing a standard autorotation with turn to stagefield, student pilot pulled pitch slightly high. IP took the controls and attempted a power recovery, but the aircraft hit hard and slid forward to a stop. Main rotor blade severed tailboom during initial impact.

Fixed wing

C-12 Class D mishap

C series - During power approach and precision landing rollout, right wheel locked up, causing tire to blow out.

U-21 Class D mishap

A series - Large bird dove in front of aircraft during approach. Crew heard impact and felt aircraft shudder. Pilot reduced power and landed. Left outboard flap panel was damaged by birdstrike.

U-21 Class E mishaps

A series - When flap switch was placed in approach position, flaps did not move. Recycling of switch and circuit breaker had no effect, and aircraft landed flaps up.

H series - During engine runups, pilot noticed large drop in oxygen pressure. Hole in lines to cabin area allowed oxygen to escape.

F series - During climbout through 8,000 feet msl, left bleed air light came on. Emergency procedures were begun, and aircraft made uneventful landing.

Forging the links in an accident chain

The right aft auxiliary tank of the CH-47C was leaking. To isolate the auxiliary tank from the fuel system so that maintenance could be performed, the platoon sergeant told the crew chief to "cap the line between the auxiliary and main fuel tanks." The platoon sergeant failed to take into account the experience level of the crew chief and the complexity of the aircraft's fuel system—and he failed to supervise the crew chief's work.

The crew chief thought he did what he was told to do, but instead he capped the main fuel line, which supplies fuel to No. 2 engine. When the crossfeed switch was placed in the closed position, no fuel would go to No. 2 engine.

The technical inspector had limited recent experience in the operation of the CH-47C fuel system. He failed to consider all of the ramifications of the capping procedure, and he didn't recognize that the actual work that had been performed would prevent fuel from flowing through the main fuel line. He placed the aircraft on an "up" status, without realizing the aircraft was actually nonflyable.

The service platoon and quality control sections agreed that *when done properly*, capping the fuel line to achieve fuel cell isolation is a "safe and accepted common practice." How safe does that make the crew of an aircraft when mistakes like these are made? ■

Maintenance

UH-1 Class E mishap

H series - Aircraft was hovering during maintenance test flight for tail rotor installation. Left pedal hit stop, and a rapid 270-degree right spin developed. Pilot closed throttle and performed hovering autorotation. Caused by improperly rigged tail rotor.

U-8 Class E mishap

F series - Aircraft was at 500 feet agl, 120 KIAS, following maximum performance takeoff. Smoke was seen coming from left engine, and engine oil pressure dropped to zero. Crew shut engine down and made a single-engine landing. Two quarts of oil remained in engine. Vacuum pump had been modified by filing boss mount to allow clearance for installation on engine accessory gear case. Modification required sealing vacuum pump oil port with metal set. Metal set did not hold, resulting in loss of engine oil.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

He lost control of the aircraft

order to investigate, the IP decided to fly down the mountainside, and he allowed aircraft airspeed to decrease below effective translational lift (etl). The IP did this without ensuring he had adequate power to operate at approximately 7,500 feet msl.

When the attempted overflight was made, directional control of the aircraft was lost, and it began to rotate to the right and descend. The IP flew the aircraft down the mountainside, regained control, and decided to attempt the same maneuver a second time. On the second attempt, the aircraft spun out of control, impacted trees, and crashed.

The IP made an improper decision to slow the aircraft below etl as a result of overconfidence. He was experienced in mountain flying and had recovered control of the aircraft the first time. Therefore, he felt he was capable of performing the maneuver again.

It was more than 15 hours after the accident before assistance reached the crash site. The only communications capability the survivors had were a PRC-90 survival radio and signal flares. The signal flares could not be used since the crew chief was trapped in the wreckage and there was a fuel leak. There was a delay in locating the wreckage of the UH-1H because the PRC-90 radio transmits on UHF 282.8 and guard frequency (243.0), which are used primarily by military aircraft. Very few civilian aircraft (and there were many that overflew the site) are equipped with UHF. Other factors are the limited range (1 mile) of the PRC-90 survival radio and its limited battery life. The survivors attempted to use the radio beacon signal after they regained consciousness but turned it off after a few hours. They were afraid the battery would run down and decided it would be better to wait until they heard an aircraft flying in the vicinity. An emergency locator transmitter, which is crash-activated and operates on the VHF guard frequency (121.5) with which most civilian aircraft are equipped, would have enhanced the chances of survival in this accident. ■

U.S. ARMY SAFETY CENTER

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Commander, Army Safety Center

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Report of Army Aircraft Mishaps

When in doubt, go around

The three-member crew was scheduled for 4 hours of night vision goggles (NVG) training in a UH-1H. In addition to the PIC, who was in the left seat, and the copilot, another aviator was occupying the crew chief's seat. This aviator would serve as a third set of eyes during the mission and would fly as copilot during the last half of the flight. There was no crew chief on the aircraft.

The helicopter took off at 2110 en route to a training area where the NVG training would be conducted. All crewmembers were wearing AN/AVS-6(V) NVGs. The first of the two copilots was flying the aircraft, conducting NOE flight maneuvers and confined area operations.

About 20 minutes into the flight, the UH-1 crew joined up with another UH-1 and proceeded to conduct loose-trail formation flight. This formation flight was planned and had been briefed. After approximately 20 minutes of formation flight, the two aircraft returned to the training area, and the second UH-1 left for the airfield to refuel, using the north route.

After practicing NVG confined-area approaches for about 10 minutes, the mishap UH-1 crew also decided to return to the airfield to refuel and change copilots.

The PIC took the controls, and instead of entering the north route at the location designated by post regulations, he entered just to the west of the small arms ranges. This put the mishap UH-1 in front of the other aircraft that had departed earlier for the airfield. The pilot of that aircraft had contacted the airfield control tower and informed them that he was on the route for landing.

The copilot of the mishap UH-1 was not aware that the PIC had made an abbreviated entry into the route, and he informed the airfield control tower of their entry into the south route. When he contacted the tower, his aircraft call sign was

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garbled, and when the tower operator responded with the wrong call sign, the copilot did not correct the call sign error. The PIC told the copilot that they were not in the south corridor and were already on downwind approach. The copilot informed the tower they were in the north route, but once again he did not correct the error made by tower personnel in the aircraft call sign. The tower cleared them to land behind another UH-1. The tower thought the UH-1 in front of the mishap aircraft was the one that had also been conducting trail formation flight and which had left the training area ahead of the mishap UH-1. However, because the mishap UH-1 had made an abbreviated entry into the route, the aircraft with which they had been conducting trail formation flight was actually now behind them.

While the UH-1 PIC's entry into the route at other than the designated location was not a direct or contributing cause of the subsequent accident, it did cause confusion among tower personnel regarding aircraft sequencing throughout the series of events that followed.

On the sod landing area short of the taxiway and runway on which the mishap aircraft had been cleared to land, a formation flight of two UH-60s, under NVGs, had just landed and were holding to allow another UH-60, which had just landed on another runway from an ILS approach, to hover-taxi off the runway and go into the refueling point.

The trail UH-60, which was holding on the sod, had its navigational lights on bright with the formation lights and anticollision lights turned off.

The PIC of the mishap aircraft was expediting his landing by making a midfield base leg turn from the downwind leg and he remained at traffic pattern altitude. He lined up on final approach to the sod area where the two UH-60s were waiting to use the runway and started the approach under NVG conditions. Because of the midfield base turn and no altitude loss on base leg, the UH-1 was in a very steep approach angle with a fast rate of closure.

The PIC of the mishap aircraft could see the lights of the trail UH-60 that was holding on the sod area, and he was using these lights to make his approach. Because of the lights he could see illuminated on the UH-60, he thought the aircraft was an OH-58 with the anticollision lights turned off.

He continued the approach with his attention fixed on the UH-60's lights. When the UH-1 was on short final to the lights that he was using for the approach, the PIC realized that his rate of closure was too fast. Then realizing that his approach was terminating onto the Black Hawk, the PIC of the UH-1 attempted to simultaneously bank right and slow down his aircraft. As a result, his tail rotor struck the tail and main rotor system of the UH-60. The UH-1 crew heard a bang and felt the aircraft yaw to the right when tail rotor control was lost. The UH-1 landed hard, approximately 75 meters from the UH-60.

The UH-60 crew heard the sound of impact and felt the aircraft shudder. The UH-60 rebounded into the air, sprang to the right, and rolled onto its left side. The main rotor blades and tail cone struck the ground. The aircraft continued to rotate, impacting once again on the right nose area, and coming to rest upright.

There was nearly $90,000 damage to the UH-1H, and the Black Hawk was destroyed.

The UH-1 crew shut down their aircraft and got out to assist the crewmembers of the UH-60. The pilots of the UH-60 also shut down their engines, and one pilot and the crew chief got out. The pilot from the UH-60 and the PIC from the UH-1 assisted the other pilot out of the UH-60. The crewmembers of the UH-1 were treated at a hospital and released. The UH-60 crew remained in the hospital for observation after treatment for their injuries.

The PIC of the mishap UH-1 had 1,051 total rotary wing hours, with 939 hours in UH-1Hs. The aviator who was copilot of the UH-1 at the time of the mishap had 339 rotary wing hours, 289 in UH-1Hs. The PIC had flown 8 hours with NVGs in the previous 60 days; however, his NVG currency had expired about 2 months before and had not been renewed at the time of the accident. He had satisfactorily completed his instrument renewal and standardization flight and had undergone an evaluation flight about 3 weeks before the accident occurred. He was well-liked and perceived by other unit personnel as an experienced, professional aviator. There was nothing in his records showing any flight violations or previous direct accident involvement.

During the NVG approach to the unlighted sod landing area, the PIC of the UH-1H failed to use proper techniques as outlined in FC 1-211: Aircrew Training Manual, pages 9-13. He made the approach with a steep angle of approach, a fast rate of closure, and to the lights of a UH-60 helicopter in the landing area. On short final, he realized that his approach was being made to the UH-60, and he turned his aircraft to the right; however, the approach rate of closure was too fast for this action to prevent the UH-1 from hitting the UH-60, resulting in the accident and injuries. The pilot used improper NVG approach techniques because of:

- **Overconfidence.** The pilot found himself on a final approach that was unacceptable by the standards set forth in the ATM. When he realized what was happening, he should have made a go-around, but instead he elected to continue the approach that was too fast and steep because he felt that he could salvage the situation. His decision was based on the confidence he had in his own ability.
- **Inadequate attention.** The pilot used the navigational position lights of the UH-60 to execute his approach without cross-referencing to other visual indicators. He became fixated on these UH-60 position lights. As a result, it was not until short final that he became aware that his closure rate was too fast, and there was not enough time for him to react effectively.

During a review of air traffic control support at the airfield, it was discovered that the tower controller did not always provide traffic advisory alert warnings to aircraft when issuing clearances. Such warnings would have alerted pilots to other traffic in the area that could affect their flight. Under normal air traffic control at this airfield, traffic advisory alert warnings were issued only as workload permitted. With both unaided (without NVGs) night flights and aided (with NVGs) flights operating in the same airspace, it would have been prudent to provide ATC support that would allow every positive control measure available, by providing traffic advisories to all aircraft within the controlled area of the airfield. ■

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Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishap

H series - Aircraft landed to change pilots, and IP remained in right seat with aircraft running at normal rpm. The next pilot entered the aircraft and noticed his seat was adjusted to full-forward position. The pilot straddled the collective while attempting to adjust his seat to the rear, before sitting down. He inadvertently raised the collective, causing the aircraft to become airborne about 3 to 4 feet. The IP was unable to effectively control the aircraft, and a hard landing resulted.

UH-1 Class E mishaps

H series - About 5 minutes after takeoff from a field site, cyclic made a violent movement to full front left position. Aircraft went nose-low and lost about 150 feet of altitude. Cyclic returned to normal operation for 2 or 3 seconds, and aircraft returned to straight and normal flight. Then cyclic again went to front left position. Hydraulic systems were turned off, and aircraft made a running landing. Caused by failure of irreversible valve.

H series - Aircraft was chalk 3 in tactical trail/free cruise formation of four aircraft. During a 30-degree left banking turn around a ridgeline, 20 to 25 feet agl, main rotor struck the top of a tree.

H series - No. 2 tail rotor drive shaft rubbed against cover during flight. Cover had not been secured before flight.

H series - Engine oil pressure fluctuated during flight, and crew decided to land. During final, engine oil temperature exceeded 150° C., and master caution and engine chip light came on. On touchdown, there was a compressor stall, and the engine quit. A residual fire on the engine deck ignited and was extinguished by the CE. Quick disconnect failed on the oil line coupling at the engine deck, between the scavenger pump and oil cooler. The oil line came out of the top of the quick disconnect, although the quick disconnect was still together. The aircraft had sustained major structural damage prior to arriving in the unit and had flown 32.2 hours since depot repairs. Part is being sent to CCAD for examination.

V series - During takeoff at 32 pounds torque, aircraft experienced four compressor stalls, and exhaust gas temperature went above 760° C. Maintenance replaced engine.

UH-60 Class D mishap

A series - Crewmembers failed to ensure adequate obstacle clearance during NOE flight, and three main rotor tip caps were damaged when main rotors contacted a tree.

UH-60 Class E mishaps

A series - During runup, PIC noticed there was no indication on the rotor percentage gauge. Caused by failure of rotor speed sensor.

A series - No. 1 generator light came on during hover check. Generator control unit was replaced.

Attack helicopters

AH-1 Class E mishaps

F series - During NOE flight at about 20 feet agl, copilot noted turbine gas temperature passing through 900° C. Pilot confirmed tgt and initiated approach to open field. Rpm audio and light came on, and pilot noticed N2 and rotor rpm at 93 percent. Caused by failure of engine fuel control.

F series - During short final, crew heard series of loud reports and noticed slight left yaw. Torque was approximately 50 to 55 percent, and all bleed air was off. Engine was replaced.

F series - Aircraft was on approach for landing. Crew heard two sharp pops from engine area, and aircraft yawed left. Engine was replaced.

P series - During cruise flight, PIC noticed engine oil temperature was 93° C. While inbound, engine oil temperature dropped to 70° C., and temperature fluctuated from 70° to 120° throughout approach. Caused by failure of temperature transmitter.

AH-64 Class E mishaps

A series - While aircraft was being moved from one firing position to another, crew heard loud, whining sound from transmission area. Caused by internal failure of shaft-driven compressor (SDC). SDC light did not come on.

A series - During movement to another firing position, utility hydraulic psi and oil-low utility hydraulic lights came on. Caused by failure of utility hydraulic pressure line.

A series - Three aircraft experienced hot battery caution lights.

A series - Tail rotor temperature light came on during OGE hover. Aircraft had been operated at a high power setting and very low airspeeds for almost an hour. Problem could not be duplicated during test flight.

A series - Both pilots noticed high-frequency vibration in the pedals during flight, and after landing, vibration was noticed in floor and crew seats. Maintenance replaced No. 7 drive shaft.

A series - Crew smelled burning odor during hover and environmental control unit (ENCU) failed. During shutdown, there was a whining sound from the ENCU area. Maintenance replaced ENCU.

A series - While repositioning to parking, primary hydraulic psi caution light came on. Caused by failure of primary hydraulic pressure switch.

Cargo helicopters

CH-47 Class D mishaps

D series - While hovering over an M102 that had just been transported externally, pilot allowed the aircraft to drift prior to releasing the load, causing the gun to turn over. The pilot was wearing AN/PVS-5A night vision goggles and was operating in dusty conditions over a landing zone of tall grass and numerous ruts.

D series - No. 3 drive shaft tunnel cover separated from aircraft during flight. Caused by failure of rivets connecting drive shaft cover to the hinge plate.

Observation helicopters

OH-58 Class E mishaps

A series - Pilot became disoriented due to reduced visibility and elected to land at an available helipad instead of risking inadvertent IMC or flight through nearby restricted areas. After delay, and a calculation of remaining fuel, pilot determined fuel was too low to permit return flight and risk of inadvertent IMC recovery. Pilot had flown too far west of desired course, in unfamiliar terrain and reduced visibility, causing him to have insufficient fuel to reorient himself and return to home base.

A series - While conducting straight and level flight at about 500 feet agl, fuel boost light flickered on and off. Caused by failure of submerged pump.

C series - During landing from a hover, engine oil bypass light came on and aircraft landed. Oil in sight glass was at the bottom of the glass. Maintenance history revealed excessive oil consumption, and maintenance replaced engine.

D series - While in cruise flight at 80 KIAS, 1,000 feet msl, with 60 percent mast torque, aircraft yawed left, then right. NG went to 51 percent and NR to 94 percent. IP initiated autorotation. At 200 feet agl, NR was 104 percent and NG at 62 percent, and aircraft was landed with reduced power. Maintenance checked throttle rigging and test flew aircraft. During test flight, fuel control message came on. Maintenance replaced engine control unit.

D series - During hover, pilot noticed transmission oil pressure dropping. After aircraft landed, oil was found on transmission deck, and transmission chip detector had backed out of housing. Troubleshooting revealed no defect. After transmission was serviced, chip detector was reseated and maintenance operation check completed. Again during hover, oil pressure dropped, oil was lost, and the chip detector popped out. Back shell of the chip detector cannon plug had contacted the transmission mount while aircraft was at a hover, causing the chip detector to disengage. An urgent message is being dispatched by the manufacturer to all users, requiring that the L-shaped cannon plug be oriented in the 6 o'clock position.

Fixed wing

C-12 Class E mishap

F series - Left fire pull handle came on during flight. Caused by failure of fire detector control amplifier.

OV-1 Class E mishaps

D series - During go-around after executing a low approach, landing gear doors would not retract. During preflight, pilot thought the left shock strut was underserviced when, in fact, it was serviced properly. He had maintenance service the strut, and later the strut was found to be overserviced, and air had to be removed.

D series - During taxi, No. 2 prop would not come out of reverse. Maintenance replaced auxiliary motor.

Mishap briefs

D series - Landing gear would not go down. Pilot made a go-around and blew gear down. Hydraulic pump shaft had sheared.

U-21 Class E mishaps

A series - During takeoff roll, copilot noticed fuel leaking from right engine nacelle. Caused by failure of check valve assembly.

A series - No. 2 engine forward cowling latch broke during flight, allowing cowling to pop open. Slipstream caused cowling to bend and twist back.

H series - During flight, left nacelle began siphoning fuel from fuel cap. Copilot failed to seat fuel cap properly after fuel check.

Maintenance

UH-1 Class E mishap

H series - Aircraft was on short final to field site, 30 feet agl, 20 KIAS. PIC noticed stiffness in flight controls and had just started a go-around when master caution and hydraulic lights came on. Failure to tighten hydraulic fitting caused loss of hydraulic fluid.

Safety messages

• Safety-of-flight maintenance mandatory message concerning one-time special inspection of tail rotor hub retaining nut on UH-1/EH-1 series aircraft (UH-1-87-10, 081345Z Sep 87). Summary: SOF technical message UH-1-86-05, 111800Z May 86, directed inspections of tail rotor nuts on UH-1/EH-1 series aircraft. The inspections were to identify and eliminate improperly manufactured nuts from Army inventories. Nuts that passed inspections were to be marked on the side with a center punch for ready identification, and any nuts installed subsequently were to be inspected and marked prior to installation. The defective nuts continue to appear on aircraft, and it is believed that defective nuts are still in the supply system and are being installed without the required prior inspection. Purpose of this message is to direct a reinspection of aircraft for these nuts and a more rigorous purge of supplies. Pre-installation inspections will be continued.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

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Report of Army Aircraft Mishaps

He should have followed the book... not his instincts

The pilot of the OH-6A was ferrying the aircraft to a unit where it would be used during training. He took off from a helipad and turned to a westerly heading at 700 feet agl and 70 knots indicated airspeed. Suddenly he heard a loud bang, the aircraft yawed right, and the nose tucked. He decided against attempting to reach an airport and elected to land because the aircraft was continuing to spin. The pilot lowered the collective to reduce the severity of the yaw but did not enter full power-off autorotation (throttle off) because of the increasing rate of descent.

As the helicopter rotated to the right, the pilot followed with cyclic, and as it descended to within about 50 feet of the ground, he added collective in an attempt to abate the rate of descent and cushion his touchdown. With the increase in power, however, the aircraft spun rapidly to the right and struck the ground. The right skid sheared off, and after spinning another one and one-half times along the ground, the aircraft came to rest on its right side in a cornfield, facing in a westerly direction.

The pilot was uninjured, and he was able to get out of the aircraft unassisted. He then walked about one-half mile to a telephone and reported the accident.

While the OH-6A was in cruise flight, the abrasion strip on the tail rotor sheared, creating an aerodynamic and weight imbalance. The resulting overstress caused the tail rotor gear case to fracture and separate from the aircraft. As a result the nose tucked, and the aircraft began to rotate about the vertical axis. The abrasion strip sheared because the adhesive coating that holds the abrasive strip in place on the tail rotor blade was not properly applied when the strip was installed. Test procedures in use when the abrasion strip was installed could detect voids in bonding, but they were not capable of discriminating between degrees of bonding.

When the tail rotor separated from the aircraft at 700 feet agl, the pilot failed to enter autorotation as described by paragraph 9-23 in the OH-6A operators manual. He lowered the collective but did not roll off the throttle. The reason he failed to follow the proper procedure and enter autorotation was a lack of composure during the emergency. He did not want to roll

(continued on back page) ►

Got a safety idea? Call Toll Free 24 Hours a Day 1-800-STAYSAF

Selected aircraft mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class D mishaps

H series - Pilot misjudged clearance during landing at a field site. Undersides of aircraft main rotor blades were damaged when they struck a bush.

V series - Aircraft was 900 feet agl at 100 KIAS. Bird flew into nose of aircraft, breaking chin bubble and making small dent in airframe.

UH-1 Class E mishaps

H series - Rpm light came on during descent, and N2 dropped to about 6000 rpm. As pilot turned toward small open area, rpm stabilized. Pilot ensured throttle was fully open and tried to increase engine rpm with governor increase/decrease switch. About 5 seconds later, rpm dropped to 5800, and pilot directed copilot to go to emergency governor operations. Rpm was recovered and pilot flew one-half mile to airfield before landing.

H series - After takeoff, pilot noticed airspeed indicators were inoperative. Caused by water in pitot static system.

H series - Master caution and transmission lights came on during flight, and transmission oil temperature fluctuated. Caused by failure of thermostat.

H series - During flight, crew felt four shuddering vibrations about 20 minutes apart, which they attributed to wind gusts or pedal overcontrol. When a fifth vibration followed after only a few minutes, and N2 and rotor rpm dropped to 6300, crew decided to land. Cause has not been determined.

H series - During takeoff, crew felt unusual back pressure in left forward quadrant of cyclic. Maintenance replaced force gradient spring.

UH-60 Class D mishap

A series - Hoist load started oscillating, and before crew could put load on the ground, the cable broke. Load swing and aircraft movement probably allowed hook assembly to slide to side of attachment point, causing cable to bind and break.

UH-60 Class E mishaps

A series - During flight, copilot's airspeed indicator dropped to zero while pilot's indicator showed 50 KIAS. Suspect heavy rain allowed water to get into pitot static system. Three other aircraft also showed indications of water in the pitot static systems.

A series - During takeoff, pilot felt vibrations which he associated with stuck antiflap stop. Bushings for antiflap had become unseated.

Attack helicopters

AH-1 Class E mishaps

F series - Transmission oil bypass light came on during flight, but all other indications were normal. Aircraft made uneventful landing in a field. Caused by loose wire to light.

F series - During normal engine start, turbine gas temperature (tgt) began rapid increase. PIC, who was in the back seat, turned key off, but tgt continued to rise and PIC rolled throttle down. Tgt increased to 1,000° C. for 1 to 2 seconds. Pilot, in gunner station, confirmed tgt readings and noted that front seat governor switch was in the emergency position. Caused by improper checklist procedures.

F series - Forward fuel boost light came on during flight. Corroded ground wire caused loss of power to fuel boost pump.

F series - During runup, PIC smelled electrical fire, and crew chief saw smoke coming from top of pylon. Inspection revealed ash on transmission support under alternator. Suspect internal failure of alternator caused fire.

P series - Aircraft was in a lateral hover during training flight. Following a simulated TOW missile engagement, crew heard loud report from rear of aircraft. Tgt climbed to 950° C., and aircraft yawed. While aircraft was being maneuvered to a landing area, two more reports were heard, and tgt remained between 880° and 950° C. for 5 to 10 seconds. When collective was reduced for landing, tgt returned to normal. Suspect compressor stall.

AH-64 Class E mishaps

A series - During postflight, tail rotor assembly was found to have excessive play. Caused by internal failure of tail rotor swashplate assembly.

A series - After No. 2 engine start during runup, low utility hydraulic caution light came on. Inspection revealed fluid leaking from utility hand pump seal. Caused by failure of hand pump seal.

A series - During systems check with APU running, crew detected odor of electrical burning, and crew chief saw smoke coming from the target acquisition designation system. Fire went out when aircraft was shut down. Cause unknown.

FY 87 Class A Mishap Countdown

	Month	FY 86 Class A Mishaps	FY 86 Army Fatalities	Month	FY 87 Class A Mishaps	FY 87 Army Fatalities
1st Qtr	October	3	0	October	3	4
	November	5	1	November	1	0
	December	1	1	December	4	6
2nd Qtr	January	3	4	January	3	3
	February	3	2	February	1	4
	March	4	3	March	4	2
3rd Qtr	April	1	8	April	2	1
	May	2	0	May	5	3
	June	2	2	June	5	13
4th Qtr	July	5	3	July	2	5
	August	3	1	August	5	1
	September	2	2	1 – 30 Sep	3	0
	Total for Year	34	27	Total to Date	38	42

A series - During approach to refueling point, vibration gearbox light came on. Accelerometer failed, causing false indication on gearbox vibration light.

Cargo helicopters

CH-47 Class E mishaps

C series - During flight, No. 2 flight boost manifold was found leaking. Maintenance replaced flight boost manifold.

C series - During postflight inspection, differential collective pitch actuator was fully extended. Maintenance replaced speed trim amplifier.

D series - During climbout, pilots heard a strange noise coming from the forward transmission area and aborted the takeoff. The noise occurred again during maintenance test flight and further investigation revealed the rotor head was loose on the forward mast. Suspect forward rotor head retaining nut was improperly torqued at the factory, allowing play to develop in forward rotor head.

Observation helicopters

OH-58 Class C mishap

C series - While pilot was attempting to start aircraft from the left seat, he noticed turbine outlet temperature was rising too fast. Emergency procedures were initiated; however, improper throttle technique was used, resulting in overtemp of aircraft. IP was acting as fireguard.

OH-58 Class D mishap

D series - Crewmember opened door during hot refueling, and it was blown off by a gust of wind.

OH-58 Class E mishaps

A series - During transition training, IP was demonstrating takeoff from confined area. As airspeed increased, IP felt high-frequency vibration in tail rotor pedals and landed. Maintenance was unable to duplicate problem.

C series - During final approach, aircraft transmission oil pressure gauge indication went to 110 percent. Caused by failure of the oil pressure gauge.

C series - During approach for landing, two aircraft had birds strike their windscreens.

C series - During hover/taxi, flight controls became stiff, and master caution and hydraulics pressure lights came on. Caused by failure of hydraulic pump.

D series - Ten minutes after takeoff, the mast-mounted sight powered down without warning, and crew could smell fumes from hot electrical wires. Maintenance replaced remote control circuit breaker.

Fixed wing

C-12 Class D mishap

C series - Aircraft took off with inoperative weather radar. No thunderstorms were indicated either at takeoff point or on en route weather updates. Aircraft was IMC in stable air with OAT -10° C. when crew saw a lightning flash to the left and rear of aircraft. Later inspection revealed damage to both inboard flaps, left elevator, and right propeller tip. Engine was removed to determine if there was any internal damage.

OV-1 Class D mishap

D series - During preflight, pilot found what he considered negligible damage to bottom of APS-94F side-mounted airborne radar (SLAR) boom. The following evening, technical observer discovered the same damage and reported it to the maintenance officer. A detailed investigation was conducted. The investigating officer could not conclusively state the cause of the damage; however, the abrasion pattern on the bottom of the SLAR boom strongly indicates the damage occurred during some phase of flight.

OV-1 Class E mishaps

D series - As pilot began descent for approach, he noted the autopilot would not disengage. Autopilot descent was made to 3,000 feet agl, and aircraft leveled off. Maintenance instructed pilot to position inverter switch to emergency. This interruption of ac power allowed pilot to take manual control of the flight controls, and pilot entered traffic and prepared for landing. On base leg, autopilot again engaged, requiring pilot to abort landing. Pilot declared an emergency and again reentered traffic. Pilot continued approach and landed with autopilot engaged. Suspect internal failure of navigational coupler.

D series - No. 1 engine hydraulic pressure gauge stuck at 3,000 psi during takeoff. Maintenance repaired wiring at transmitter cannon plug.

D series - During takeoff roll at approximately 80 KIAS, aircraft engines ingested several small birds. Another OV-1 at the same airfield collided with several large birds immediately after liftoff.

U-21 Class E mishaps

H series - During flight, pilot saw fuel seeping from left engine nacelle. Caused by failure of left fuel probe seal.

H series - Copilot detected smoke coming from behind instrument panel during flight. Caused by internal failure of weather radar.

H series - During engine runup, No. 1 autofeather light failed to go out. Light was stuck in test position.

H series - During after-takeoff check, crew saw fuel leaking from right engine nacelle. Fuel con-

Mishap briefs

tinued to leak until engine was shut down. Caused by faulty fuel cap.

Maintenance

UH-1 Class E mishap

H series - Master caution light came on during flight, but there was no accompanying segment light. Aircraft made uneventful landing, and master caution light again came on when the standby generator picked up the load. Caused by improper voltage separation between the main and standby generators.

CH-47 Class D mishap

D series - During slingload of 2 ½-ton truck, FE noticed hydraulic fluid flowing along bottom of aircraft and blowing into his face. He checked hydraulic fluid levels and found the level on No. 2 flight hydraulic system was decreasing. Hydraulic fitting had been cracked during installation.

Safety messages

• Safety-of-flight technical message concerning one-time inspection of shaft coupling washers on CH-47B, C, and D aircraft (CH-47-87-10, 142230Z Sep 87). Summary: Several shaft coupling washers (P/N 114D3044 series) have been identified as having flat surfaces instead of the required 7-degree bevel on both surfaces. Beveled surfaces are needed to minimize stress concentration which leads to cracking of the flex plates against which the washers bear. Suspect washers may be installed in the flexible couplings of the synchronizing and engine cross shafts of all CH-47 models and in the blower drive shaft of CH-47B and C models. The purpose of this message is to require a one-time inspection of all CH-47 helicopters to identify and replace defective washers of this series. If satisfactory replacement washers are not immediately available, the aircraft may be operated for a maximum of 30 additional flight hours, provided that couplings that have defective washers installed are inspected for cracks at intervals of 10 flight hours.

For more information on selected mishap briefs, call AUTOVON 558-4198/3901, commercial 205-255-4198/3901.

Potential hazards of aircraft fuel deicer

Aircraft fuel deicer additives can pose potential hazards for aircraft crews and support personnel during aircraft refueling operations.

Although the Army does not routinely procure bulk quantities of aviation fuels requiring that deicers be added, aircraft crews are at times exposed to the potential hazard. Fixed-base operators at civilian airfields do procure aviation fuels that require deicer additives be injected during refueling operations. On such occasions, Army aircrewmembers are exposed to the potential hazards associated with deicer additives. Individual crewmembers are routinely involved in refueling operations for their aircraft at civilian airfields and should be made fully aware of the potential hazard.

Ethylene glycol monomethyl ether (EGMME), the primary ingredient of Prist additive, is primarily a central nervous system depressant, although various animal studies have revealed that acute inhalation overexposure may cause kidney injury. Primary symptoms of inhalation overexposure include headaches, drowsiness, blurred vision, weakness, incoordination, tremor, unconsciousness, and even death —especially in confined or poorly ventilated areas.

EGMME is only mildly irritating to the eyes and skin; however, it can be readily absorbed through the skin in toxic amounts. Symptoms of overexposure due to skin absorption are essentially the same as those of inhalation.

Ingestion of EGMME in massive doses is reported to cause death by narcotic action, but at lower dosage levels, death is delayed and is accompanied by lung edema, slight liver injury, and marked kidney injury.

Prist additive should be blended with turbine fuel as it flows into an aircraft tank. This method of proportioning at the point of use is more effective than blending the Prist additive into jet fuel being put into storage.

Prist additive should be protected from contact with oxidizing agents, including long-term contact with the air. It can combine with oxygen to form explosive peroxides after long-term contact with air.

Prist additive should be handled as a combustible liquid and stored away from direct sunlight and other sources of heat. The flammable limits of its vapor range from 2 to 14 percent in air. ■

—Reprinted from U.S. Army Training and Doctrine Command Aviation Standardization Bulletin No. 2-87, dated 1 Sep 87. Point of contact at U.S. Army Materiel Command is L.L. Becker, AUTOVON 284-9475/9476.

He should have followed the book... not his instincts

off the throttle and aggravate the rate of descent that was established when the collective was lowered. As a result, the aircraft continued to rotate about the vertical axis.

When he subsequently applied collective to slow the descent for landing, with the throttle still on, the aircraft increased its rate of spin to the right. The pilot lost control as the aircraft struck the ground, still in a violent spin to the right. Total damage from the materiel failure and the subsequent events amounted to more than $84,000.

The pilot had failed to follow proper procedures by completing a daily inspection of the aircraft prior to flight. TM 55-1520-214-PMS requires use of a 5X magnifying glass to inspect bonding of the tail rotor blade abrasion strip. However, the pilot was confident that a preflight would suffice for the daily inspection; consequently, he signed off on a logbook entry without following the required steps.

This pilot had a total of 2,168 rotary wing hours, primarily in UH-1Hs. He had 220 hours in the OH-6A. He had satisfactorily completed his instrument renewal, and a standardization flight evaluation had been conducted only a few days before the mishap occurred. The pilot's records revealed no flight violations or any previous direct involvement in an aircraft accident. ■

Chin strap pad for SPH-4 helmet

Numerous requests have been received from the field for a pad that can be used on the SPH-4 helmet chin strap. Some people are using a thick foam pad, which could prove dangerous in a crash. Such pads could compress during a crash sequence, allowing the helmet to come off, and leaving the wearer's head unprotected.

In order to prevent helmets from coming off, and still provide some degree of comfort to personnel who have problems with the SPH-4 helmet chin strap, the chin strap from the tanker's helmet should be used. To obtain these pads, specify:

Pad, chin strap NSN 8415-00-163-9048

No other chin strap pad should be used with the SPH-4 helmet. If other pads are in use, they should be discarded immediately.■

—MAJ John V. Barson, Chief, Life Support Equipment/Crew Injury and Epidemiology Branch, U.S. Army Aeromedical Research Laboratory, AUTOVON 558-6881/6882, commercial 205-255-6881/6882.

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