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Accident sense and the FY 82 record

VII. Supervisory error: Failure to correct actions of subordinates

This is the seventh in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. This week we will focus on failure to correct actions of subordinates, one of five dominant supervisory errors involved in fiscal 82 Class A flight accidents. Accidents caused by failure to correct actions of subordinates resulted in three fatalities and cost the Army almost $2,400,000.

• A UH-1H was the lead aircraft in a flight of four. The flight proceeded down a valley at an altitude of 100 to 150 feet agl and an airspeed of 90 to 100 knots. The copilot was flying the lead aircraft and the PIC/air mission commander was navigating. The copilot saw one set of wires to his front and missed them, but the aircraft hit another set of wires which were higher than the first set. Control was lost and the aircraft crashed. The PIC was concentrating on his map and did not monitor the performance of the pilot, who was flying at an airspeed excessive for the terrain and altitude. The mission was being flown at an altitude below the level of the highest terrain without benefit of a route/hazard recon as required by the unit SOP. The unit commander was onboard one of the aircraft in the flight, yet took no corrective action. Also, a current hazards map was not maintained in the operations area nor by the pilots involved in the accident. Result: destroyed aircraft, one minor injury, and $930,000 in losses. The PIC had 471 rotary wing hours, with 421 in the UH-1H. The copilot had 313 rotary wing hours, with 263 in the UH-1H.

• A UH-1H was scheduled to take supplies to a river site and pick up some troops. Before taking off on his mission, the pilot was told by his platoon leader, who was participating in adventure training on the river, to recon the surface condition of the river downstream and to check for campers. Rappelling training was planned for the next day in the area. Three crewmembers and three passengers—the acting troop commander, the acting squadron commander, and a flight surgeon—were on board the aircraft. The first part of the mission was completed, the supplies were offloaded, and three more soldiers boarded the helicopter. The pilot took off and proceeded downstream. A post regulation and the unit SOP prohibited flights at altitudes less than 300 feet above the ground outside the military reservation. The pilot decided he could not do a good recon of the river from 300 feet. He went down to 75 feet and flew down the river at an airspeed of about 80 knots. A few minutes later, the helicopter hit powerlines. Control was lost and the aircraft crashed. The acting troop commander, a current and qualified aviator, was seated behind the copilot and was monitoring the communication system. At no time during the 10-minute flight at the low altitude did he tell the crew they were in violation of regulation and require them to operate the aircraft at a higher altitude. Result: destroyed aircraft, three fatalities, six major injuries, and $1,350,000 in losses. The pilot had 839 rotary wing hours, with 784 in the UH-1H. The copilot had 316 rotary wing hours, with 266 in the UH-1H.

Next week's article will focus on failure to provide adequate guidance. ■

Accident review: mountain flying mission

Synopsis

A UH-1V was flying up a canyon toward rising terrain. Application of aft cyclic caused airspeed to decrease below effective translational lift. The aircraft began an uncommanded right turn and control was lost. The Huey crashed in a level attitude in the canyon.

History of flight

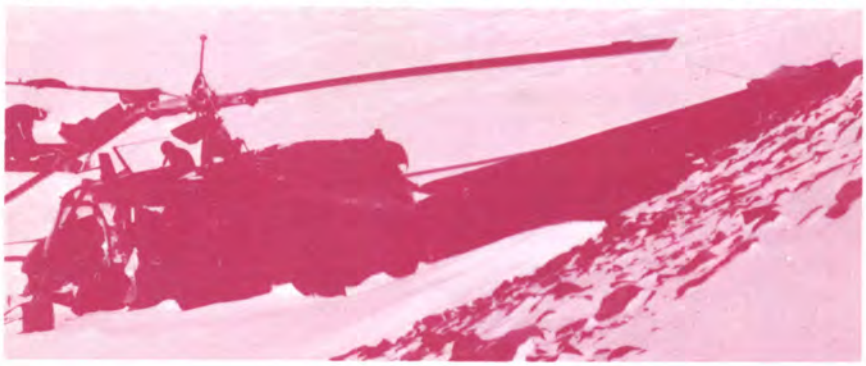
A civilian aircraft was missing in the mountains. An aviation unit received a request to supply a helicopter to help in the search. A UH-1V was assigned the mission.

Earlier in the day, the PIC had completed his preflight planning tasks, filed a VFR flight plan, checked the weather, prepared a performance planning card, and flown a 1-hour support mission. The aircraft was returned to the airfield and the crewmembers remained on standby until notified of the search mission. They then went to the aircraft to prepare for takeoff. The crew did not do a through-flight inspection in accordance with the operators manual although the 1-hour mission had been flown earlier.

The Huey, with five people on board, left the airfield and flew to the search area. The missing aircraft was not located, and the search aircraft landed at a civil airport. After a brief stay on the ground, the crew took off again to continue the search.

As the aircraft entered a canyon, a strong emergency locator transmitter signal was received. The UH-1 was about 400 feet above the ground and the airspeed was 35 knots when the PIC told the copilot, who was flying the aircraft, to maintain 60 knots. The copilot increased the airspeed and continued on until the signal stopped. He then reversed course, proceeded down the canyon, reversed course again, and flew up the canyon. During this time, the PIC was marking his map to indicate the elevation and approximate ELT signal location.

The radar altimeter indicated that the aircraft was 147 feet above the ground and airspeed was about 45 knots wher



the copilot sensed that something didn't feel right. He immediately increased power and applied forward cyclic to increase altitude and airspeed. At the same time, he asked the PIC for instructions since the approach terrain was rising very fast and airspeed was decreasing to zero.

The aircraft began a slow turn to the right, engine and rotor rpm started to bleed off, the low rpm audio sounded, and the rpm light came on. The copilot applied full left antitorque pedal in an unsuccessful attempt to stop a yaw to the right and then followed the turn with right cyclic toward lower ground to avoid hitting a ridge. The aircraft began a near vertical descent and crashed into a ravine.

Four of the occupants, although slightly injured, were able to exit the aircraft unassisted. The copilot sustained a back injury and had to be helped from the wreckage. The crewmembers put on their cold weather clothing to protect them from the wind, snow, and cold temperatures. Radio contact could not be established with other aircraft in the area.

The crew decided to use the wreckage as a shelter and wait for a search party to locate them. Throughout the night, several attempts were made, without success, to establish radio contact by using the aircraft radios and the survival radio.

The next morning, the crew heard a helicopter coming up the valley. A smoke grenade and pen gun flares were used to signal the helicopter. Some time later a CH-47 dropped off a rescue party at an LZ near the accident site, and the UH-1 crewmembers were evacuated to a hospital.

Crewmember experience

The 43-year-old PIC had more than 3,300 rotary wing hours, with more than 1,700 in the UH-1. The 34-year-old copilot had more than 2,000 rotary wing hours, most of them in the UH-1. He had not flown in an area environmentally similar to that in which the accident occurred.

Commentary

Shortly before the accident, the PIC warned the nonmountain-trained copilot to keep his airspeed up. Although warned, the copilot inadvertently allowed the airspeed to dissipate below effective translational lift because of a tailwind, the rapidly rising terrain in the canyon, and his concentration on searching for the missing aircraft. As the airspeed dissipated, more power was applied to maintain altitude and left antitorque pedal was applied to maintain directional control. The aircraft began a right yaw which intensified as the copilot continued to apply power in an attempt to fly out of the turn and maintain altitude. The aircraft also began to settle because of the winds and turbulence associated with mountain flying and the low rotor rpm caused by the demand for power in excess of power available.

During the turn, the aircraft was over a relatively level ridge on which the aircraft could have been landed, as required by the operators manual for loss of tail rotor control/effectiveness. Instead, the copilot tried to fly out of the turn by lowering the nose of the aircraft in a descending dive toward the valley floor.

The PIC, after warning the copilot to keep up the airspeed, concentrated on marking his map. When he looked up from his map, the aircraft had begun to turn and effective control was lost. The PIC was confident that the copilot, because of his experience and his contact IP status (outside mountainous areas), could fly the mission. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps ☐ (H series) Crew heard loud banging noise. IP then saw cargo mirror break away from aircraft. Suspect failure of brace assembly. ☐ (H series) As aircraft touched down, it was completely covered by snow cloud. Aircraft slid 6 to 8 feet before coming to a stop. Left skid and ski were damaged.

UH-1 Class E mishaps ☐ (H series) Right pedal would not move as aircraft was on final approach. Caused by defective tail rotor servo. ☐ (H series) Aircraft yawed left and right and torque fluctuated between 15 and 35 psi. N_1 and egt also fluctuated. Caused by failure of fuel control. ☐ (H series) Vertical vibration developed during flight. Caused by worn rod end bearing. ☐ (H series) Cabin filled with smoke during taxi for takeoff. Caused by engine failure. ☐ (H series) Engine oil temperature fluctuated, and master caution and engine oil pressure lights came on. Thermal bypass valve was stuck in closed position. ☐ (H series) Transmission oil pressure gauge fluctuated. Caused by defective pressure transmitter. ☐ (H series) Master caution and transmission oil hot lights came on. Caused by malfunction of thermostatic switch.

UH-60 Class C mishaps ☐ Pilot flared excessively during approach for landing and lost sight of intended landing point. Aircraft touched down in nose-high attitude and stabilator hit the ground. ☐ Aircraft hit small tree during landing, damaging four main rotor tip caps.

UH-60 Class E mishaps ☐ Avionics compartment door came open during landing. Medic had replaced compartment vent after preflight inspection and had not resecured key lock on compartment door. ☐ Stabilator failed on takeoff and could not be reset. Caused by stuck K-4 relay. ☐ Preflight inspection revealed 2-inch separation on trailing edge of tail rotor blade. Metal bracket bonded to graphite spar which is part of tail rotor blade pivot assembly had come loose in flight, causing trailing edge of blade to separate.

Attack helicopters

AH-1 Class E mishaps ☐ (S series) Oil bypass light came on during runup. Oil puddle was found in bottom of engine combustor section. Rubber slivers from O-ring in oil pump fouled spring/ball relief valve, allowing oil into engine. ☐ (S series) Transmission oil bypass light came on during takeoff. Caused by failure of pressure switch. ☐ (S series) N_2 tachometer dropped to zero during landing. Caused by failure of tachometer generator. ☐ (S series) Tgt exceeded 900 degrees for about 8 seconds during NOE deceleration. Leaves were found to be blocking turbine inlet screens.

Cargo helicopters

CH-47 Class E mishaps ☐ (B series) No. 2 engine chip detector light came on during runup. Caused by failure of nose gearbox. ☐ (C series) Smoke was seen coming from rear of aircraft during landing. Caused by hydraulic fluid leaking from utility hydraulic pump onto generators.

Observation helicopters

OH-58 Class C mishaps ☐ (A series) As power was applied to bring aircraft to stationary hover at 10 feet, right 90-degree pedal turn was initiated. Aircraft continued to turn right for three revolutions. Pilot reduced throttle and aircraft hit the ground, damaging landing gear and vertical fin. ☐ (A series) Rotorwash from hovering aircraft caused copilot's door to separate from OH-58 and break chin bubble. (continued on next page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**4**	**2**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

OH-58 Class E mishaps □ (A series) Engine oil temperature fluctuated from 50 degrees to 130 degrees and then stabilized at 80 degrees. Caused by failure of temperature gauge. □ (A series) Pilot applied insufficient initial pitch to slow descent during landing. Tail stinger hit ground and aircraft bounced about 5 feet. IP took control, leveled aircraft, and landed. □ (A series) Hydraulics were lost during flight. Caused by failure of hydraulic pressure return line quick disconnect fitting. □ (A series) Master caution and d.c. generator lights came on. Caused by sheared generator shaft.

Fixed wing

C-12 Class E mishaps □ (A series) Flaps failed to extend for landing. No-flap landing was made. Caused by stuck flap motor relay switch. □ (A series) No. 1 engine torque decreased to 70 percent during descent for landing. No. 1 engine torque was increased to 75 percent and No. 2 engine torque was decreased to 75 percent. No. 1 power lever was well forward of No. 2 power lever. Caused by rupture of high pressure bleed valve diaphragm.

OV-1 Class A mishap □ (D series) Aircraft was involved in testing for verification of OV-1D VMC/stall speeds. Aircraft was being operated at a gross weight of 18,313 pounds and approximately 3,500 feet agl with gear and flaps down to simulate an approach configuration at maximum gross weight. Pilot reduced power on left engine to idle and set power on right engine at 80 percent. Aircraft was then allowed to slow until control buffet occurred and left wing dropped. Pilot announced that VMC was reached at 78 knots and he was initiating a recovery. Recovery was not made, and aircraft continued into a 45-degree, nose-down, left spiral and crashed. Two fatalities. 8306

OV-1 Class E mishaps □ (D series) No. 2 generator failed during climbout. Caused by short in unadjustable voltage regulator. □ (RV-1D) No. 2 engine oil temperature increased to 150 degrees during flight. Caused by failure of scale-board in display unit. □ (D series) Fuel boost pump light came on. Caused by failure of aft boost pump. □ (RV-1D) No. 1 engine chip detector light came on during runup. Caused by failure of western gearbox.

T-42 Class E mishap □ No. 2 alternator ammeter went to zero in flight. Caused by failure of alternator.

U-21 Class E mishaps □ (A series) When gear handle was raised, transit lights did not go out. Whining sound was heard from gear motor. Crew manually extended gear and landed. Caused by stripped gears in landing gear motor shaft. □ (A series) Right fuel boost pump pressure gauge fluctuated and right boost pump light came on during flight. Caused by failure of fuel boost pump. □ (D series) Crew noticed fuel leaking from right nacelle during flight. Caused by failure of preformed packing.

Maintenance

UH-1 Class C mishap □ (H series) While rotor was coasting to a stop during maintenance operational check, pilot placed cyclic in left forward quadrant. Jolt was felt in cyclic control and it was placed in center position. Inspection revealed that white scissors lever hit stud on retaining plate on rotating ring of swashplate, gouging scissors lever and retaining plate. Caused by incorrectly adjusted collective servo clevis.

UH-1 Class E mishaps □ (V series) Oil was seen on floor when aircraft was landed. Hole was chafed in oil line in transmission well. □ (V series) Transmission oil pressure gauge fluctuated and pressure decreased to 35 psi. Crew chief did not fully close transmission valve after taking oil sample.

UH-60 Class E mishap □ Crew was alerted by crew of another aircraft that aft drive shaft access cover appeared to be open. Postlanding inspection revealed both access covers were open. Camloc studs installed on drive shaft cover were the wrong type.

OH-6 Class E mishap □ Fuel filter caution light came on during low-level flight. Caused by chafed wire to fuel filter.

OH-58 Class E mishaps □ (A series) Engine-out light came on and N_1 decreased below 50 percent during standard autorotation. Postlanding inspection revealed N_1 throttle linkage on copilot's controls and flight idle screws were out of adjustment. □ (C series) Copilot felt binding in cyclic control during hover. After aircraft was landed, bolt from lower hydraulic reservoir mount was found lying on forward hydraulic servo.

Messages received

• Safety-of-flight maintenance mandatory message concerning one-time inspection of CH-54A rotor brake disc (CH-54-82-05, 152108Z Nov 82). Summary: Seven Quality Deficiency Reports on rotor brake disc, P/N 6435-20196-102, have been received in the past 36 months. The rotors, which have undergone analysis, indicate failure occurred as a result of stress corrosion. Complete failure of the disc can be destructive to the aircraft. The purpose of this inspection is to remove this rotor brake disc from the inventory. Contact: Michael West, AUTOVON 693-2470, commercial 314-263-2470.

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

TM changes

Change 12, dated 8 Oct 82, to TM 55-1520-228-CL, Operator's and Crewmember's Checklist for OH-58A, has been released.

Drunk driving leads to a dead end

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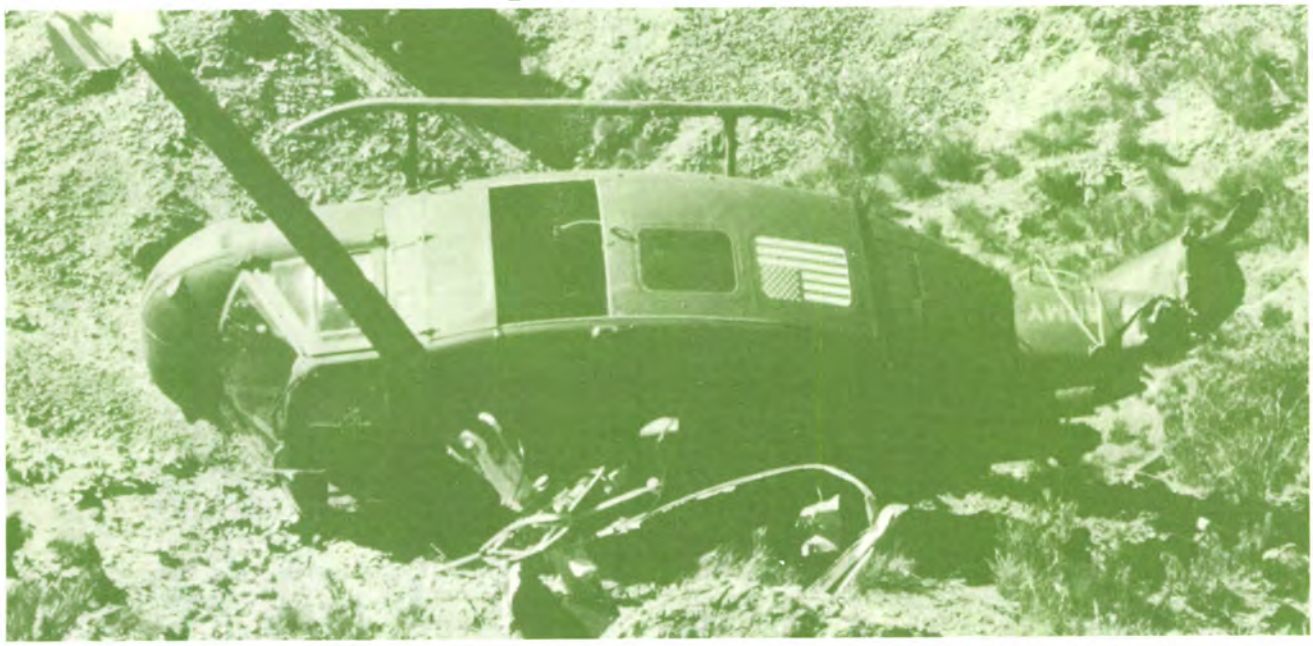
Accident sense and the FY 82 record

IX. Supervisory error: Failure to insure IP qualifications



This is the ninth in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. This week we will focus on failure to insure IP qualifications, one of five dominant supervisory errors involved in fiscal 82 Class A flight accidents. Accidents caused by failure to insure IP qualifications cost the Army more than $900,000.

• A UH-1H pilot and IP were on a high-altitude training mission in mountainous terrain. On the first attempt to land, the pilot ran out of left pedal and the aircraft began to yaw to the right. A go-around was made, followed by a second approach 30 degrees from the first approach heading. At 3 to 5 feet agl, the pilot again ran out of left pedal. The pilot increased collective and tried to fly out of the turn instead of landing. Main rotor rpm was lost, and the aircraft crashed into a ravine. The IP got on the controls too late to gain control of the aircraft. The pilot had not flown in a high-altitude, mountainous environment since completing the training cycle the previous year and had not attended the required ground school. The IP had no high-altitude flight experience during the preceding 6 years and had not received a high-altitude checkout before assuming IP duties. Result: destroyed aircraft and $923,000 in losses. The IP had 2,163 rotary wing hours, with 1,335 in the UH-1H. The pilot had 4,444 rotary wing hours, with 1,882 in the UH-1H.

Next week's article will focus on failure to take corrective action. ■

Last FLIGHTFAX this year

This is the last issue of FLIGHTFAX you will receive this year. The next issue will be dated 12 January 1983 and will include briefs for the period 3-30 December 1982. The personnel of the Army Safety Center wish you a Merry Christmas and a Safe and Happy New Year. ■

Ice causes fatal accident

Analysis of a recent Super King Air 200 fatal accident highlights the hazards of operations in icing conditions at high gross weights. The accident resulted from ice accumulation aft of the deicing boots because of an overgross weight condition that caused a low airspeed/ high angle of attack climb profile. The King Air 200 is the civilian version of the Army's C-12.

The pilot of the King Air 200 requested a weather briefing about 1020. He said he would be taking off at 1330. The pilot was told there were reports of light rime icing in the area between 8,000 feet and 11,000 feet msl, with a forecast calling for moderate mixed icing in the afternoon.

After he received the weather briefing, the pilot filed an IFR flight plan. He told the weather briefer he would call back to get an update on the weather before departing. He did not call back for an updated weather briefing. During the more than 4 hours which elapsed from the time of the weather briefing to the time of departure, meteorological conditions changed significantly. These changes were reflected in new weather reports and forecasts which indicated deteriorating conditions, including occasional severe icing.

The aircraft took off about 1434, with a crew of two and eight passengers, 600 pounds over gross weight. About 10 minutes after takeoff, the copilot radioed that they would like to return to the airport because they were getting too much ice. About a minute later, the copilot radioed that they wanted to go to another airport about 25 miles northwest of their position.

The aircraft crashed in an open field about 18 minutes after takeoff. All aboard were killed.

Evidence revealed nothing to substantiate a power loss caused by mechanical failures. The crew's decision to continue to climb at or near minimum airspeed for flight in sustained icing conditions, once they encountered severe icing, was one of the main causes of this accident. The crew failed to realize the significance of the resultant higher angle of attack in these conditions and did not recognize soon enough the substantial performance decrease that was occurring. Several minutes passed before they radioed that they were getting too much ice and needed to return to the airport. They should have maintained an airspeed well above the recommended minimum icing penetration speed while seeking diversion alternatives.

"Airplanes equipped for flight in icing conditions cannot be expected to cope with the worst of such conditions that nature can produce."

The crew would have been much better prepared for the flight if they had obtained a current weather briefing. With the forecast calling for occasional severe icing, they might have changed their departure time, altered their route, returned to the airport more promptly, or taken other available alternatives.

Exceeding the maximum allowable takeoff gross weight by 600 pounds normally would not have had a serious detrimental effect on the performance of the aircraft. However, the overweight condition and speeds of 140 knots or less required high angles of attack that led to ice accumulation on the airfoil surfaces aft of the deicing boots.

The Super King Air 200 Operating Manual contains the following paragraph:

"No airplane or combination of deicing and anti-icing equipment can be designed for the worst possible icing encounter—this condition cannot even be defined. As competent pilots know, there appear to be no predictable limits for the severest weather conditions. . . . Airplanes equipped for flight in icing conditions cannot be expected to cope with the worst of such conditions that nature can produce. The prudent pilot must remain alert to the possibility that icing conditions may become so severe that his equipment cannot cope with them. At the first indication that such conditions may have been encountered or may be ahead, he should react by deciding the most expeditious and safe course of action. The decision should be based on weather briefing, recent pilot reports and ATC observations. Alternatives could be course changes, altitude changes and even continuing on the same course. . . . It is the inexperienced or uneducated pilot who presses on 'regardless,' hoping that steadily worsening conditions will improve, only to find himself flying an airplane which has become so loaded with ice that he can no longer maintain altitude. At this point he has lost most if not all of his safety options, including perhaps a 180-degree turn to retreat along the course already traveled. The responsible and well informed pilot recognizes the limitations of his airplane and its systems and reacts accordingly."

The information in this article was extracted from a National Transportation Safety Board aircraft accident report. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) While ground taxiing in congested area, aircraft ran over ground rod which was not recessed below surface level. Right skid tube was dented. □ (H series) During approach to taxiway, pilot decided to divert between runway and taxiway. Landing gear hit snow berm, bending skids and cross tubes. □ (H series) Aircraft shuddered as it was sitting on the ground waiting to hover into rapid refueling area. Crew chief found pieces of the aircraft's FM fiberglass antenna next to tail boom. Tail rotor blade and right synchronized elevator were damaged.

UH-1 Class E mishaps □ (M series) When IP entered autorotation, N_1 dropped to 30 percent. Caused by sticky solenoid plunger, which did not extend fully and allowed throttle linkage to partially close past idle stop. □ (V series) Master caution and hydraulic lights came on during landing. Caused by failure of irreversible valve. □ (H series) Pilot felt severe vibrations and heard unusual noises. Caused by separation of skin from outboard end of main rotor blade. □ (H series) Loud noise was heard during flight. Pilot's overhead window had cracked from left front to right rear. □ (H series) Transmission oil hot light came on during hover. Caused by failure of thermostatic switch. □ (H series) Pilot smelled burning odor, and rpm warning circuit breaker popped out. Caused by failure of rpm warning box. □ (H series) Master caution and right fuel boost pump lights came on during landing. Caused by failure of fuel pump.

UH-60 Class E mishap □ Hydraulic fluid was seen on right side of aircraft. Caused by failure of hydraulic pressure switch.

FY 83 Class A Accident Countdown

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	March	5	3	March		
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	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**4**	**2**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Attack helicopters

AH-1 Class E mishaps □ (S series) Aircraft yawed 20 degrees during flight. Caused by malfunction of SCAS transducer. □ (S series) Medium frequency vibration occurred during flight. Air accumulation in hydraulic lines caused oscillation in turret. □ (S series) Pilot misjudged clearance between rotor system and trees in confined area. Main rotor blade hit top of tree, damaging tip of blade. □ (S series) Forward fuel boost pump light came on. Caused by malfunction of circuit breaker.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Copilot felt violent lateral inputs in cyclic control and could not turn right. Pilot took control and landed. Caused by failure of SAS amplifier box. □ (C series) Crew chief detected leak in utility hydraulic pump line. Caused by deteriorated O-ring at hydraulic pump fitting.

Observation helicopters

OH-58 Class C mishap □ (A series) Engine failed during takeoff. Suspect foreign object damage.

OH-58 Class E mishaps □ (A series) Excessive feedback was felt in flight controls during hover. Caused by failure of magnetic brake. □ (A series) N_2 varied from 101 percent to 103 percent during runup. Caused by failure of double check valve. □ (A series) Engine oil bypass and master caution lights came on during flight. At 50 feet agl, engine oil pressure gauge fluctuated. When aircraft was landed, oil was seen from right side of engine to aft section of tail boom. Caused by failure of seal between compressor and impeller sections.

Training helicopters

TH-55 Class C mishap □ Engine failed to respond during attempted power

recovery from simulated forced landing. Aircraft touched down level in plowed field, slid down slope, and rolled over.

TH-55 Class E mishaps □ Engine ran rough during flight. Caused by defective right magneto. □ Engine rpm dropped and aircraft vibrated. Caused by broken No. 1 cylinder fuel injector line.

Fixed wing

OV-1 Class E mishap □ (D series) Technical observer saw hydraulic fluid buildup in right floorboard. Pilot turned off windshield wipers and buildup stopped. Caused by failure of cylinder in windshield wiper motor.

U-21 Class C mishap □ (A series) Aircraft was sitting on taxiway when IP heard clinking sound and saw small stone rolling on taxiway. No. 2 engine was shut down. Gouge was found in propeller blade.

U-21 Class E mishap □ (A series) No. 2 engine failed during flight. Single-engine landing was made. Caused by failure of fuel control unit.

Maintenance

UH-1 Class E mishaps □ (H series) Oil pressure gauge dropped to zero during approach to landing. Caused by loose wire to oil pressure transmitter. □ (H series) Master caution and inverter lights came on. Caused by loose wire to inverter failure relay.

AH-1 Class E mishap □ (S series) Oil leak was seen during runup. Return line from oil cooler to transmission bypass manifold was positioned too close to No. 1 tail rotor drive shaft bearing and was cut by bearing.

CH-47 Class E mishaps □ (C series) Master caution and transmission oil pressure lights came on. Caused by incorrectly adjusted No. 1 engine transmission oil pressure. □ (C series) Aircraft filled with smoke during

touchdown. Chafed hydraulic pressure line had ruptured. □ (C series) No. 1 boost indicator fluctuated from 0 to 4000 psi. About 2 minutes later, needle on flight boost gauge fell off and glass filled with a liquid substance. Pin in cannon plug was chafing another pin, causing excessive voltage to hydraulic indicator.

OH-58 Class E mishap □ (A series) Generator caution light came on during flight. Cause by loose wire.

T-42 Class E mishap □ Fuel was seen siphoning from right auxiliary fuel cap during takeoff. Caused by incorrect locking tension on filler cap.

Messages received

• Maintenance information message concerning UH-60 pitch bias actuator (MIM-UH-60A-82-MEA-09, 301000Z Nov 82). Message authorizes flight with an inoperative pitch bias actuator under prescribed conditions.

• Maintenance information message concerning external cargo sling (MIM-82-UH-60A-MEA-07, 301530Z Nov 82). Message outlines correct way to use the sling to hook up to a Black Hawk.

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

TM changes

The following changes to TMs have been released:

• Change 8, dated 8 Nov 82, to TM 55-2840-241-23 for OH-58 gas turbine engine.

• Change 5, dated 10 Nov 82, to TM 55-2840-231-23 for OH-6 and OH-58 T63-A-5A and T63-A-700 engines. ■

Accident review: dropped load

Synopsis

An M198 155mm howitzer was being slingloaded to a field location at night. When the load descended into trees, the CH-47C pilot-in-command (PIC) jettisoned it to prevent damage to the aircraft.

History of flight

The mission called for two CH-47C aircraft and crews to airlift some artillery about 5 kilometers from one tactical firing position to another. A standby aircraft was also available. One of the aircraft developed a mechanical problem, and the standby aircraft had to take over. The night before, the pilot of the standby aircraft had flown several similar loads in the same aircraft from the same pickup zone (PZ) to the same landing zone (LZ).

The crew of the standby aircraft, consisting of a PIC, pilot, crew chief, and flight engineer, took off from the field site and spent about 10 minutes in the air trying to communicate with the other aircraft, their unit operations, and the supported unit. They could not contact anyone, so they proceeded with the mission and were ground guided to an M198 howitzer. Hookup was completed and the aircraft took off in an easterly direction.

The PIC immediately turned his attention to the radio console in an attempt to establish communications with someone. He told the pilot to turn to a heading of north since the LZ was about 5 kilometers due north of the PZ. The pilot began a turn to the left. He was confident in his ability to go from the PZ to the LZ because of his previous night's flights.

As the pilot made his left turn, he saw lights on the ground with some dust in the background. Assuming the lights to be at the LZ and the dust to be generated by the other aircraft flying the same mission, the pilot continued his turn to fly directly to the LZ. He told the PIC he had the LZ in sight and was beginning his approach. The PIC was still occupied with the radio and had not followed their progress on the map nor checked the direction of flight on the navigation instruments.

On short final, the PIC looked up and commented to the pilot that he appeared to be unusually low on his approach angle. Starting at about 100 feet above the trees, the flight engineer began calling out load clearance in 10-foot increments. The pilot suddenly realized by the color of the lights in the LZ that they were approaching the wrong LZ, and he began a right turn. Almost simultaneously, the lights in the LZ became screened by the tops of the trees. At this time, the pilot estimated he was below 30 knots airspeed. He stopped the turn and applied maximum allowable torque (78 percent) to try to raise the load above the trees.

The flight engineer said the load was in the trees. The PIC then took the controls. When he felt the load make contact with the trees, he jettisoned the load. The howitzer hit a couple of trees and came to rest on its right side. The damage amounted to $179,500.

The aircraft immediately rose above the trees and continued to climb. The crew was still unable to communicate with anyone. The PIC, now at the controls and not realizing they had jettisoned the load at the wrong LZ, proceeded back to the PZ and continued with the mission, making two more lifts to the correct LZ. They then returned to their unit field location, landed, and reported the dropped load.

Crewmember experience

The 34-year-old PIC had more than 5,000 rotary wing hours, with more than 100 in the CH-47C. The 31-year-old pilot had more than 1,500 rotary wing hours, with more than 200 in the CH-47C. He had been involved previously in a similar situation in a CH-47. That time he overtorqued the aircraft to prevent damaging the load on approach.

Commentary

The pilot did not maintain a constant angle of descent during his approach, allowing the load to descend into the trees. The pilot's postaccident evaluation flight showed he had a tendency to underarc approaches during external load operations. This had never been detected because TC 1-139 does not require evaluation of CH-47 pilots in external load operations during each Annual Aviator Proficiency and Readiness Test.

After realizing his load was descending into the trees, the pilot did not add the power necessary to stop the descent of the aircraft because he did not know he could have applied more than 78 percent torque for less than 10 seconds without damaging the aircraft. The CH-47C Operators Manual indicated that 78 percent is the maximum torque allowable during dual engine operation. The CH-47 Organizational Maintenance Manual states that as much as 100 percent torque can be applied for less than 10 seconds during dual engine operation without damage to drive train components. Since this accident, change 10 to the operators manual has been published. This change states that up to 100 percent dual engine emergency torque can be applied for no more than 10 seconds without damage to drive train components.

The PIC did not monitor the progress of the mission or the approach because he channelized his attention on establishing radio communication.

The crew did not report the dropped load until they completed their mission about 50 minutes later. Procedures should be established to insure immediate action to determine the extent of injury and/or damage immediately following a dropped load. ■

Shortfax

AN/PRC-90 safety hazard

Message 181815Z Nov 82 from CECOM warns that AN/PRC-90 radios procured under contract F41608-74-C-2178 are failing the water leak check and should not be used. All holders of radios procured under this contract should turn in their radios to Sacramento Army Depot through normal supply channels. Submit an exception requisition AOE for a replacement radio, citing the turn-in document number of the unserviceable radio plus a "26" in card columns 55 and 56. This will insure immediate receipt of a replacement radio.

Supply units should ship all unserviceable AN/PRC-90 radios to Sacramento, marked as follows:

Transportation Officer
Sacramento Army Depot
Sacramento, CA 95801
M/F: Depot Stock Purpose Code E ■

Parachute safety hazard

Some of you parachute club members may have an SST Racer or SST Delta parachute assembly. Some of these parachutes have a shoulder pad secured to one end of the harness by a piece of binding tape which crosses over the main lift web directly below the 3-ring riser release assembly. During movement with the harness on, the binding tape can work its way up and over the largest ring in the riser release assembly. This action will prevent proper functioning of the assembly following activation. The parachutist will be unable to cut away from the main risers in the event of a main canopy malfunction or drag condition after landing.

The solution is to tack the tape to the main lift web directly below the release assembly with a piece of waxed and doubled six-cord. Jumpers should never make adjustments to or sew items on their parachute equipment without the direct supervision of an FAA-licensed parachute rigger. ■

AVGAS causes engine flameout

An OH-58 pilot recently refueled his aircraft with AVGAS because jet fuel was not available. During flight, the boost pump failure light came on. The pilot continued to fly until the engine

flamed out 35 minutes later. The aircraft was autorotated to a field.

Analysis of the fuel revealed it was 96 percent 100/130 AVGAS. The Reid vapor pressure requirement of AVGAS conforming to MIL-G-5572 grade 100/130 is a minimum of 5.5 to a maximum of 7.0 psi. The vapor pressure requirement of JP-4 is 2.0 to 3.0 psi.

Engine failure was caused by cavitation of the engine-driven fuel pump as a result of the increased vapor pressure of the AVGAS and the negative pressure at the suction side of the fuel pump. The negative pressure resulted from failure of the fuel boost pump.

Unless you are in an emergency situation, do not use any type of fuel except JP-4. ■

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FIRST CLASS

1982 index included in this issue

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 13 □ 12 Jan 1983

US Army Aviation Training Library
Fort Rucker, Alabama 36360

A look at the first quarter

Through the first 3 months of this fiscal year, Army aviation units had recorded eight fewer Class A accidents and eight fewer Class B accidents than during the same period in fiscal 82. As you can see from the table, fatalities, dollar losses, and the Class A rate per 100,000 flying hours also dropped substantially.

The first quarter figures show that accidents can be reduced. This savings in lives, equipment, and dollars greatly increases our combat readiness.

Army Class A Aircraft Accidents

	First Quarter	
	FY 82	FY 83
Number	12	4
Flying hours	407,916	374,365
Rate	2.94	1.07
Fatalities	9	2
Cost	$10.4M	$4.6M

That's the bright side of the picture. There's also a not-so-bright side. All four of the Class A accidents this year were caused by human errors—the same kinds of errors which last year produced the worst Army aircraft accident record since FY 73. Following is a synopsis of each of these four accidents.

• The crew of a UH-1H was assigned to fly baled hay to stranded sheep in a mountainous area covered by 3 to 5 feet of snow. The sheep were located at the 9,600-foot level and two drops were made. On the third trip, with 21 bales of hay, ranging from 60 to 90 pounds, on board, the pilot slowed his airspeed to about 20 knots. The low rpm audio signal and warning light activated. The aircraft then began a slow, descending turn to the right and crashed in a level attitude. Demand for power exceeded

that available for the operational conditions.

Cause—crew error: Neither the pilot nor copilot was qualified for mountain flying. The copilot was not even UH-1H qualified. The pilot, without authority, replaced the assigned mountain-qualified copilot used on the two successful drops with a copilot who was not qualified in the UH-1H. Neither the pilot nor the copilot had computed aircraft performance requirements for this mission. Therefore, they were unaware of the power required versus power available.

Result: destroyed aircraft, at a cost of $922,700.

• The crew of an AH-1S was attempting a straight-in autorotation at night. The runway had been resurfaced recently and had not been repainted. The aircraft touched down at a high rate of speed about two-thirds the distance down the 2,200-foot runway. The IP, thinking they would not be able to stop before they reached the overrun, took control as the skids touched down. He tried to make a power recovery during the autorotative slide. The aircraft did not regain rpm. At the end of the runway, the IP pulled in the remaining collective pitch. The aircraft climbed 2 to 3 feet and settled to the ground, rolling onto its right side.

Cause—crew error: The IP allowed the pilot to land the aircraft at a high rate of speed and then tried to make a power recovery without first reducing collective pitch. The IP attempted the power recovery although more than sufficient runway remained to safely complete the maneuver.

Cause—supervisory error: The IP was assigned this mission even though events strongly suggest he was fatigued because of participation in recent field exercises, unit training, and inspections.

Result: more than $200,000 in damage.

• Three UH-1H helicopters were on short final for landing. They entered downwind behind another UH-1H. About 3 feet of snow had accumulated on the airfield, but the main runway and part of the south taxiway had been cleared 3 days before. There was 3 to 6 inches of fresh powder snow on the airfield. The single UH-1 was cleared to land on the south taxiway near airfield operations. The flight of three was cleared to land to a helicopter pad on the south taxiway. The pilot of the lead aircraft of the flight of three, because of his unfamiliarity with the airfield, landed behind the single aircraft instead of

(continued on next page)

A look at the first quarter

landing to the pad 400 meters further up the taxiway. The pilot of the second aircraft in the flight was expecting the lead aircraft to go further up the taxiway and had to take evasive action. He decelerated abruptly, terminated at a hover, and lost all visual reference. The aircraft rolled to the right and came to rest inverted.

Cause—crew error: The pilot of the No. 2 aircraft in the flight tried to land rather than "go around" when the flight leader landed short of the intended landing area. Blowing snow caused by the lead aircraft and his own aircraft caused the pilot to lose visual references.

Cause—supervisory error: The flight leader landed short of the intended landing area, contrary to tower instructions, causing the other pilots to take evasive action to avoid a collision.

Result: destroyed aircraft, at a cost of $922,700.

• An OV-1D pilot was conducting the static and dynamic VMC portion of a test flight. The aircraft was being operated about 4,000 feet agl with gear and flaps down to simulate an approach configuration at maximum gross weight. The pilot reduced power on the left engine to idle and set power on the right engine at approximately 75 percent. The aircraft was then allowed to slow until control buffet occurred and the left wing dropped. The pilot announced that VMC was reached at 78 knots and he was initiating a recovery. The aircraft did not recover and continued into a steep nose-down, left spiral and crashed. The test flight engineer attempted to eject just before impact. The pilot made no attempt to eject. The crew had completed the same test at the same level twice before, but at different engine power settings.

Cause—crew error: The pilot used incorrect recovery procedures for the maneuver he was performing. The pilot and test flight engineer failed to comply with the briefed ejection altitude of 3,000 feet.

Result: two fatalities and a destroyed aircraft, at a cost of $2,537,000.

If we are to continue to reverse the upward trend in accidents which started in FY 82, then every commander, supervisor, SIP, IP, PIC, pilot, and mechanic must insure that all established procedures are followed to the letter. The elimination of human-error accidents must continue to be the No. 1 priority of all those associated with Army aviation. ■

Accident sense and the FY 82 record

X. Supervisory error: Failure to take corrective action

This is the tenth and last in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. This week we will focus on failure to take corrective action, one of five dominant supervisory errors involved in fiscal 82 Class A flight accidents. Accidents caused by failure to take corrective action resulted in one major injury and cost the Army more than $600,000 in losses.

• The pilot of a UH-1V did not insure that the left side engine cowling was secure and it came off during flight, hitting the tail rotor. The tail rotor blades and hub assembly separated from the aircraft. The pilot entered autorotation and the UH-1 landed hard. The pilot failed to identify the loss of tail rotor thrust and reacted to a nonexistent engine failure. He did not try to regain powered flight and began an autorotative deceleration at 125 to 150 feet instead of 75 feet in accordance with the operators manual. About 7 months before this accident, an IP had recommended the pilot receive additional training in simulated antitorque procedures. Two months later the pilot failed a written exam on emergency procedures. About a month and a half before this accident, the pilot was involved in a minor accident in which he demonstrated poor judgment. It was determined at that time that he needed additional supervision and counseling. No action was taken by the unit to provide additional training and supervision or upgrade the pilot's knowledge of emergency procedures. Result: destroyed aircraft, one major injury, and $621,000 in losses. The pilot had 986 rotary wing hours, with 172 in the UH-1V. ■

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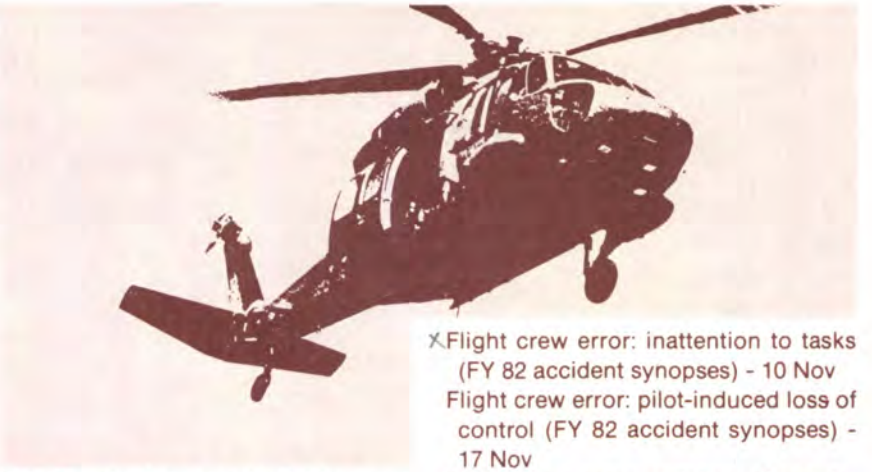

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Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (V series) Vertical vibration in flight was caused by failure of bearing rod end. □ (H series) Aircraft yawed right and left, and torque fluctuated. Caused by malfunction of fuel control. □ (H series) Hydraulics failed during hover. Caused by defective right lateral servo cylinder assembly. □ (H series) Defective magnetic brake caused antitorque pedals to bind during hover. □ (H series) Engine and rotor tachometer bled off simultaneously during autorotation. Caused by failure of sprag clutch. □ (H series) Loud bang was heard during hover. Caused by thermal runaway of battery. □ (H series) Crew heard whistling noise from main rotor blades during coastdown. Skin on one blade had peeled back because of failure of bonding. □ (H series) Master caution light came on during hydraulics-off maneuver. Caused by defective safety relief valve. □ (H series) Pilot did not remove engine air inlet covers during preflight. When engine was started, air pressure caused covers to deform forward intake baffle.

UH-60 Class E mishaps □ Binding in cyclic controls was caused by failure of pitch trim assembly. □ Low rotor rpm light came on. Caused by failure of rotor speed sensor. □ Transmission oil pressure decreased during flight. Caused by failure of oil pressure sensor. □ Right input module and right accessory gearbox lights came on. Caused by failure of gearbox input module.

Attack helicopters

AH-1 Class C mishaps □ (S series) Engine oil bypass and master caution lights came on. Pilot entered power-on autorotation to airfield. During descent, engine oil pressure dropped below 50 psi, engine oil temperature exceeded 150° C., and engine chip detector and fire warning lights came on. Aircraft was landed and fire extinguisher used to put out fire in engine exhaust and tail boom. □ (G series) Main rotor blades hit tree during transition from NOE hover to forward flight.

AH-1 Class E mishaps □ (S series) Roll channel SCAS oscillated excessively during flight. Circuit card was bent, causing erratic inputs to cyclic. □ (S series) Transmission oil hot light came on. Caused by cracked cannon plug. □ (S series) Forward fuel boost and master caution lights came on. Caused by failure of fuel boost pump. □ (S series) Droop cam failed to maintain rpm within limits during power changes. Caused by malfunction of overspeed governor. □ (S series) Crew heard whistling noise on final approach. Skin had separated on one rotor blade 10 inches from blade tip. □ (S series) Engine oil pressure went to 100 psi plus during landing. Caused by failure of pressure transducer. □ (S series) Engine oil pressure went to zero and oil pressure and bypass lights came on during runup. One quart of oil was found on ground. Caused by frozen oil pump shaft assembly.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Pilot felt unusual control feedback and vibrations after takeoff. Caused by failure of No. 1 SAS amplifier box. □ (C series) Failure of speed trim control assembly caused speed trim to retract during flight. □ (C series) No. 2 hydraulic light came on and hydraulic pressure gauge dropped to zero. Caused by failure of hydraulic pressure line in combining transmission area. □ (C series) Master caution and transmission oil pressure lights came on. Caused by malfunction of aft transmission pressure transducer. □ (C series) No. 2 engine torque fluctuated during hover and PTIT increased. Caused by broken diffuser curl assembly.

Observation helicopters

OH-58 Class C mishap □ (A series) While talking on radio and looking at a vehicle during recon mission, pilot allowed aircraft to drift to left rear. Main rotor blades hit tree limb.

OH-58 Class E mishaps □ (A series) Fore and aft cyclic binding was caused by failure of magnetic brake. □ (C series) Excessive deceleration and late initial pitch pull resulted in nose-high attitude during termination of autorotation. Tail skid hit ground. □ (A series) Engine failed when throttle was retarded to flight idle position. Caused by malfunction of engine fuel control unit. □ (C series) Sprag clutch would not disengage when throttle was rolled of. during practice autorotation. Caused

by failure of sprag clutch freewheeling assembly. □ (A series) IP lost sight of the ground during demonstration of night low-level autorotation. Aircraft was pulled off the ground as it touched down. Aircraft became airborne and then settled back to runway. Inspection revealed no damage.

Fixed wing

C-12 Class E mishaps □ (A series) Landing gear motor continued to run after gear indicated full up during takeoff. As aircraft was returning to airfield, cockpit filled with smoke. Pilot manually extended landing gear, and aircraft was landed. Landing gear motor had burned out. □ (A series) Props could not be synchronized during climb. Caused by failure of primary propeller governor.

OV-1 Class E mishaps □ (D series) No. 1 engine would not accelerate to takeoff power. Caused by failure of fuel control. □ (D series) Technical observer noticed hydraulic fluid buildup in right floorboard. Pilot turned off windshield wipers and buildup stopped. Caused by failure of windshield wiper motor cylinder.

T-42 Class E mishap □ With gear lever in down position, gear started to retract and then cycled again. When gear lever was retracted on go-around, gear stayed down for several seconds and then retracted. Gear was manually lowered and aircraft landed. Caused by failure of gear switch.

U-8 Class E mishap □ (F series) During climb to altitude, crew chief told IP and pilot that black smoke was trailing from No. 1 engine. Engine was shut down and aircraft landed. Failure of piston caused loss of engine oil and oil pressure.

Maintenance

UH-1 Class C mishap □ (H series) While doing daily inspection, crew chief found 30-inch steel ruler under drive shaft cover of tail boom. Drive shaft and cover were damaged. Ruler was probably used during installation of tail boom, accidentally left on tail boom, and lost. Aircraft had been test flown nine times since installation of tail boom. Several people had inspected drive shaft but had not seen ruler.

UH-1 Class E mishaps □ (H series) Cockpit filled with smoke, transmission oil pressure light came on, and transmission oil pressure gauge went to zero. Caused by installation of incorrect hose, which failed at clamp. □ (H series) Unusual vibration was felt after takeoff. Tail rotor assembly was out of balance. □ (H series) Crew chief heard noise from tail rotor drive shaft area during shutdown. Hanger bearing nut had come off in flight and was lying between No. 2 and No. 3 hanger bearings. Cotter pin was not installed in hanger bearing retaining assembly. TI and crew did not notice missing cotter pin. □ (H series) Hydraulics failed during hover. Caused by incorrectly torqued hydraulic line. □ (H series) Crew chief saw fuel leaking from servo filter during engine start. Caused by incorrect installation of preformed packing in filter. Packing was pinched.

AH-1 Class E mishap □ (S series) When aircraft was landed, pilot saw fuel leaking at N_1 fuel line and flow divider. Crew chief had not tightened fuel line after maintenance.

CH-47 Class E mishaps □ (C series) Crew chief saw fluid accumulation around lower transmission area during flight. No. 2 flight boost caution light then came on and hydraulic pressure gauge indicated loss of pressure. Crimped line was caused by incorrect installation. □ (C series) Aircraft yawed to right and loud bang was heard.

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	1-12 Jan	**0**	**0**
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**4**	**2**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

Caused by out-of-balance condition between No. 1 and No. 2 SAS in yaw axis. Loud bang was caused by cargo hook hitting side of aircraft. □ (C series) Crew heard grinding and bumping sound from rear of aircraft during shutdown. Source of noise was an aluminum oil transfer tube which was adrift between the transmission housing and planetary gear carrier assembly. This extra tube had apparently been inadvertently left in the transmission's interior during overhaul.

OH-58 Class E mishaps □ (A series) Hydraulic pressure light came on during landing. Inspection revealed hydraulic filters were dirty, cannon plug wires were brittle, pressure switch terminal was burned, and hydraulic system was contaminated. □ (A series) N_2 tachometer failed during start. Electric wire to tachometer was inadequately spliced. □ (A series) Rotor rpm dropped to 310 and N_2 remained at 104 during initial entry into standard autorotation. Cannon plugs to dual tachometer were reversed.

Messages received

• Safety-of-flight message concerning update status of actions to restore operational readiness capability of CH-47 fleet (CH-47-82-17, 172100Z Dec 82). Summary: Message contains current status of actions underway to restore operational readiness capability of CH-47 fleet, CCAD team efforts to date, transmission requisitioning/disposition procedures, and other information and instructions. Contact: LTC Horvath, AUTOVON 693-1225, commercial 314-263-1225.

• Safety-of-flight message concerning one-time inspection of UH-60 cargo door upper tracks (UH-60A-82-22, 211930Z Dec 82). Summary: Several instances have been reported where cracking of cargo door tracks have been so severe that cargo doors fell off in flight. Improved door tracks fabricated from steel are being procured and stocked as spares. This message requires inspection of upper door tracks. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• UH-60 maintenance information message concerning T700-GS-700 engine post maintenance acceptance test, improper engine preservation, and return to depot of fuel injector/primer nozzles (MIM-T700-82-MEA-07, 131930Z Dec 82).

• CH-47 maintenance information message concerning forward transmission removals at Fort Campbell (MIM-82-47-11, 202045Z Dec 82).

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

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War stories

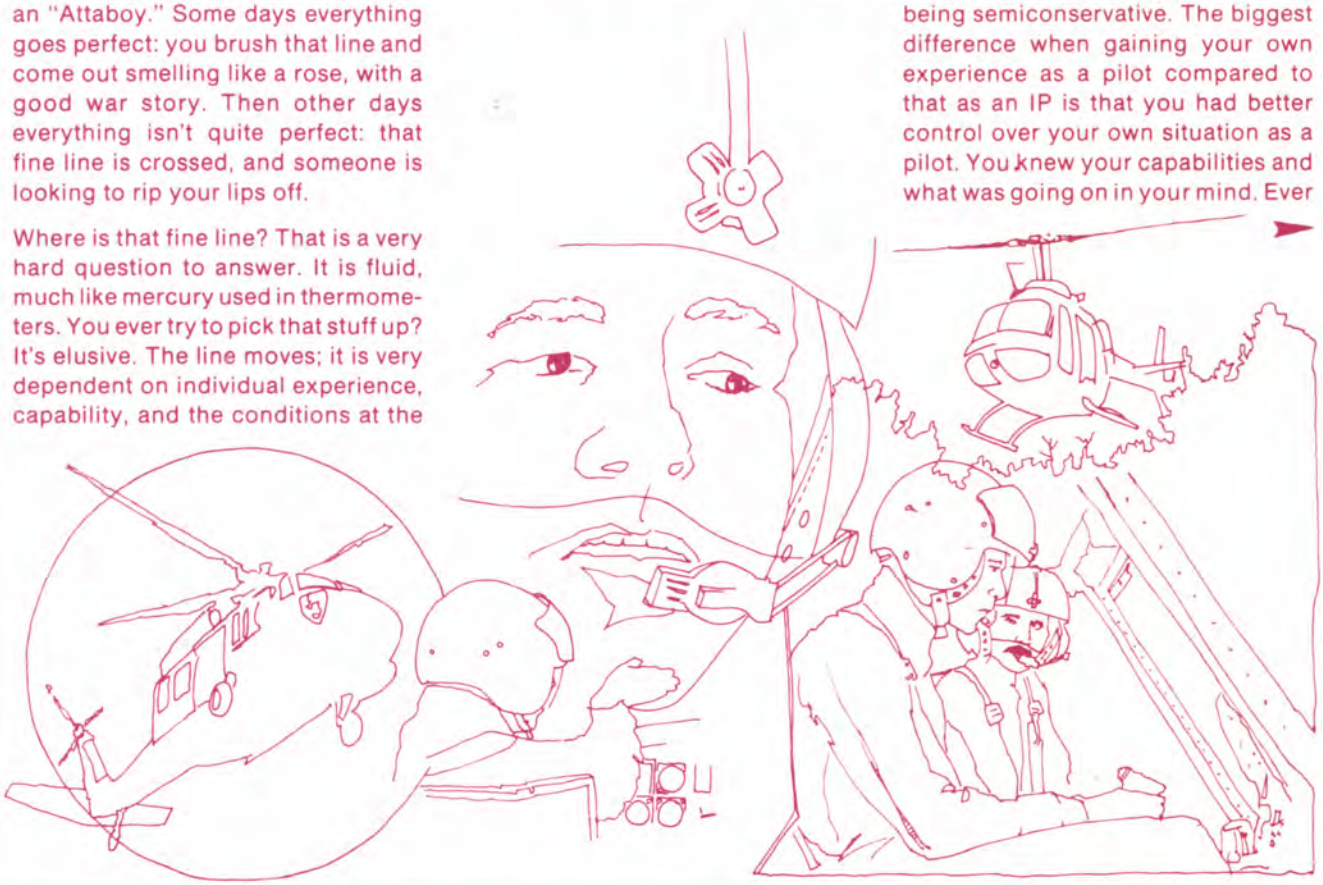
Ever wonder why the events that make a good war story happen? In combat most flying stories come about because someone is shooting back, which is expected. But what about peacetime in the controlled training environment? Not much shooting goes on, at least with real bullets. So how do the events to make a good war story come to pass? "Did you hear what happened to old 'ACE-IP' today? Boy he was lucky...." So the story begins.

There is an old saying that there is a fine line between an "Awshucks" and an "Attaboy." Some days everything goes perfect: you brush that line and come out smelling like a rose, with a good war story. Then other days everything isn't quite perfect: that fine line is crossed, and someone is looking to rip your lips off.

Where is that fine line? That is a very hard question to answer. It is fluid, much like mercury used in thermometers. You ever try to pick that stuff up? It's elusive. The line moves; it is very dependent on individual experience, capability, and the conditions at the time it is approached. As IPs, it is part of our job to know where that line is and never to cross it.

That is all well and good; but if I cannot define it nor get a hold of it, what good is it, and how can I prevent crossing it? The best answer I can offer is experience. Believe it or not, that is why only highly experienced and qualified pilots should become IPs. Experience coupled with ability helps an individual to develop the sixth sense to know when he is approaching that magical line. Ability and experience in flying aircraft is something that is generally not lacking among instructor pilots. Gaining experience with students is an ongoing thing and something none of us will ever get enough of. Just as sure as the world turns, when you think you've seen it all, some one will show you a new way to do a hi yo-yo, an approach to landing, or a new formation wing position.

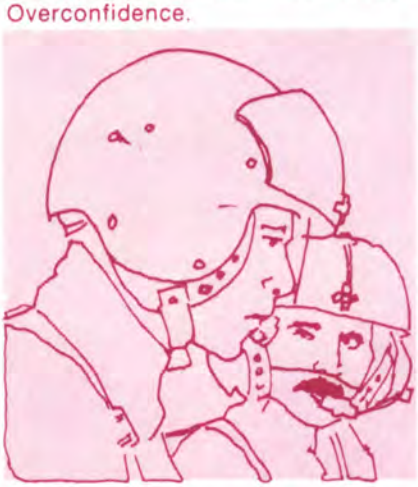
How do you survive until you've had time to develop that sixth sense? The same way you got your flying experience—either by being lucky or by being semiconservative. The biggest difference when gaining your own experience as a pilot compared to that as an IP is that you had better control over your own situation as a pilot. You knew your capabilities and what was going on in your mind. Ever



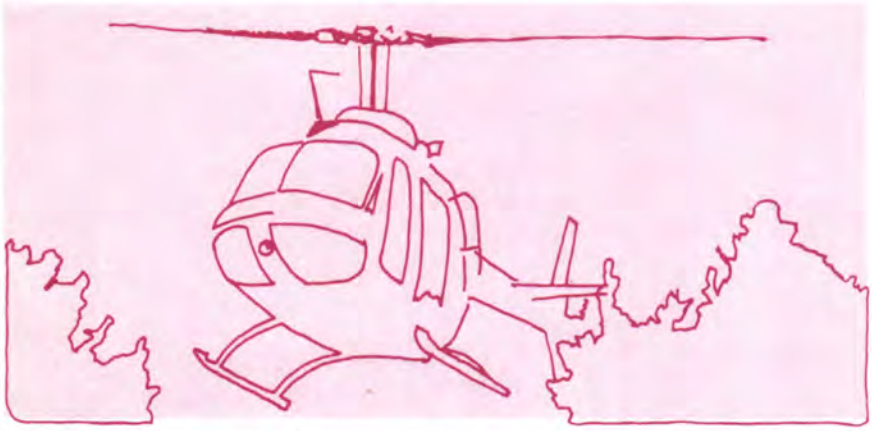
War stories

heard, "I tried to stop him, but he did it before I realized he was going to?" I believe I can safely say that no one will know completely what someone else is thinking, especially in our business. It is far easier to know what a student is not thinking than what he is. If the airspeed is going berserk, you can bet he is not thinking about airspeed. If airspeed is important, who really cares what he was thinking as long as he gets his mind back to what is important? That's the job of the instructor; to teach him what is and isn't important and how to make it work right.

What then causes most IPs to get on the back side of the magical line? I believe there are a couple of reasons. First, overconfidence and inattention to details. Overconfidence in either himself or the student will cause a relaxing on the IP's part which can result in inattentiveness. Ever wonder why the statement "the most dangerous aircraft is one in which two IPs are flying together" was made? Overconfidence.



The second reason is the approach, or method of training. The spectrum goes from total trial and error to a style that only allows perfection. The optimum point of teaching, I believe, is somewhere in between, and most



of us use a combination. We demonstrate maneuvers and watch the student's attempt at duplication. The philosophy that a student learns by his errors is true; however, that can be a very expensive and time-consuming method of learning. Pure trial and error started going out the window when man first began communicating and passing on his experiences. This is why and how the IP comes into play.

The question that comes up is, At what point do I as an IP pass on my experience? The tendency to let the student experience the results or to recognize and correct his mistakes has probably caused more gray hair (check mine after 2,000 hours IP time) among IPs than anything else. The question is, How far can I let him go? If I take the aircraft early, he may have recognized and corrected the situation by himself. All the while that magical fine line is rapidly being approached. On the other hand, what learning is produced by flying around in ignorance? Ignorance is bliss, right? I don't think so.

I don't have the answer for every situation because they are all different but here are a few helpful hints. As a hard rule, I do not trust anyone when it comes to flying an aircraft that I am responsible for.

Next, I divide all phases of flight into two categories: critical and noncritical. This is where ability comes into play. Any time I must take immediate action to prevent an accident or to prevent a dangerous situation from developing, time is critical. Therefore, I am very close to the stick. I don't ride the flight controls because that is very annoying to the other jock, no matter how light you think you are on the stick; but I'm only a gnat's hair away. For example, you'll never see me in close formation with my arm resting on the canopy rail, no matter who is flying. Same way on final approach, even if it is the third one and everything up to that point has been wired. What I use as a guide is the amount of time I have to react if something unforeseen happens. Hardware failures are hard to anticipate. However, think of the worst case that could happen in the situation, determine the amount of time necessary for you to react, and that is how close you need to guard. If your reaction time required is less than a nanosecond, you're across the magical line, and it is time to exercise your IP prerogative and do something.

Lastly, don't assume anything. ■

—from TAC ATTACK
LTC James H. Wood
479 TTW Chief Stan/Eval

Selected mishap briefs

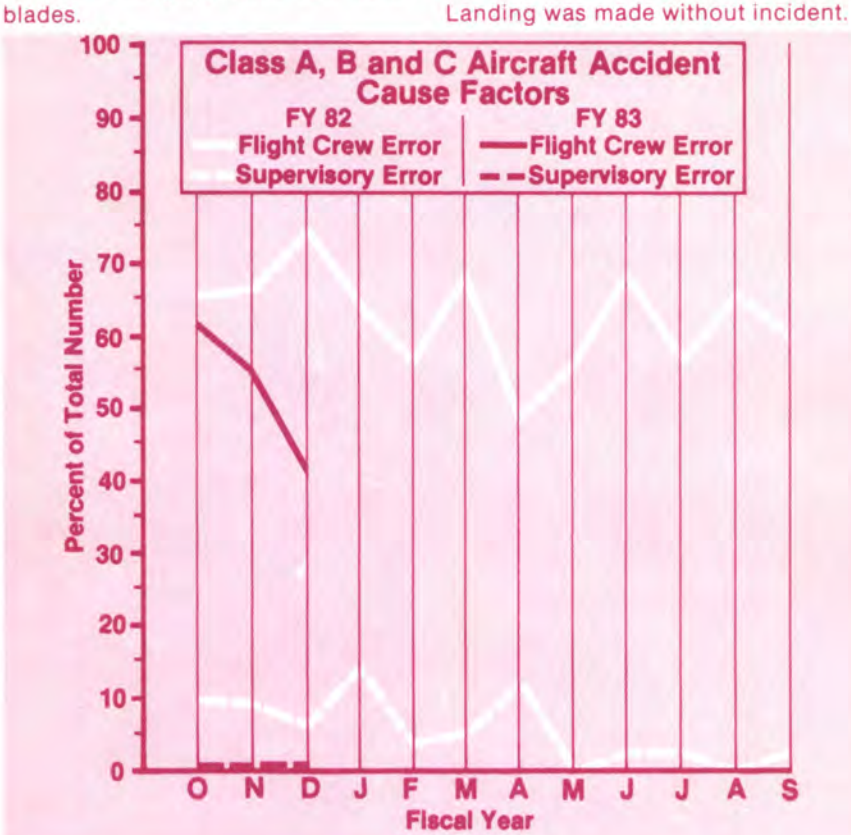
Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap □ (V series) Aircraft crashed during hover. 8307

UH-1 Class C mishaps □ (H series) While landing to LZ, No. 2 aircraft in flight of 3 entered brownout because of blowing sand. Aircraft was in deceleration attitude when visual reference was lost. Tail skid hit soft sand, and aircraft rocked forward and hit the ground left skid low. Aircraft became airborne again and hit the ground nose low, spreading cross tubes and breaking chin bubbles. □ (V series) Aircraft was landing from a hover. Ground guide thought tail rotor was clear of fence surrounding landing pad and signaled pilot to land. As aircraft descended, tail rotor hit top of fence, damaging both tail rotor blades.

UH-1 Class E mishaps □ (H series) N_2 tachometer needle rose during flight. Postflight inspection revealed splines on N_2 accessory case of engine had failed, causing high-side governor failure. □ (H series) Extreme vibrations occurred during approach. Caused by failure of No. 1 tail rotor hanger bearing assembly. □ (H series) Transmission oil hot light came on during hover. Caused by defective transmission thermostatic switch. □ (H series) Loud noise was heard during landing. Caused by separation of main rotor blade skin from blade tip to 8 inches inboard. □ (H series) Aircraft encountered unforecast rime ice while in clouds. Asymmetric shedding of ice from main rotor system occurred as aircraft broke out of overcast. Aircraft then vibrated and pilot felt feedback through cyclic control. Landing was made without incident.



UH-1 aviation-related mishaps □ Tail rotor blade hit hangar door as tug operator was pulling UH-1 out of hangar. □ Servicemember was driving tug on flight line. As he swerved to avoid a fuel truck, tug hit elevator on left side of UH-1.

Attack helicopters

AH-1 Class E mishaps □ (S series) As aircraft came to a stop after landing, forward cross tube broke just above both saddle mounts. Caused by metal fatigue. □ (S series) Engine oil pressure exceeded red line during hover. Caused by failure of oil pressure transducer.

AH-1 aviation-related mishap □ Mechanic was removing collective control head. Technical manual procedures indicate control head can be removed by taking out a single pin. The mechanic, however, disassembled control head, separating labeled portion of head from buttons on head. Maintenance being performed required depression of idle stop release button on control head. When mechanic picked up labeled portion of head to determine which button was the stop release, he allowed unlabeled portion to rotate 180 degrees. He then depressed jettison button, which is 180 degrees from idle release button, and external stores jettisoned.

Observation helicopters

OH-58 Class E mishaps □ (A series) N_2 needle fluctuated during flight. Caused by failure of tachometer. □ (C series) Fuel filter caution light came on and engine failed during start. Fuel cell was drained and flushed. Cell contained about 2 quarts of water. Aircraft had been left defueled for 34 days during rainy weather. Fuel sample was not taken before engine start.

OH-58 aviation-related mishaps □ Servicemember started tractor with gearshift in reverse. Tractor backed into OH-58, damaging chin bubble. □ Three people were pushing aircraft from hangar. No forward guide was used, and nose of aircraft was pushed into a parked truck.

Fixed wing

C-7 Class E mishap □ Emergency landing gear system was activated during training flight. Nose gear would not extend using correct emergency procedures. Landing gear was extended normally and aircraft was landed. Caused by failure of emergency hydraulic handpump.

OV-1 Class E mishap □ (D series) Hydraulic pressure gauges dropped to zero during flight. Nonmetallic hose had burst.

U-8 Class C mishap □ (F series) Nose gear did not indicate up during after-takeoff check. Gear was recycled four times with main landing gear operating properly and nose gear indicator not indicating up or down. Visual inspection through mirror on engine cowling indicated nose gear appeared to be down. Aircraft was landed with mixtures at idle cutoff and throttles closed. Nose gear collapsed during rollout. Inspection revealed clevis broke at bolt where clevis attaches to end assembly of nose gear actuator assembly.

U-8 Class E mishap □ (F series) When pilot placed landing gear handle in down position, left main gear indicated in transit. All visual indications were that gear was down. Aircraft was landed without incident. False reading was caused by broken wire from left main gear down-lock switch to gear indicator.

Maintenance

UH-1 Class E mishaps □ (H series) Battery voltage dropped to 10 volts during start. Battery was not inspected or cleaned properly. Screw was loose and post was dirty. □ (H series) Pilot felt high frequency vibration in pedals during landing from hover. Battery inspection log sheet was not correctly secured to battery. Sheet came loose and lodged in oil cooler fan, causing vibration.

AH-1 Class E mishap □ (S series) Aircraft rolled left and right during takeoff. Pilot had to add excessive cyclic movements to maintain aircraft straight and level. Roll channel SCAS was disengaged and aircraft landed. Caused by out-of-adjustment SCAS card.

OH-58 Class E mishap □ (A series) During hot refueling operation, pilot noticed red main rotor blade reservoir grip sight glass was broken. Reservoir had just been serviced. Suspect sight glass retention bolt was overtightened.

Messages received

• Maintenance information message concerning transmission main mount nut and bolt assembly on AH-1S (MIM-82-AH-1-MEA-10, 031900Z Jan 83).

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

TM changes

Change 15, dated 9 Sep 82, to TM 55-1520-235-CL for OH-58C helicopters, has been released. ■

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	1-19 Jan	0	0
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	4	2

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 87 □ 19 Jan 1982

CY 82 STACOM index

STACOM 76, 20 Jan - FY 81 and Pilot Errors
CY 81 STACOM index
STACOM 77, 24 Feb - Operators Manual and Checklist Update
STACOM 78, 17 Mar - Procedures for Student Selection
Questions and Answers
STACOM 79, 28 Apr - You Think You Have Weight and Balance Problems
ARNG Safety Conference
STACOM 80, 26 May - Operators Manual and Checklist Update
STACOM 81, 16 Jun - Dynamic Rollovers
Flaky Hover Practice
Recurring Deficiencies
Use of Checklists
Questions and Answers
STACOM 82, 14 Jul - Directional Control Margin
Correction to STACOM 81
STACOM 83, 1 Sep - Operators Manual and Checklist Update
STACOM 84, 3 Nov - Loss of Tail Rotor Authority
UH-60 Operational Limits
Procurement of Pink Filters for NVG Users
STACOM 85, 17 Nov - The Aviator's Role in Aircraft Maintenance
Transponder Set AN/APX-72 or AN/APX-100 Mode 4 Operation
STACOM 86, 8 Dec - New AR 95-1
Warning to Users of MIL-H-83282 Hydraulic Fluid ■

Questions and answers

Question: Paragraphs 4-2g(1)(c), AR 95-1, caution Army aviators that sole instrument approach facilities which are unmonitored may not be used in alternate airfield selection. How does one determine if the facility is unmonitored?

Answer: The latest information on unmonitored facilities will be found in NOTAMs. In addition, the FLIP IFR Supplement (effective 23 Dec 82), page A14, indicates that the word "unmonitored" is abbreviated as "unmto." If the facility in question is unmonitored, the abbreviation will appear in the "RADIO AIDS TO NAVIGATION" portion of the "FACILITY DIRECTORY LEGEND" of the IFR Supplement, e.g., BOLTON FIELD, OH.

Question: In determining alternate airfield criteria, is a 50-percent reduction in visibility authorized for helicopters when planning and selecting alternate airfields?

Answer: Paragraphs 4-2b, Alternate Airfield Planning, and 4-2g, Alternate Airfield Selection, AR 95-1, direct Army aviators to apply 400 feet and 1 mile to the **published** weather planning minimum. Reduction in visibility by 50 percent prior to applying the 1 mile is not authorized. In other words, alternate airfield planning and alternate airfield selection criteria are the same for helicopters and airplanes.

Note: The above information is not in contravention to the provisions of paragraph 4-2c(5) which permits aviators flying helicopters to reduce **destination** Category A visibility minimums by 50 percent (except "COPTER ONLY") when executing an instrument approach at destination.

Question: Paragraph 3-26c(2), AR 95-1, authorizes an IP to be given an IFE equivalency evaluation by a DA-designated IFE. What is the definition of a "DA-designated IFE," and what are the procedures and prerequisites for implementation of the equivalency evaluation?

Answer: The IFE equivalency evaluation will be accomplished **only** under the following conditions:

a. The examinee selected by the commander must have completed the academic training requirements specified in the USAAVNC Instrument Flight Examiners Course exportable training package.

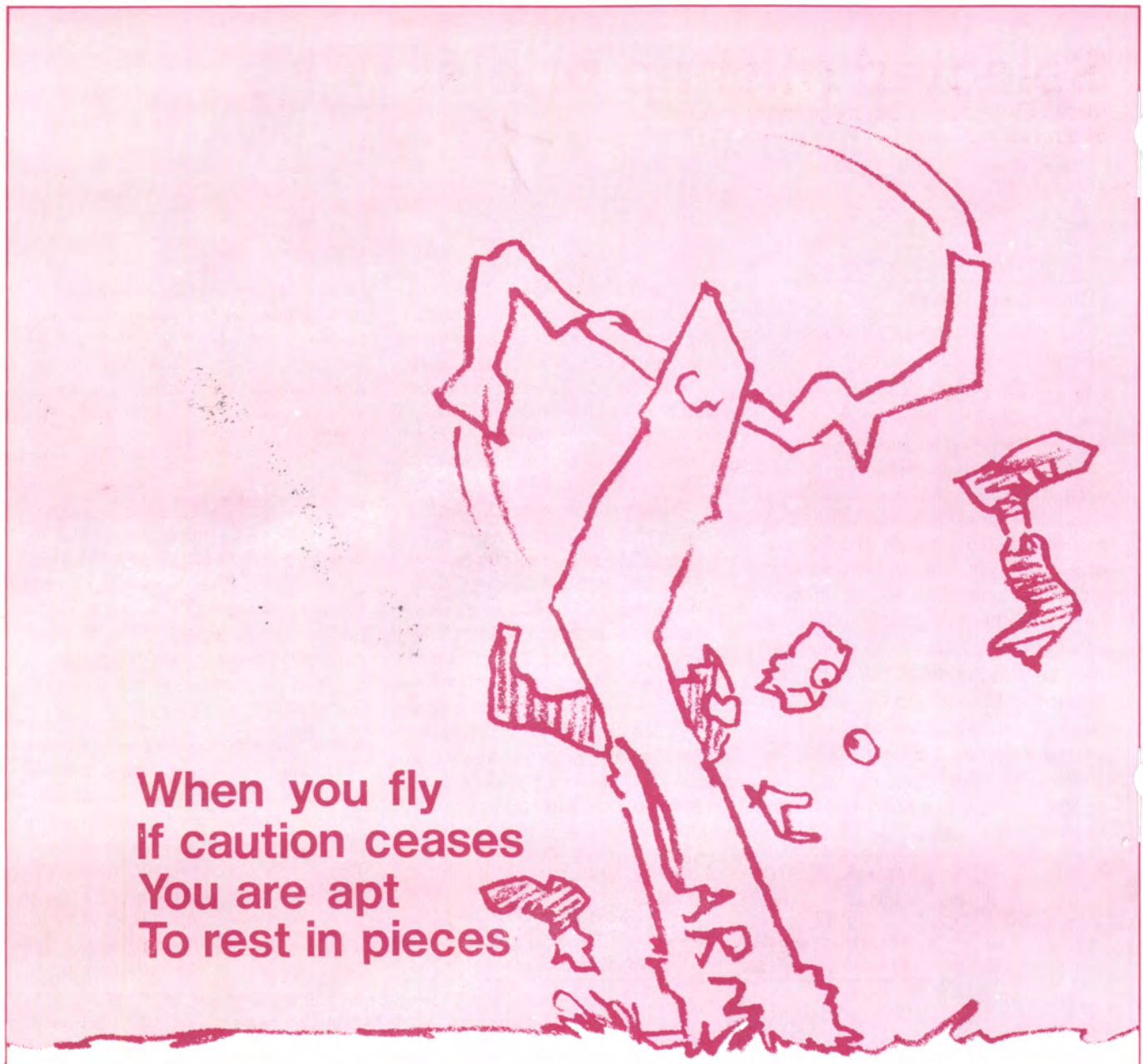
b. The request for the equivalency examination must be made by the commander through the local aviation standardization committee, through the appropriate MACOM, to DES, USAAVNC.

c. The "DA-designated IFE" administering the evaluation will be a DES IFE.

Question: Paragraph 2-22, AR 95-1, directs commanders to "train personnel to perform MOCs" and details requirements in order to be qualified and authorized to perform MOCs. Does this apply to qualified and current aviators who are authorized to run up Army aircraft per paragraph 1-9, AR 95-1? Must a crew chief meet the requirements of paragraphs 2-22 for all maintenance checks he/she performs?

Answer: An aviator who does not meet the requirements of paragraph 2-22 may **not** perform MOCs. This does not mean that the aviator is prohibited from running up an aircraft while an MOC is performed by qualified maintenance personnel. If, for example, an MOC is required after installation of a generator, a pilot who is not MOC qualified may start and run up the aircraft while an MOC qualified person checks the component and makes the necessary entries on maintenance forms. A crew chief must meet the requirements of paragraph 2-22 only when authorized to perform MOCs. MOC is defined in the AR 95-1 glossary as "systems checks made on the ground through engine runup and taxi." If a maintenance check is made without aircraft engines running, paragraph 2-22 does not apply. ■

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.



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See and avoid

Today's airways are becoming more and more saturated with both civilian and military aircraft. As the number of aircraft grows, so do the chances of midair collisions.

In this modern age of aviation, we have highly sophisticated computer-assisted air traffic control and navigation systems. But despite these elaborate systems, we continue to have in-flight collisions. Many of these collisions could be avoided if the crewmembers would practice the "see and avoid" concept.

The eyes of each crewmember play the most important part in seeing and avoiding an in-flight collision. Yet, we must realize there are many factors that affect visual acuity which place pilots in situations over which they have little control, but should be aware of.

Blind spot. The human eyeball has a blind spot where light strikes the optic nerve. The location of the blind spot for most people is about 30 degrees right of center. With both eyes unobstructed, the blind spots of each eye are cancelled out by the peripheral vision of the other eye. However, put a windshield center post or other type obstruction between the eyes and the brain cannot fill the void. Under certain conditions, a Boeing 707 would be blocked out at a distance of 1 mile and a Boeing 747 would disappear at a mile and a half.

Space myopia. Space myopia is a condition that reduces the ability of the eyes to focus due to the lack of objects to focus on. This condition can be prevalent during hazy and cloudy days where there are no mountains, buildings, etc., to focus on. A helicopter pilot will tend to focus on the rotor tip path plane while a fixed wing pilot will stare at a part of his instrument panel instead of continuing to scan for other aircraft.

Nearsightedness. The normal eye with 20/20 vision can detect an aircraft with a fuselage diameter of 7 feet from about 4½ miles away. If the crewmember is nearsighted (myopic), he will not be able to see the aircraft until it is closer. How close depends on how nearsighted the crewmember is. The more severe the myopia, the closer the aircraft will be before it is detected. If glasses are prescribed for a crewmember, they must be worn for safety's sake.

Glare. Glare overstimulates the eyes and causes a loss of sensitivity which reduces the ability of the eyes to see objects under normal light conditions. Glare may be produced from the light striking the windscreen or the instrument panel at an angle. Blinding glare can be caused by scanning, when the pilot looks directly into the sun, causing a temporary haze over the visual field.

Lack of relative motion. Lack of relative motion results in more time needed for the eyes to spot another aircraft. If an aircraft is on a head-on collision course, it will appear to be motionless. If an aircraft is directly overtaking another aircraft, it will also appear motionless. An object that moves across the windscreen will be much more rapidly detected. The pilot must perform some type of evasive maneuver to cause the apparent collision aircraft to move in some direction across his windscreen.

Focusing. The time required for the eyes to change their focus from one object to another (accommodation time) is at least 2½ seconds, e.g., the time it takes to change focus from the instrument panel to outside the aircraft. This time

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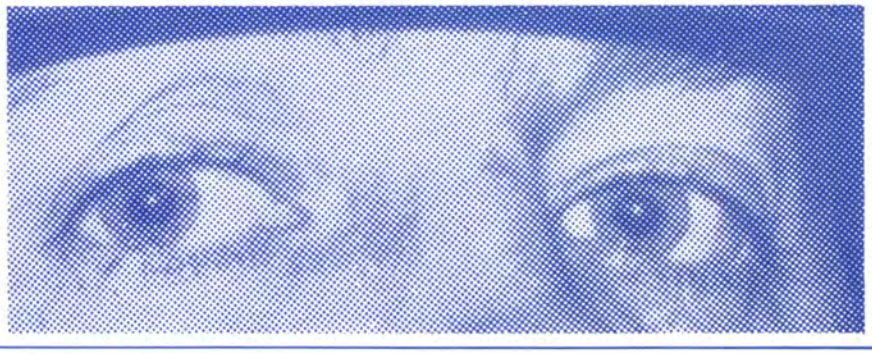


See and avoid

delay in focusing increases with fatigue and age.

Contrast. Contrast of objects is very important in avoiding another aircraft. The aircraft that contrasts with its background is much easier to detect than one that blends in with its background, especially during low-light illumination. Sky conditions on many occasions make it much more difficult to detect another aircraft. If there is a lack of contrast, the aircraft must come closer in order to be detected, thus increasing the danger of an in-flight collision.

Hypoxia. Hypoxia can affect the ability of the eyes to detect distant objects, especially at night. Due to the lack of oxygen in the blood at higher altitudes, the eyes suffer a loss of visual acuity and have difficulty in focusing. The smoker must be especially aware of this factor. The smoker's blood is carrying carbon monoxide which displaces some of the oxygen and makes the effects of hypoxia begin to occur at a lower altitude.

Turbulence or vibration. In some cases, turbulence or vibration can cause a deterioration in vision. It can also cause fatigue which further degrades the ability of our eyes and our alertness.

Central vision. At night, the eye's central vision is lost and corner vision, which is not as effective as central vision, must be used. An object must get closer to be detected.

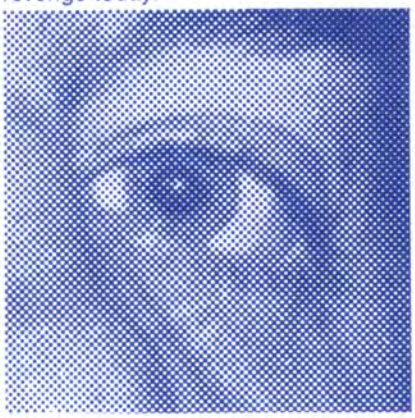
Midair avoidance checklist

Effectively avoiding midairs takes more than just proper scanning techniques. You can avoid a midair by using the following checklist developed by the Aircraft Owners and Pilots Association. The checklist has been modified for use by Army aviators.

• Check yourself. Make sure you are physically and mentally up to flying. If you need glasses, wear them.

• Plan ahead. Study your entire route to include weather. Know what approaches you can expect at your destination. By planning ahead, your head will be out of the cockpit, scanning for other aircraft instead of studying a map or airport overlay.

• Clean windscreen. Part of your preflight should include checking the windscreen for possible obstructions. That bug you hit yesterday might get his revenge today.



• Obey the rules. Adhere to all local and federal regulations to include local SOPs. Maintain your assigned altitude and route. If you're not able to do so, advise the proper authority and get an amended clearance. Study the local area you are flying in and the area you are going to. Enter traffic as specified. Many a midair has been caused by a pilot entering a traffic pattern wrong. In most midair collisions, one of the aircraft was in the wrong place.

• Know your aircraft. All aircraft have blind spots. Know the aircraft 's flight limitations. If the aircraft is a low-wing type, it will be hard to detect traffic during descents.

• Brief the crew. Brief the entire crew on proper crew scanning procedures and how to report other aircraft that should be considered possible midair threats. When identifying other aircraft, make sure you are talking about the same aircraft. Many a near miss and midair have been caused by a crewmember identifying one aircraft while the pilot was identifying another.

• Avoid crowded airspace. If at all possible, avoid areas of heavy aircraft concentration. If you must enter these areas, be well prepared by planning ahead. When navigating VFR, don't cross directly over VOR, but pass slightly to the left or right. Cross over airports at a safe altitude or, if possible, fly to the left or right of an airport. Beware of airports where skydiving is conducted and check with your FAA Flight Service Office for their advice on where to avoid skydiving.

• Talk and listen. Use your radio equipment and monitor it continuously. When approaching an airport, make a radio call from a distance far enough away to receive the local traffic situation. If the airport has radar service, call and take advantage of it. Remember, FSS will give you traffic advisories at uncontrolled airports. Once you have detected a radar target, don't forget it; yet, don't overconcentrate on it. There are many more aircraft in the area. Remember also that the primary responsibility for aircraft separation is the pilot's during VFR conditions and not the controller's. In other words, see and avoid.

• Scan. The most important item is to scan all the time. You must scan continuously where you are going and off to either side. Also, remember that most midairs occur when a faster aircraft overtakes a slower aircraft.

Early in the history of aviation, we found that midair collisions occurred while aircraft were close to the ground—namely during takeoffs and landings. But, regardless of what altitude we're flying, the best way to avoid this type of catastrophe is the "see and avoid" concept. ■

—adapted from an article by Major David F. Sale in the ARMY AVIATION DIGEST

Shortfax

Recap of TSARCOM messages

Following is a list of AIG 8881 addressed messages transmitted by TSARCOM from 1 October through 31 December 1982.

AH-1-82-11 Maintenance advisory message concerning the flatplate canopy removal detonation transfer system

AH-1-82-12 Maintenance mandatory message concerning wiring clearance of the AN/ALQ-144 IR jammer on the AH-1S

UH-1-82-05 Maintenance mandatory message concerning replacement of safety relief valve with plug on UH-1B/H/V and EH-1X aircraft

UH-1-82-06 Emergency technical message concerning one-time inspection of connecting link, rigid, left cyclic and connecting link, rigid, right cyclic

CH-47-82-13 Maintenance mandatory message concerning one-time inspection of CH-47 engine fire extinguisher system actuation cartridge

CH-47-82-14 Update status of actions to restore operational capability of CH-47 fleet

UH-60-82-18 Maintenance mandatory message concerning main rotor spindle droop stop bearing inner race and droop stop bearing support

UH-60A-82-19 Maintenance mandatory message concerning one-time inspection for yaw trim and roll trim servos for improved seal

OH-58-82-03 Maintenance mandatory message concerning one-time inspection of anti-icing valve poppet seat screw for secure staking on all T63-A-5A1700 and T63-A-720 gas turbine engines

GEN-82-07 Maintenance mandatory message concerning compliance with emergency Airworthiness Directive 82-20-01

AH-1-82-10 Maintenance mandatory message concerning maintenance procedures relative to an inoperative 10KVA alternator

UH-60A-82-20 Establish inspection intervals for engine output shaft

UH-60A-82-21 One-time inspection of drag beam/axle assembly

AH-1-82-13 One-time inspection of collective sleeve bearings

UH-1-82-07 One-time inspection of collective sleeve bearing

CH-47-82-15 Night operation restriction on CH-47C aircraft

CH-47-82-16 Update status of actions to restore operational capability of CH-47 fleet

CH-54-82-04 One-time inspection of tail rotor pitch link rod ends

CH-54-82-05 One-time inspection of rotor brake disc

UH-1-82-08 One-time inspection of tail boom fittings

UH-60A-82-22 One-time inspection of cargo door tracks

CH-47-82-17 Update status of actions to restore operational readiness capability of CH-47 fleet

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

AR 385-95 delayed

The effective date of AR 385-95, Army Aviation Accident Prevention, is delayed until 15 March 1983, pending publication of DA Pam 385-95, a key supporting document. AR 95-5 remains in effect until 15 March. ■

Followups to previous Shortfax

• On the back of the 15 December 1982 issue of FLIGHTFAX, we said that a safety hazard existed in AN/PRC-90 radios procured under contract F41608-74-C-2178. The only "safety hazard" is that if the radio leaks water it will not work. If the radio doesn't work, your personal safety may be compromised if you go down in the "boonies." The water leak check consists of submerging the radio for 5 minutes at 18 psi.

• On the same page in the same issue, we said that you should not use any type of fuel except JP-4 unless you were in an emergency situation. This statement should have read: Do not use any type of fuel except JP-4 or authorized alternate. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (M series) Flight idle solenoid failed in depressed position, causing engine to stop when throttle was reduced during landing. □ (H series) Rpm warning light came on. Caused by defective warning box. □ (H series) Transmission oil pressure fluctuated. Caused by defective oil pressure transmitter. □ (H series) Rotor tachometer needle dropped to zero. Caused by failure of tachometer generator. □ (H series) Pilot felt feedback in cyclic. Caused by failure of left lateral servo cylinder. □ (H series) High frequency vibration in control pedals was caused by defective tail rotor servo. □ (H series) Pilot heard noise from hydraulic pump. Master caution and hydraulic lights came on. Caused by failure of hydraulic pump and lines. □ (H series) Pilot noticed restriction of cyclic in aft quadrant during descent. Hydraulics-off landing was made. Ice was found on bellcrank, causing control restriction. □ (H series) Fire warning light came on. Caused by failure in open position of actuator assembly for bleed band. □ (H series) Master caution and transmission oil pressure lights came on. Transmission oil pressure gauge dropped to zero. Caused by worn quick disconnect on transmission oil pressure line from transmission to thermal relief valve. □ (H series) Master caution and right fuel boost pump lights came on. Caused by failure of boost pump.

Attack helicopters

AH-1 Class E mishaps □ (S series) Pilot noticed slight deformation of main rotor blade during coastdown. Skin had separated in two places on underside of blade spar. □ (S series) Airspeed dropped to zero during takeoff. Caused by broken pitot static line. □ (S series) Oil pressure fluctuated during flight. Caused by failure of oil pressure transducer.

Cargo helicopters

CH-47 Class E mishaps □ (B series) Crew chief noticed oil coming from hydraulic oil cooler fan during flight. Caused by failure of fan. □ (B series) No. 1 engine chip detector light came on. Caused by failure of engine transmission. □ (A series) N_1 fluctuated and No. 1 engine oil pressure decreased during flight. Caused by failure of engine oil pump. □ (C series) Right aft bubble cargo window was lost during flight.

Observation helicopters

OH-6 Class C mishap □ Pilot was wearing night vision goggles. IP was not. Pilot pulled cushioning pitch too high during low-level autorotation to hard-surface taxiway. Aircraft hit the ground hard. Left skid collapsed, causing main rotor to sever tail boom.

OH-58 Class E mishaps □ (A series) As aircraft turned downwind at an altitude of 800 feet msl, crew saw kite about 700 feet msl near southeast end of runway. Tower personnel were told about kite. On next takeoff, crew extended takeoff leg to miss kite. Kite was not seen again. During postflight inspection, fishline was found in main rotor system. Assume line was that of kite, although kite was not found. □ (A series) Engine oil temperature gauge dropped to zero. Caused by electrical short between engine oil temperature transmitter and engine oil temperature gauge. □ (A series) Aircraft was flying contour down a valley at 60 knots and 50 feet agl, paralleling a tree line on the left and a road on the right. Pilot saw a set of wires just above skid level about 20 to 30 feet ahead of aircraft. Pilot tried to overfly wires by rapidly increasing collective and applying aft cyclic. Bottom

(continued on back page)

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	1-26 Jan	**1**	**0**
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**5**	**2**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Accident review: division of attention

Synopsis

An OH-58A pilot, flying over a lake, descended from about 800 feet agl. He intended to level off at some altitude below 200 feet, but his attention was distracted and the descent continued unnoticed until the aircraft hit the water.

History of flight

The mission called for an OH-58 to drop two passengers at a site on the reservation and return later to pick up one of them. A flight plan was not filed, contrary to AR 95-1.

After dropping the passengers at the site, the pilot and crew chief flew to a hot refueling point. Thirty to 45 minutes later, the crew returned to pick up one of the passengers. The pilot was told it would be 1½ hours before the passenger would be ready to leave. Since the pilot was unfamiliar with the route over which he was scheduled to take his passenger to the next stop, he decided to make a reconnaissance of the area.

The recon flight carried the aircraft off the military reservation. After completing the recon, the crew had some time remaining before they had to pick up their passenger. The pilot started a shallow right turn toward a fresh water reservoir just off the reservation. Reaching the reservoir at an altitude of 800 feet agl, the pilot began a descent of 500 to 700 feet per minute. There was a 200-foot agl altitude restriction on the military reservation because of jet traffic, and the pilot wanted to be below that altitude by the time he reentered the reservation.

At an estimated altitude of 200 feet, the pilot applied power to stop the descent. As the aircraft passed one of the boats on the lake, the pilot waved, with his right hand, to the occupants in the boat. The pilot did not notice that the aircraft was still descending. He was looking 45 degrees to the right front when the OH-58 hit the water at an airspeed of about 90 knots, several hundred meters from the nearest shore. The fuselage disintegrated on impact.

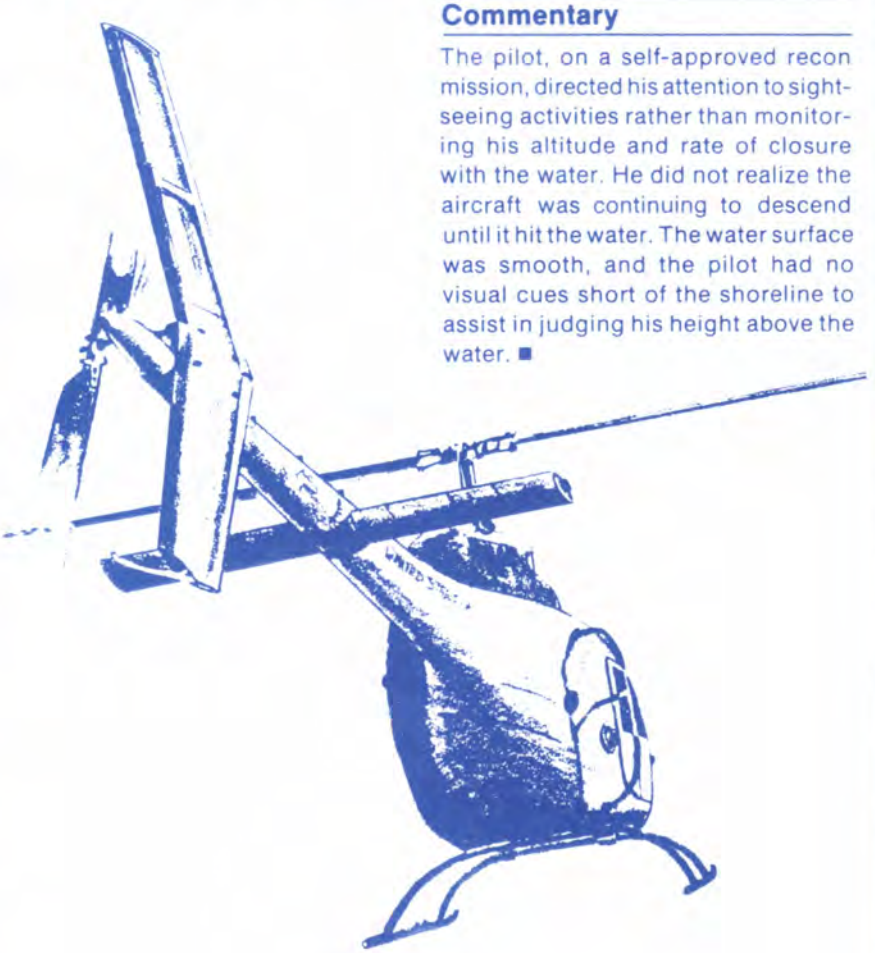
Both of the occupants, still in their seats, were ejected forward through an opening in the cockpit wreckage between the top of the windscreen and forward edge of the fuselage roof. Both occupants came to rest under water, still attached to their seats. They released their seatbelts and swam to the surface. Both of the crew chief's legs were broken, and the pilot sustained cuts and bruises. The pilot and crew chief were helped into some boats by people who were fishing nearby.

Crewmember experience

The 28-year-old pilot had more than 650 rotary wing hours, with more than 400 in the OH-58A.

Commentary

The pilot, on a self-approved recon mission, directed his attention to sightseeing activities rather than monitoring his altitude and rate of closure with the water. He did not realize the aircraft was continuing to descend until it hit the water. The water surface was smooth, and the pilot had no visual cues short of the shoreline to assist in judging his height above the water. ■



Mishap briefs

of skids hit and severed first wire of a set of three powerlines. Aircraft was landed without further incident. □ (A series) Severe high-frequency vibration was felt throughout airframe. Moisture had accumulated under oil cooler fan. When aircraft was cranked, moisture was thrown around fan and froze when exposed to subfreezing temperatures. Fan had asymmetrical shedding, causing unbalanced condition of tail rotor drive shaft and severe vibration in airframe. Drain hole beneath oil cooler fan was clogged with dirt and grass debris from parking area. Aircraft was hangared overnight because of ice accumulation from a recent storm. Water accumulated during the overnight stay.

Training helicopters

TH-55 Class B mishap □ Student pilot on solo flight crashed into trees. Aircraft was seen to be spinning just before entering trees. 8308

TH-55 Class E mishaps □ Crew smelled smoke in cockpit. Caused by short in clutch switch. □ Engine quit when throttle was closed during autorotation. Caused by malfunction of fuel servo. □ Engine ran rough during hover. Caused by failure of No. 4 cylinder fuel injector line.

Fixed wing

OV-1 Class E mishap □ (RV-1D) Crew heard loud popping noise, followed by vibration. Suspect ring gear failure, with prop and engine overspeed.

T-42 Class E mishap □ Excessive application of brakes caused right main tire to blow out on touchdown.

U-8 Class E mishap □ (F series) Left main landing gear did not indicate down. Emergency procedures were accomplished, and aircraft was landed. Caused by broken wire to landing gear indicator.

U-21 Class E mishaps □ (A series) HIT check on right engine indicated +38° Caused by failure of fuel control unit. □ (RU-21H) On takeoff roll with throttle advanced to full power position, No. 1 engine would not produce more than 750 pounds of torque. Caused by separation of aft rod end bearing to power turbine generator.

Maintenance

UH-1 Class E mishaps □ (H series) Master caution light came on during takeoff. Caused by loose cannon plug locking pin. □ (H series) Master caution and hydraulic lights came on. Partial loss of hydraulic pressure was exhibited by stiffness in collective. Input hydraulic line was not secured correctly to hydraulic pump. Loose line allowed hydraulic fluid to seep from fitting. □ (H series) Master caution and transmission oil pressure lights came on. Oil pressure dropped to 30 psi. Crew chief had not replaced packing during internal transmission filter change.

AH-1 Class E mishaps □ (S series) Nose of aircraft pitched down and right during flight. Caused by loose pin in cannon plug to SCAS amplifier. □ (S series) Forward fuel boost pump light came on. A few minutes later, aft boost pump light came on. Caused by loose wire at cannon plug for fuel boost pump pressure switch. □ (S series) Master caution and engine oil bypass lights came on, and fuel/oil valve circuit breaker popped. Caused by incorrectly positioned wires. Wire leading to engine oil bypass valve was chafing against safety wire, causing a short.

T-42 Class E mishap □ Pilot saw fuel siphoning from left auxiliary fuel tank cap during climbout. Tension on fuel was too loose.

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

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The secret is selectivity

There's no way you can remember all the regulations, rules, and procedures established and published by the Army all of the time. And no one expects you to. But what about the business of remembering and following established flight procedures . . . **all the time**? The Army does expect you to do this and there is a way. The secret is selectivity.

Aviators must concentrate on reading and learning everything they can about their aircraft and its capabilities, limitations, and emergency procedures, the missions they will be flying, the environment in which they will be operating, and the unit SOP. And then continually review this information. Mechanics should always use maintenance manuals when working on aircraft and not trust anything to memory.

It is possible to violate established procedures and get away with it. Sometimes. But if you do it often enough, sooner or later something bad will happen—like in the following cases.

• A UH-1 pilot did not follow the procedures in the aircraft checklist when he did his preflight inspection. He did not latch or physically check the security of the left side engine cowling. The cowling came off during flight and hit the tail rotor. The aircraft crashed. The pilot was known to take shortcuts and not go by the book.

• An OH-58 pilot had completed a tactical mission and was flying toward his release point. He had traveled about 400 yards at 35 feet above the ground when he saw some electrical cables in front of his aircraft. He tried to miss the cables, but the aircraft hit three of them and crashed almost inverted. The pilot was required by command regulation to fly single pilot missions no lower than 50 feet above the highest obstacle. His company's wire strike prevention policy stated that pilots would maintain 300 feet agl unless specifically required to fly at a lower altitude.

• A UH-1 maintenance test pilot was doing an autorotation as part of his test flight. He descended to 200 feet before applying collective pitch to complete the power recovery. TM 55-1500-219-MTF requires recovery from autorotations to be completed at or above 500 feet agl. When the pilot reached 200 feet, the engine would only develop partial power. Instead of selecting a landing area and heading toward it, the

(continued on next page)

The secret is selectivity

pilot tried to diagnose the engine problem and allowed the aircraft to descend below treetop level before looking outside. The UH-1 hit a wire, crashed into trees, and was destroyed.

• A U-21 was on a local training flight. When the right main landing gear would not fully extend to the locked position, the IP failed to use the backup manual gear system to lower the gear. During the rollout, he also failed to apply light braking force to the gear. He knew the operators manual required the use of the backup manual system and the brakes, but he did not attempt the procedures. The right main gear collapsed, causing substantial damage to the aircraft.

• A CH-47 pilot was taxiing his aircraft from the runway to a parking spot. He positioned a ground guide in front but did not place a blade watcher under the aft blades, as shown in the operators manual. A crew chief stayed in the rear of the aircraft to help clear it. The ground guide told the pilot he was clear to turn to the right. The pilot attempted a sharp right turn, and the aft rotor blades hit a pole. The crew chief inside the aircraft could not see the aft rotor tip path plane and the top of the pole.

• A UH-1 flight leader led four aircraft in a close diamond formation to a landing in a snow-covered field, instead of spacing them out at 15- to 30-second intervals as prescribed in TC 1-12. When the pilot of the No. 3 aircraft became disoriented because of the rotor-induced blowing snow, he did not initiate a go-around. The aircraft drifted to the rear and crashed.

• An OH-6 pilot, while practicing confined area operations, set up a final approach, with no intent to land, to an area he knew was not authorized for confined area practice. His aircraft hit two power cables and crashed. The pilot violated flight manuals and regulations by flying below 500 feet agl, not doing a high recon, and not identifying a forced landing area.

Following established procedures is the key to preventing crew-error mishaps.

• A U-8F crew chief disconnected the nose gear drag link to adjust the clearance on the down lock. When he reconnected the down lock, he did not reconnect the drag brace. The crew chief did not enter his work in the logbook, his work was not checked by anyone else, and the pilot did not do an adequate preflight inspection. As a result, the nose gear failed to retract in flight, causing the gear motor to overheat and pop the circuit breaker. The IP did not complete the required landing gear malfunction emergency procedures and did not discover that the gear motor circuit breaker had opened, preventing full extension of the main gear. When the aircraft was landed, the main gear collapsed, damaging the wings, props, and underside of the fuselage.

Every aviator and aircraft mechanic knows that following established procedures is the only professional way to be sure a job gets done every time the way it is supposed to be done. What happens all too often is that impatience sets in. A mechanic servicing an aircraft begins to fall back on his memory, to tell himself he recalls a particular procedure because, whether or not he knows it, he wants to avoid the time and trouble of wading through a lot of fine print to make sure. Or a pilot, for whatever reason, fails to follow the preflight the book calls for because he really thinks he has it all down in his head. This may be the one time a memory which has worked well in the past decides to play dead.

When you're tempted to ignore or violate established procedures—think of those other people who are depending on you. You owe it to them, to yourself, and to everybody in the Army to follow regulations and established procedures to the letter every time. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Tail rotor blades hit tree limbs during hover in confined area. Both blades were damaged. □ (H series) Pilot preflighted aircraft for the next day's mission. During review of weight and balance records, pilot found that aircraft was overdue weight check. Aircraft was weighed, and pilot and technical inspector made a walk-around inspection. The next day, pilot inspected aircraft again before his flight and then flew for 1½ hours. During postflight inspection, pilot noticed secondary lifting clevis was still attached to main rotor retaining nut. Damage was caused by clevis contacting mixing lever and center frame assembly of stabilizer bar.

UH-1 Class E mishaps □ (H series) Transmission oil pressure fluctuated during hover. Caused by defective oil pressure relief valve. □ (H series) Engine rpm indicator dropped to zero, and warning light and audio activated. Caused by sheared tachometer generator drive shaft. □ (H series) Master caution and transmission oil pressure lights came on. Thumping sound was heard from engine and aircraft yawed left. Caused by failure of transmission oil filter gasket. □ (H series) Aircraft yawed left and right during flight. Caused by malfunction of fuel control. □ (H series) Stiff cyclic during hover was caused by defective hydraulic valve. □ (H series) Transmission oil pressure gauge fluctuated during flight. Caused by defective oil pressure transmitter.

Attack helicopters

AH-1 Class C mishap □ (G series) Engine failed as aircraft was hovering to taxiway. Last two sets of power turbine blades were destroyed. Debris coming out of engine exhaust damaged tail rotor blades and vertical fin.

AH-1 Class E mishaps □ (S series) Main rotor tip path plane varied in pitch 4 to 6 inches for 3 to 5 minutes during runup, followed by rapid vertical jump of 2 feet. Caused by malfunction of SCAS control transducer. □ (S series) Crew smelled electrical smoke during runup, followed by illumination of aft fuel boost pump, alternator, and rectifier caution lights. Caused by failure of starter generator. □ (S series) Airspeed indicator did not work during takeoff. Caused by cracked pitot static system tubing.

Cargo helicopters

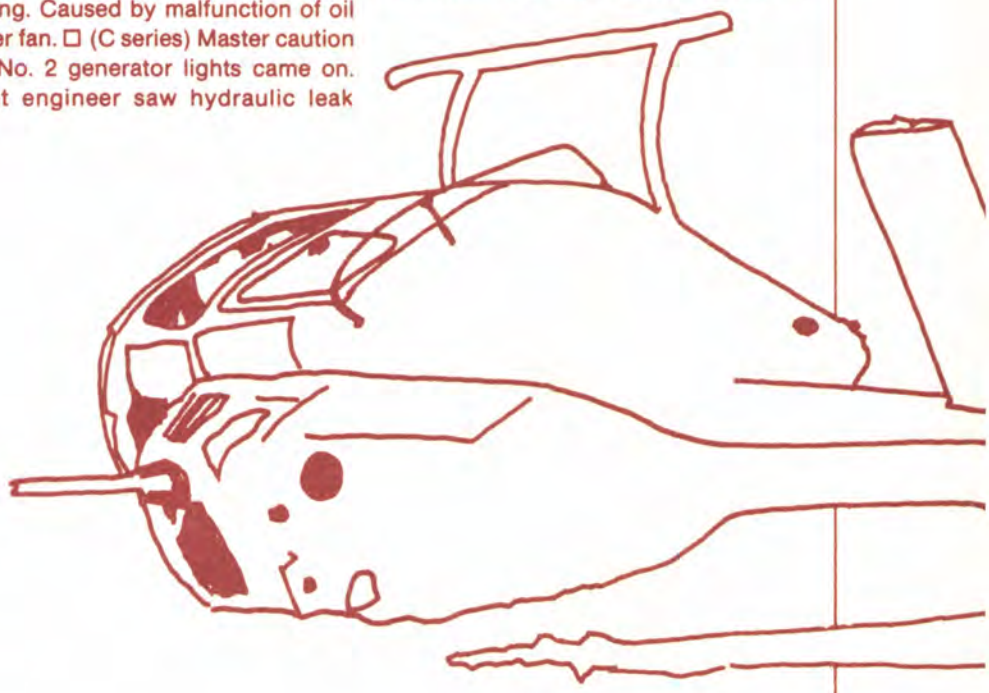
CH-47 Class C mishap □ (C series) IP and pilot positioned aircraft over load. Crew chief was using shepherd's hook for load pickup. Crew chief, who did not tell crew he had dropped the doughnut, told them to move the aircraft. Aircraft hit the load, putting three holes in the skin and damaging a former.

CH-47 Class E mishaps □ (C series) Unusual noise was heard from vicinity of ramp area during final approach to landing. Caused by malfunction of oil cooler fan. □ (C series) Master caution and No. 2 generator lights came on. Flight engineer saw hydraulic leak above No. 2 generator. Caused by failure of utility hydraulic pump pressure line. □ (C series) During takeoff to hover, copilot noticed No. 1 engine torque was not matched with No. 2. Caused by failure of N_2 actuator.

CH-54 Class E mishap □ (A series) Caution light stayed on when rotor brake was released. Caused by failure of low pressure switch on rotor brake package.

Observation helicopters

OH-58 Class B mishaps □ (C series) As pilot hovered about 5 to 10 feet above 50- to 60-foot trees, aircraft began slow, uncommanded turn to right. Pilot had applied full left pedal before the start of the turn. After aircraft turned about 50 degrees to right, pilot removed part of the left pedal and applied forward cyclic to gain airspeed. Turn accelerated into a spin. Pilot closed throttle as aircraft moved over a small clearing. Autorotation was initiated and aircraft



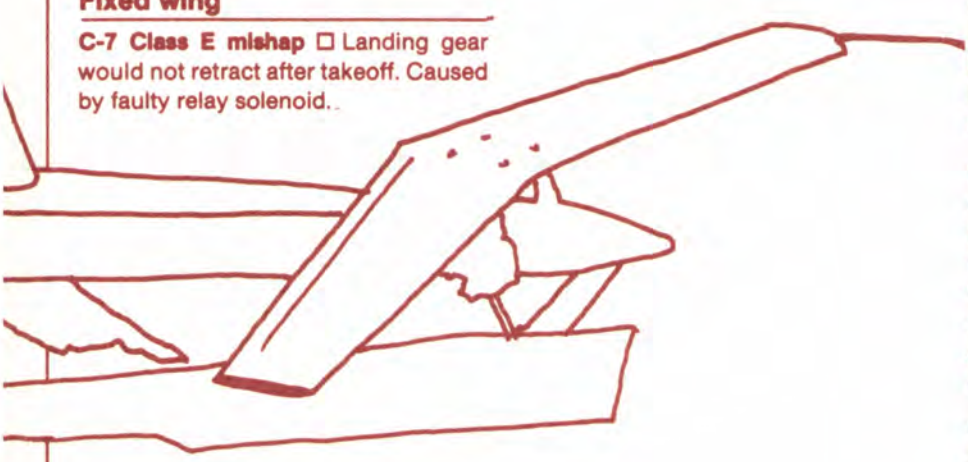
descended into the clearing, striking trees with tail rotor and main rotor blades. Aircraft came to rest on left side. 8309 □ (A series) Aircraft entered whiteout during approach, crashed, and rolled over. 8310 □ (A series) Whiteout occurred during takeoff, and aircraft crashed and rolled over. 8311

OH-58 Class C mishaps □ (A series) Aircraft was being landed to tactical field site. As skids touched down, shudder was felt throughout aircraft. Tail rotor had hit a rock formation to left rear of aircraft, damaging blades, 90-degree gearbox, and tail boom. Blowing dust hindered visibility. □ (A series) As copilot was attempting slope landing, aircraft started sliding. Pilot lowered collective and centered cyclic. Mast bumping occurred.

OH-58 Class E mishaps □ (A series) Generator caution light came on after aircraft landed. As passenger was leaving aircraft, he noticed smoke coming from engine compartment. Aft freewheeling seal had contracted due to low temperatures, allowing oil to seep onto starter generator. □ (C series) Master caution and fuel boost pump lights came on during landing. Caused by failure of boost pump.

Fixed wing

C-7 Class E mishap □ Landing gear would not retract after takeoff. Caused by faulty relay solenoid.



C-12 Class C mishap □ (A series) Gear control handle was placed in up position after takeoff. Crew heard noise and red light in gear control handle remained on. Tower personnel said gear appeared to be up. When gear control handle was placed in down position for landing, handle light remained on. Crew heard noise that sounded as if gear motor started and then stopped. Tower flyby confirmed that gear was not down. Manual gear extension handle could not be pushed down. Aircraft was landed gear up on foamed runway.

C-12 Class E mishap □ (A series) Right brake failed on rollout after landing. Caused by failure of preformed packing on brake assembly pistons.

U-21 Class E mishap □ (A series) Crew noticed fuel siphoning from right wing after takeoff. Caused by incorrectly positioned fuel cap.

Maintenance

UH-1 Class E mishaps □ (V series) Cabin filled with smoke and fumes after takeoff. Crew chief misinterpreted instructions from maintenance supervisor and wired customer bleed air valve and mixing valve in full open position. This permitted 450° C. bleed air in full open position. Hot air heated and deformed plastic ducting beneath cargo floor on right side. □ (H series) Crew smelled JP-4 fumes in cockpit. Dirt around cockpit drain valve caused incorrect seating of valve.

AH-1 Class E mishap □ (S series) Forward fuel boost pump light came on. A few minutes later, aft boost pump light came on. Caused by loose wire at cannon plug for fuel boost pump pressure switch.

CH-47 Class E mishap □ (C series) No. 1 engine condition lever was in ground and No. 2 engine was being topped when No. 2 N_1 dropped to 50 percent. No. 2 engine then quit. Running landing was made. Postflight inspection revealed that main fuel line quick disconnect had come loose at engine deck, causing fuel starvation.

OH-58 Class E mishaps □ (A series) White smoke came from heater vents when heater was turned on during runup. Asbestos cover around pneumatic air line on engine deck to heater was soaked with oil. □ (A series) Fuel boost light came on. Caused by moisture behind access panel. Sealant was not applied when access panel was installed, allowing moisture to enter. □ (A series) Pilot noticed abnormal rise in d.c. amperage and landed. Caused by incorrectly wired battery relay.

OV-1 Class E mishaps □ (RV-1D) Right main gear indicated unsafe after takeoff. Caused by overserviced strut. □ (RV-1D) Landing gear would not retract when gear handle was placed in up position. Suspect valve linear direct control landing gear dump was left unseated.

U-8 Class E mishap □ (F series) When landing gear was lowered, nose gear

(continued on back page)

Accident review: UH-1 wire strike

Synopsis

The lead UH-1 in a flight of four aircraft hit a set of wires. The aircraft pitched up and rolled right. It then crashed into trees and was consumed by a postcrash fire.

History of flight

The mission called for four aircraft to move some personnel from one location to another. A pilot and copilot flew to the pickup zone to make a reconnaissance of the zone and to get a detailed briefing of the mission. After receiving the mission briefing, the crew flew back to their station. They did not do a route reconnaissance on their way back.

Arriving at their station, the pilots briefed the crews of the other aircraft. The map from which the briefing was given had no wire hazards marked along the mission route. There was a known wire hazard at the pickup zone, which was briefed.

The flight of four helicopters took off and flew along a highway for several miles. The flight then went into a tactical trail formation, flying about 125 feet above the ground and 90 knots indicated airspeed. While flying down a valley, following a stream and a road en route to the pickup zone, the PIC of the lead aircraft, who was navigating, checked his map. The copilot saw a set of wires and flew over them, watching them pass under the aircraft to his right. When the copilot returned his attention to the area in front of the aircraft, he saw more wires in his flight path. He applied aft cyclic, increased collective, and yelled "Wires!" over the intercom. The PIC looked up about the same time and saw the wires.

The Huey responded to the control inputs with a climb. One wire hit the lower windshield and went up and over the aircraft roof. A second wire hit slightly higher on the windshield, shattering it and making forward visibility impossible. The crew felt a severe lateral vibration, probably caused by the damaged main rotor system. The aircraft rolled slightly right and continued flight in a right, turning flight path with a gradually increasing right yaw. The aircraft would not respond to cyclic inputs by the crew and crashed into trees.

The UH-1 came to rest lying on its left side with the nose and left cockpit door jammed against a tree trunk. The pilot rolled the throttle off and turned off the fuel and battery before getting out of the aircraft . Hot engine exhaust gases ignited the dry vegetation. The left rear belly of the fuselage was punctured during the accident sequence and fuel was flowing from the hole. The fuel ignited and then the aircraft caught fire and was destroyed.

The four crewmembers escaped from the aircraft before the fire spread. None of the crewmembers were injured except the copilot, who had glass fragments in his eyes. The personal protective equipment worn and installed in the aircraft prevented serious injuries to all the crewmembers.

Crewmember experience

The 26-year-old PIC had almost 500 rotary wing hours, with more than 400 in the UH-1H. The 26-year-old copilot had almost 300 rotary wing hours, with more than 250 in the UH-1H.

Commentary

The unit was operating in violation of FM 1-51 and its own SOP. No wire hazard map was maintained in the field operations office, and a route recon was not done before a flight being conducted below the highest terrain feature. Had the pilots who had earlier flown to the pickup zone for the mission briefing made even a cursory inspection of the route on their return to their

station, noting only the most significant wire hazards, the wires involved in the accident could have been marked on the operations map and properly briefed. The pilots maintained individual wire hazard maps and informally discussed wires they had seen. Reliance on individually maintained maps and informal discussions do not provide adequate protection from wire strikes.

The 90 knots' airspeed was excessive for the altitude being flown, particularly in an area of unknown hazards. The wires had become dark through aging, and the rising vegetation-covered terrain provided a dark background for the wires, making them extremely difficult to see. The high speed being flown reduced the time available to see and react to the wires.

The copilot focused his attention on the first set of wires that they passed over. When he looked forward again, he did not have enough time to miss the second set of wires. The PIC, who was also the mission commander, did not see the wires because his attention was channelized on his map. Neither pilot saw the poles on which the wires were strung. Only two of the four crews in the flight saw the poles and were aware of the wires. ■

Mishap briefs

indicator and light in gear handle showed unsafe. Engine cowling mirrors reflected that gear was extended. Tower operator said gear appeared to be extended. Landing was made on main wheels, holding nose wheel off the runway. When nose wheel was lowered to runway, indicators showed safe condition. Nose gear drag link was installed upside down after removal for magnetic inspection. Nose gear extension rod clevis was binding against incorrectly installed drag link when nose gear fully retracted, causing clevis shaft to bend enough to prevent free extension of stacking spring. Spring action was ineffective in pushing down locks over locking pins far enough to disengage nose gear microswitches.

Messages received

- Maintenance advisory message concerning inspection of nonsafety matches used in Army aircraft survival kits (ALSE-83-1, 211600Z Jan 83).

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

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	1-2 Feb	**0**	**0**
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**5**	**2**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 17 □ 9 Feb 1983

Accident review: another wire strike

Synopsis

While on a low-level recon of a river, the UH-1H hit a powerline extended over the river. Control was lost, and the aircraft crashed on the bank of the river.

History of flight

The UH-1 was on a mission to drop off some supplies at a river site and pick up some troops. Three crewmembers and three passengers were on board the aircraft. After the supplies were off-loaded, three more soldiers boarded the helicopter.

Before taking off, the pilot was told by his platoon leader, who was participating in adventure training on the river, to recon the surface condition of the river downstream and to check for campers. Rappelling training was planned for the next day in the area.

The pilot then took off and proceeded downstream. The aircraft was brought to a hover in the vicinity of some falls where several photographs were taken. The pilot continued downstream at an altitude of 75 to 100 feet agl and an estimated airspeed of 70 to 80 knots.

About 7,000 meters downstream from the falls, the helicopter hit a two-wire powerline crossing the river. One wire wrapped several times around the mast, swashplate, and flight controls before breaking, resulting in total loss of control. The aircraft crashed onto the northwest bank of the river and came to rest on its right side. The copilot, crew chief, and one passenger were killed. The other six occupants sustained major injuries.

Crewmember experience

The 23-year-old pilot had more than 800 rotary wing hours, with most of them in the UH-1H. The 35-year-old copilot had more than 300 rotary wing hours, with more than 250 in the UH-1H.

Commentary

A post regulation and the unit SOP specified a minimum altitude restriction of 300 feet agl for flights outside the military reservation. This restriction was not complied with. The decision to fly at an altitude lower than the prescribed minimum was completely voluntary and was made by the pilot. He decided he could not do a good reconnaissance of the river, as requested by his platoon leader, from 300 feet.

The acting troop commander, a qualified and current aviator, was a passenger in the aircraft. He was seated behind the copilot and was monitoring the communication system. At no time during the flight did he indicate to the crew that they were in violation of regulation and require them to operate the aircraft at a higher altitude. ■

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class B mishap in 7 Jul 82 issue (8263) ☐ Engine failed as aircraft was descending through 200 feet agl. Pilot was forced to autorotate while over a pond. Aircraft was landed on the edge of the pond, resulting in damage to tail boom, fuselage, and electrical equipment. Overstress failure of several compressor blade retaining pins allowed compressor rotor blades to move rearward, make contact with stator vanes, and ultimately result in compressor failure.

UH-1 Class A mishap in 14 Jul 82 issue (8265) ☐ Pilot did not compute a performance planning card. As a result, he was not aware of the existing engine power required versus power available and attempted an out-of-ground-effect hover with a heavily loaded aircraft in a downwind condition. Aircraft performance capability was exceeded and engine rpm decreased. Aircraft settled through trees onto sloping terrain and rolled inverted.

UH-1 Class B mishap in 14 Jul 82 issue (8267) ☐ Downgraded to Class E.

UH-1 Class A mishap in 21 Jul 82 issue (8269) ☐ As aircraft was climbing after takeoff, scissors lever pivot bolt failed, displacing scissors. Rigid connecting link struck stabilizer damper and separated from its clevis. Red main rotor blade became an uncontrollable, free-feathering blade. Aerodynamic forces acting on the uncontrolled blade caused main rotor system to flap excessively, resulting in failure of the mast and separation of the main rotor system from the aircraft. Aircraft rolled left and crashed in a near vertical attitude. Cause of bolt failure could not be determined.

UH-1 Class B mishap in 25 Aug 82 issue (8273) ☐ IP and pilot were on training mission. While demonstrating straight-in autorotation, IP initiated deceleration well below 100 feet agl. Aircraft fell through and landed hard.

Attack helicopters

AH-1 Class B mishap in 31 Mar 82 issue (8234) ☐ IP and pilot were on night vision goggle training mission. During low-level autorotation, IP misjudged his altitude and applied initial collective pitch excessively high. Aircraft landed hard and slid off runway.

AH-1 Class A mishap in 2 Jun 82 issue (8250) ☐ Aircraft was flying about 30 to 35 knots and 10 feet agl during training exercise. Engine rpm bled off and aircraft crashed. Demand for power exceeded that available for the tailwind conditions, high temperature, and high density altitude.

AH-1 Class A mishap in 9 Jun 82 issue (8252) ☐ Aircraft was on maintenance test flight. About 700 feet above the ground, a lurch was felt by the pilot, followed by an uncommanded roll (SCAS hardover) and gyrating excursions from controlled flight. Pilot established a descent and, about 20 feet agl, a final SCAS hardover to the right

8263

occurred. Main rotor blades hit the ground and aircraft crashed. No cause could be found for the SCAS malfunction. When confronted with the SCAS malfunction, pilot misinterpreted the aircraft actions as being caused by a main transmission mount failure. Pilot did not release the SCAS nor make sufficient cyclic control inputs to compensate for the displaced neutral position of the cyclic control stick. Inadequate school and unit training and inadequate written procedures regarding the identification of SCAS malfunctions were contributing factors.

Cargo helicopters

CH-47 Class B mishap in 14 Jul 82 issue (8268) □ Aircraft was being four-wheel ground taxied at an excessive rate of speed across a dry lake bed. Copilot, who was operating the power steering control and brakes, failed to slow the speed to a brisk walk. As the taxiing progressed, copilot began a slight right turn. About 15 meters into the turn, an abrupt, uncommanded right turn caused aircraft to skid and begin to roll left as the degree of turn increased. Brakes were not applied and aircraft control was lost. In an attempt to regain control, pilot applied excessive left pedal and left cyclic inputs to the flight controls. This resulted in failure of two forward static droop stops which allowed two forward rotor blades to strike No. 6 tunnel cover and tunnel area flight control push-pull tubes.

8234

8250

Observation helicopters

OH-6 Class A mishap in 21 Jul 82 issue (8270) □ Aircraft was landed at field site. Artillery aerial observer got out of aircraft, walked around rear of aircraft, and was hit by tail rotor blade. Observer sustained major injuries to his face and arm. Observer had been briefed by the pilot before the flight and was told to stay in the aircraft when it was landed.

OH-58 Class A mishap in 28 Apr 82 issue (8245) □ Pilot induced loss of effective tail rotor control during confined area takeoff. When aircraft yawed right just as it cleared the treetops, pilot reacted with left pedal, forward cyclic, and increased collective pitch. Aircraft, near the critical limits of tail rotor control, immediately entered uncontrollable right spin and crashed.

OH-58 Class A mishap in 9 Jun 82 issue (8254) □ Aircraft began uncontrollable spin to right during termination of approach. Aircraft did not respond to attempts to stop the spin nor to an attempt to fly out of the spin into the wind. After three rotations, pilot reduced throttle to autorotate and aircraft landed hard. Accident resulted from marginal tail rotor effectiveness of the OH-58. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Main rotor blades hit tree branch during NOE flight. □ (H series) During post-flight inspection at intermediate stop, crew chief found section of tail rotor drive shaft cover was unsecured. Crew chief secured cover without inspecting tail rotor drive shaft and without telling pilot of his discovery. Mission was terminated one-half hour later at home base. Crew chief then noticed damage to tail rotor drive shaft section and drive shaft clamps. Crew chief had not secured drive shaft before flight and pilot did not detect unsecured cover.

UH-1 Class E mishaps □ (H series) Low rpm audio and warning light activated. Caused by failure of N_2 tachometer generator. □ (H series) Tail rotor chip detector light came on. Failure of input seal on 42-degree gearbox caused loss of lubricating oil and activation of light. □ (H series) Transmission oil light came on. Caused by failure of thermostatic switch. □ (H series) Loud banging sound was heard during flight. Post-flight inspection revealed large crack in pilot's greenhouse. □ (H series) Engine oil pressure dropped to zero. Caused by faulty oil pressure gauge. □ (H series) Crew smelled smoke during landing, and rattling noise was heard in tail rotor drive shaft. Caused by defective No. 2 hanger bearing. □ (H series) High reading on transmission oil pressure gauge was caused by broken wire on sending unit. □ (M series) Thumping and grinding sounds were heard. Master caution and No. 2 hydraulic lights came on. Caused by failure of hose from No. 2 hydraulic pump to filter module.

UH-60 Class E mishaps □ No. 2 fuel filter bypass light came on. Caused by defective fuel filter system. □ Stabilator failed during landing. Caused by failure of amplifier.

Attack helicopters

AH-1 Class C mishaps □ (S series) Aircraft hit top of tree during low-level flight. Right wing store was dented and cracked. Copilot, who was flying the aircraft, was looking at a low-flying jet. Pilot was looking at his map. □ (S series) Copilot tried to start engine with main rotor tiedown still attached to blade. As main rotor began to turn, knot on end of tiedown hit tail rotor blade, denting blade.

AH-1 Class E mishaps □ (S series) Crosscheck of torque gauges revealed a difference of 6 percent. Caused by failure of transducer. □ (S series) Transmission oil bypass light came on. Caused by failure of pressure switch. □ (S series) Pilot heard the sound of the gun drive motor and noticed ammeter fluctuating. Pilot turned armament system off but gun stow elevation light did not come on. Aircraft was hovered at 6 feet while ground support personnel confirmed that gun was pointing down. Attempt was made to manually stow gun, but gun again dropped to full depression. Someone had to hold gun in stow position while aircraft was landed. Caused by failure of turret control asembly. □ (S series) Generator light came on during flight. Caused by failure of voltage regulator.

Cargo helicopters

CH-47 Class E mishap □ (B series) After engines were started and advanced to flight, generators failed when APU was shut down. Both generator shafts were sheared.

Observation helicopters

OH-58 Class C mishaps □ (C series) Damage to main rotor blade was discovered during maintenance daily inspection. Caused by bird strike. □ (A series) Top door jettison release pin on pilot's side pulled free in flight. Windstream caused door to fold in half, but it remained secure at lower pin and handle. Pilot did not notice on preflight that pin was not installed correctly.

(continued on next page)

OH-58 Class E mishaps □ (A series) Airspeed indicator fluctuated during flight. Caused by cracked air pressure line to indicator. □ (A series) Master caution and transmission oil pressure lights came on. Caused by failure of oil pressure switch.

Fixed wing

C-12 Class E mishap □ (A series) No. 1 engine tgt gauge dropped to zero during climbout. Caused by failure of chrome terminal lug.

T-28 Class E mishap □ (B series) Engine began surging just after aircraft lifted off runway. Caused by broken propeller governor cable.

T-42 Class A mishap □ IP and pilot were on ATM refresher flight. Returning to base, IP shut down left engine about 200 feet above the ground. About 10 feet above touchdown point, pilot raised nose of aircraft and added power to right engine to get past the arresting gear. Aircraft drifted and yawed to left. Left wing tip hit the ground. Aircraft bounced into the air, hit on nose and left engine, bounced into the air again, and came to rest upright. 8312

U-21 Class E mishaps □ (A series) Flap motor circuit breaker popped in flight and flaps stuck in approach position. Caused by failure of flap motor. □ (A series) Fuel was seen siphoning from No. 1 engine nacelle tank after takeoff. Aircraft had been refueled after crew told ground personnel that aircraft did not need to be serviced. Fuel caps were not checked by crew before engine start. Fuel cap was positioned incorrectly, causing fuel to siphon.

Maintenance

UH-1 Class E mishaps □ (H series) Fireguard saw hydraulic fluid dripping from underside of aircraft during runup. Caused by incorrectly installed sleeve in fitting assembly. □ (H series) Pilot detected unusual odor during hover and then saw smoke coming from left side of overhead console. Caused by loose wire to resistor on windshield wiper.

AH-1 Class E mishap □ (S series) Yaw SCAS began to motor in flight between 80 and 130 KIAS. SCAS card was out of adjustment.

Messages received

- Maintenance information message concerning T73-P-1 and T73-P-700 engine hot section inspection requirements (MIM-T73-83-MEA-01, 261930Z Jan 83).
- Maintenance message concerning extended phase maintenance intervals for UH-1H/V and EH-1H/X aircraft (272200Z Jan 83).
- Maintenance information message concerning elimination of Black Hawk tail rotor control rod boots (MIM-83-UH-60A-MEA-02, 271840Z Jan 83).

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

TM changes

The following changes to TMs have been released:

- Change 1, dated 10 Sep 82, to TM 55-1520-228-23P for OH-58A and C aircraft.
- Change 10, dated 11 Jan 83, to TM 55-1520-228-PM for OH-58A and C aircraft. ■

FY 83 Class A Accident Countdown

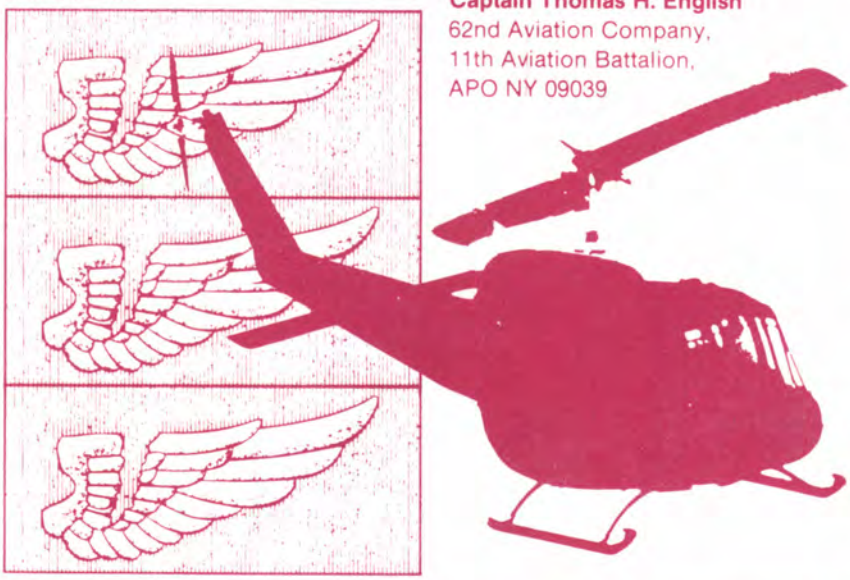
		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	1-9 Feb	**0**	**0**
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**5**	**2**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Twelve receive Broken Wing Award

The Broken Wing Award is given to aircraft crewmembers who demonstrate a high degree of professional aviation 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.

Twelve aviators received the Broken Wing Award from October through December 1982.



Broken Wing Award recipients

CW4 Carl A. Coyan
Attack Helicopter Troop,
107th Armored Cavalry, Ohio ARNG,
Worthington, Ohio

CW3 Robert C. Cushman
B Troop, 3rd Squadron,
4th Cavalry, 25th Infantry Division,
Schofield Barracks, Hawaii

Captain Thomas H. English
62nd Aviation Company,
11th Aviation Battalion,
APO NY 09039

SSG Marvin W. Flatt
DOFT, Fort Rucker

Captain Stevan J. Hammack
DOFT, Fort Rucker

CW2 Robert L. Heidrick
DOFT, Fort Rucker

CW3 Richard A. Hodge
D Company, 47th Aviation Battalion,
Wisconsin Army National Guard,
Madison, Wisconsin

DAC Wilburn A. James
Directorate of Evaluation
and Standardization,
Fort Rucker

CW2 Steven A. Overhang
C Company, 7th Combat
Aviation Battalion,
Fort Ord

CW3 John H. Strickland
128th Aviation Company,
APO SF 96208

CW4 Johnie M. Webster
Davison Army Airfield, Fort Belvoir

WO1 Michael L. Weddington
128th Aviation Company,
APO SF 96208

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Accident review: OH-58 tail rotor spin

Synopsis

The OH-58A pilot was taking off from a confined area. As the helicopter cleared 50-foot trees, the nose yawed to the right. The pilot reacted with left pedal, forward cyclic, and increased power. The aircraft entered a spin to the right and crashed.

History of flight

The pilot preflighted the aircraft and loaded his personal equipment on board in preparation for a tactical support mission. He then flew to a field site 10 minutes away. Arriving at the field site, he was told that he had a mission to pick up two passengers at the tactical operations center which was located about 1,000 meters to the west.

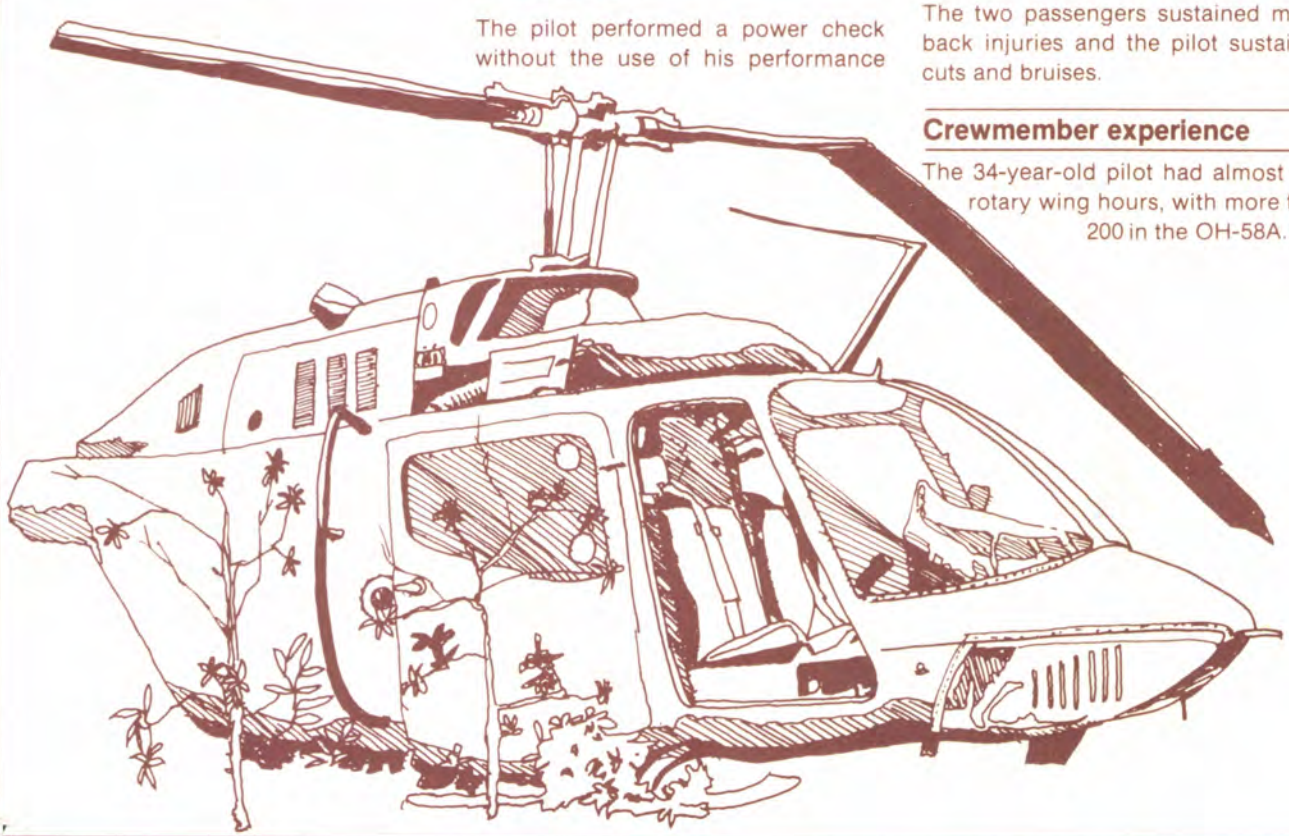
The pilot removed his personal equipment from the aircraft and departed for the pickup point. Locating the tactical operations center, the pilot selected a landing area nearby. He landed the helicopter in a 6-knot wind condition over 50-foot trees. He did not shut down the aircraft, brief the passengers, or secure loose equipment. One of the passengers, a rated officer from another service, helped the other passenger with his seat belt and the operation of the cabin doors.

The pilot performed a power check without the use of his performance planning card which, along with his operators manual, was located in his personal equipment. Departure heading was 050 degrees and resulted in a takeoff over the highest obstacle and in a downwind condition. As the aircraft cleared 50-foot trees, it yawed slightly to the right. The pilot reacted by adding left pedal, forward cyclic, and increased power. The aircraft continued to turn right and went into a spin. It spun about five times before hitting the ground. Just before ground impact, the pilot pulled all available collective pitch. The aircraft bounced into the air about 18 inches and moved to the left, coming to rest upright.

The two passengers sustained major back injuries and the pilot sustained cuts and bruises.

Crewmember experience

The 34-year-old pilot had almost 400 rotary wing hours, with more than 200 in the OH-58A. ►



OH-58 tail rotor spin

Commentary

The pilot was not properly trained in the OH-58A. His transition grade slips revealed an omission of several mandatory task requirements. Omitted were confined area operations, vertical helicopter instrument recovery procedures, night flight, and instrument flight. Less than a month after his transition training, the pilot received a night orientation and instrument training evaluation. His overall grade for this flight was satisfactory even though he was unable to control the aircraft during instrument flight within the limits of the standards stated in TC 1-137. The pilot was identified as weak on helicopter aerodynamics, but he was given no remedial training in this area.

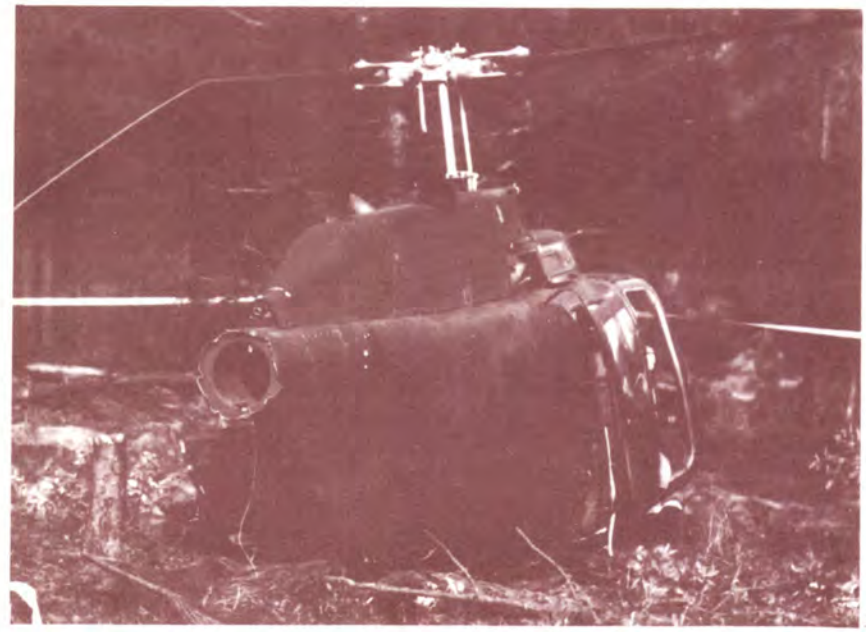
It is felt the pilot satisfactorily completed previous flight evaluations because the confined areas used were too large to provide a realistic challenge to his ability to perform this maneuver during actual tactical support missions and because of deviation from the standards prescribed in TC 1-137.

The pilot was involved in another OH-58 tail rotor spin accident 12 days before this accident. His postaccident flight evaluation did not comply with the intent of TC 1-137 in that no effort was made to evaluate the pilot's ability to fly a tactical NOE mission. Had the evaluation flight been done properly, it is possible that shortcomings in the pilot's flying techniques would have been discovered.

According to expert medical opinion, 12 days is not enough time for an individual to recover from a residual mental condition evolving from a severe accident. The operations officer assigned the pilot to a 2-day solo tactical training support mission involving maneuvers that would have placed him in the same conditions that resulted in his first accident. The pilot crashed on his first confined area takeoff after almost duplicating the final sequence of his earlier accident.

Planning errors on the part of the pilot resulted in the OH-58 entering a flight condition of critical directional control response. Performance errors on the part of the pilot induced an uncontrollable loss of tail rotor control effectiveness. The pilot did not take full advantage of the clear zone of the takeoff area, but instead made a short, steep departure, upslope and downwind, over high barriers. This subjected the aircraft, demanding relatively high power at low to zero airspeed, out of ground effect, to a potential wind gust from the right rear. These are the conditions considered most conducive to loss of tail rotor control in the OH-58. The application of full left pedal, forward cyclic, and increased collective aggravated the already critical parameters of controlled flight and induced the right spin.

See Operation Alert on page 5 for actions to take to help you deal with the OH-58 tail rotor spin phenomena. ■



Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Bird hit and shattered pilot's windscreen. Pilot's visor was down, protecting him from injury. Copilot took control and landed.

UH-1 Class E mishaps □ (H series) Pilot and copilot did not properly monitor their instruments during takeoff, and transmission was overtorqued. □ (H series) Pedal controls were excessively stiff during approach to landing. Caused by defective tail rotor servo cylinder. □ (H series) Engine fuel pump light came on. Caused by defective fuel pressure switch. □ (H series) Transmission pressure gauge fluctuated from 10 to 100. Caused by faulty transmission oil pressure switch. □ (H series) Hydraulic pressure light came on. Caused by failure of hydraulic pressure switch.

UH-60 Class C mishap □ Rotor blades hit trees during landing at night. Main rotor and tail rotor blade tip caps were damaged.

UH-60 Class E mishaps □ Pedals became stiff during landing. Caused by failure of yaw trim actuator. □ Ground personnel did not properly secure PRC 77 antenna and it came loose, hitting main rotor blades.

Attack helicopters

AH-1 Class C mishap □ (S series) Copilot allowed aircraft to drift into a tree during hover. Both tail rotor blades were damaged.

AH-1 Class E mishaps □ (S series) Transmission oil pressure fluctuated from 50 to 100 psi. Caused by failure of pressure transducer. □ (S series) Transmission oil bypass light came on during hover. Caused by short in wire.

Cargo helicopters

CH-47 Class C mishaps □ (C series) Aircraft was landed in a confined area to await passengers. Pilot repositioned aircraft because trees were bending close to rotor blades. Aft rotor blade hit tree as aircraft was being moved. □ (C series) When aft gear touched the ground, pilot felt aircraft shudder and immediately picked aircraft up to a hover. Pilot was then told he had lost a wheel. Aircraft was landed on stacked tires. Suspect left aft swivel lock malfunction caused wheel to be out of phase when aircraft touched down. □ (C series) As jeep was being loaded into aircraft, driver failed to follow prescribed procedures and disregarded instructions of crew. Repeated attempts to load jeep resulted in damage to interior right side of aircraft. Darkness made alignment of jeep with ramp difficult.

CH-47 Class E mishaps □ (C series) Master caution and No. 1 transformer rectifier lights came on. Crew chief reported smoke in cabin area in vicinity of aft transmission. Caused by seized bearing in generator. □ (C series) As aircraft was hovering from parking area to passenger pickup point, tower personnel told pilot that fluid was venting from aircraft. Oil leak at No. 2 engine was caused by loose oil line to oil pressure transducer. Loose line should have been found on daily or preflight inspections.

Observation helicopters

OH-58 Class C mishaps □ (A series) During cooldown period after shutdown, jeep approached from left rear. Pilot sensed that jeep was too close and applied right cyclic. As jeep stopped, antenna whipped to right and hit main rotor tip cap, breaking the skin. Jeep driver had worked 13 consecutive

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	1-23 Feb	**0**	**0**
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**5**	**2**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

16-hour days. ☐ (C series) Tail rotor blade hit small tree during hover. ☐ (C series) Aircraft hit tree during landing. Right chin bubble was broken and two skid tubes and tail rotor control pedals were damaged.

OH-58 Class E mishaps ☐ (A series) Aircraft was at hot refueling point. When crew chief opened right rear door, high wind gust jerked door full open, damaging window. ☐ (A series) High frequency vibrations in pedals and airframe were caused by failure of tail rotor drive shaft. ☐ (A series) N_2 rpm dropped during takeoff. Air leak check revealed leak in pneumatic line near double check valve and another leak around governor diaphragm. ☐ (A series) Fluid was seen leaking from forward end of freewheeling unit during runup. Caused by cracked oil pressure return line. ☐ (C series) Fuel quantity gauge dropped from 390 pounds of fuel to 65 pounds during landing. Caused by malfunction of upper fuel quantity transmitter.

Fixed wing

C-12 Class E mishaps ☐ (A series) Cabin pressure differential was seen to be above 6.1 psi. Noise was heard from rear of cabin and cabin pressure began to climb at 2,500 feet per minute. Altitude warning light came on and pilot began rapid descent. Caused by clogged left flow control pack filter. ☐ (A series) Muffled explosion was heard and aircraft yawed right. Smoke was seen coming from exhaust stacks. Aircraft was landed at airfield. Catastrophic failure of No. 2 engine is thought to have been caused by loss of compressor blade.

U-21 Class E mishaps ☐ (A series) Copilot saw smoke coming from right engine cowling. Fuel was leaking from fuel nozzle. Gasket was replaced. ☐ (A series) Generator and fault warning lights came on. Generator failure was caused by chipped brushes.

Maintenance

UH-1 Class E mishaps ☐ (H series) Master caution and transmission oil pressure lights came on, and transmission oil pressure went to zero. Cotter pin was found lodged in quick disconnect line valve, holding valve in open position. This caused excessive pressure at internal oil filter, blowing the gasket. ☐ (V series) Loud grinding sound was heard from area of main rotor system. Vibrations were felt, and some feedback was felt in flight controls. Aircraft was landed in field. Three bolts which hold pillow block bearing plate to main rotor hub assembly came loose during flight. Suspect incorrect torque.

UH-60 Class E mishap ☐ No. 2 fuel filter bypass light came on. Fuel filter element was clogged with sand.

AH-1 Class E mishap ☐ (S series) Cyclic was excessively stiff during flight. Top spanner nut on pilot's cyclic was loose and bottom nut was excessively tight, causing friction on cyclic to become stiff.

OH-58 Class C mishap ☐ (A series) Aft position light dislodged during flight and hit tail rotor blade. Light was not installed correctly.

C-12 Class E mishap ☐ (C series) Red gear handle lights would not extinguish when gear handle was placed in up position. Nose gear actuator device assembly was out of adjustment.

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

TM changes

Change 25, dated 21 Jan 83, to TM 55-1520-228-23-1 for OH-58A and C helicopters, has been released. ■

High lightning potential weather briefings

Aviators, it is now possible for you to receive a high lightning potential briefing as part of the normal weather briefing. It would be very helpful to the Air Force weather forecasters if, for the next several months, you would ask for this information during your weather briefings. This will insure that all concerned are communicating on this vital subject.

As always, the Air Force Air Weather Service stands ready to provide professional assistance to Army aviators. ■

Operation Alert

OH-58 tail rotor spin phenomena

Loss of tail rotor effectiveness continues to be a significant factor in OH-58 accidents. The tail rotor spin phenomena was a major contributing factor in 38 percent of all OH-58 Class A and B accidents over the past 3 years. Work is ongoing to more precisely identify the causes of the OH-58 tail rotor spin phenomena and to develop programs for near-term and long-term solutions. Meanwhile, alertness is required by all involved in OH-58 flight operations to prevent recurrence.

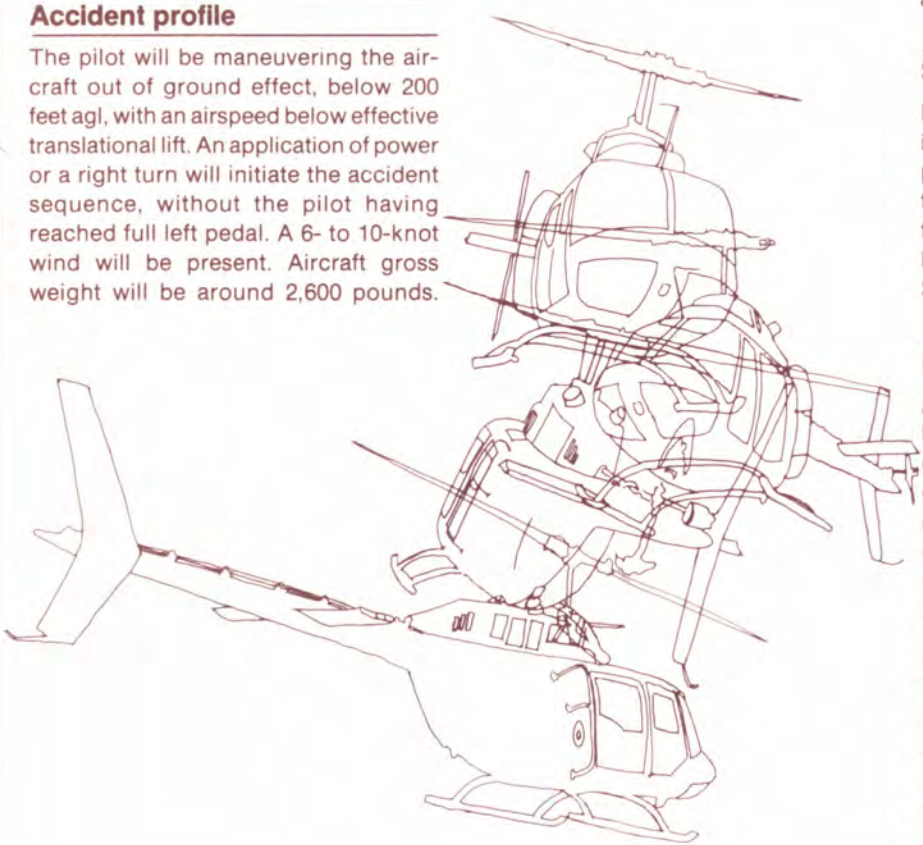
Accident profile

The pilot will be maneuvering the aircraft out of ground effect, below 200 feet agl, with an airspeed below effective translational lift. An application of power or a right turn will initiate the accident sequence, without the pilot having reached full left pedal. A 6- to 10-knot wind will be present. Aircraft gross weight will be around 2,600 pounds. Investigation will confirm that the aircraft was within the operating limitations.

Actions to take

Company/detachment commander

Focus command attention on the OH-58 problem by requiring all OH-58 missions be approved by you or your designated representative, e.g., operations officer, unit SIP/IP. In addition, monitor flight operations to make sure the following actions are taken by your key personnel.



Pilot

Evaluate winds, density altitude, and aircraft gross weight **before** each mission.

Maintenance officer

Check your OH-58s for rigging of the fuel control, governor, and tail rotor in accordance with TM 55-1520-228-23.

Safety officer

Make sure all OH-58 standardization instructor pilots, instructor pilots, and pilots view the Army National Guard television tape "How Not to Crash by the Book." This tape is available at your local Army Training and Audiovisual Support Centers.

IP/SIP

Assure all pilots demonstrate their knowledge and skill concerning the loss of tail rotor effectiveness and, once encountered, the appropriate emergency procedures. Pilots should not be cleared for flight until proficiency has been demonstrated in Army Training Manual (ATM) task 4035.

Operations officer

Make spot checks to insure that all operational OH-58 pilots are current in accordance with ATM requirement and, particularly, task 4035.

Point of contact at the Safety Center for information on OH-58 tail rotor spins is Systems Management Directorate, AUTOVON 558-4202/4198. ■

Microlights

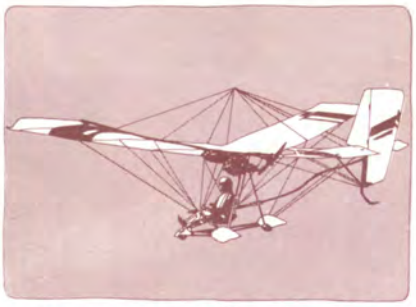
A few months ago, a wide-body passenger jet carrying 384 people reported a near miss while at 13,000 feet. Nothing unusual, really, about this incident. Near misses are recognized aviation hazards that occur all too frequently.

So what's the point?

The point is that **this** near miss was between a DC-10 and a powered hang glider, a microlight. This fledgling had rigged up a homemade oxygen system and was enjoying flying up there with the big boys.

Some of you may be microlight aviators, but the vast majority are not. In fact, I suppose most of you haven't even heard about microlights, let alone seen or flown one. So let's talk about this airplane for just a minute.

A microlight, sometimes called an ultralight, is essentially a powered hang glider structurally modified to accept a small power plant and propeller (remember the Wright Flyer, 1903?). Its maximum speed is about 50 mph, cruise is about 30 to 40 mph, and it has a stall speed as low as 15 to 20 mph. Because of the light weight, large wings, and respectable power (some microlight



engines approach 500 c.c.) microlight performance is impressive (takeoff roll is often 100 feet or less).

Add in the relatively low cost of a microlight, and you can bet the industry is just beginning to tap the "fun flying" market. In fact, at the recent Farnborough Air Show, the only airplane drawing more interested lookers than the microlights was the B-1.

The world of microlight flying is big. It's the same airspace most of us fly in. The flyers of the microlights, however, as a group are not extensively schooled pilots. Most receive their "license" via manufacturers' schools and, although the basics of pilotage are taught, there seems to be little instruction on the extensive complexities of the overall airplane flying environment.

The FAA is just now putting out some rules about microlights. However, do **not** expect the microlight community to conform quickly. There's just too much independence and freedom out there for microlight flyers to accept any more air savvy than their individualist minds will allow.

So how do you handle this slow-moving big bird? Start by understanding that microlight flyers fly for fun. They like to fly low over the same places and in the same weather conditions you would fly in if you were just "fun flying." So expect them at altitudes usually below 3,500 feet agl near suburban countrysides where the views are pretty and in the relatively open spaces of fields and shorelines.

These fun-flying microlights will only increase in number as they become more popular. Nothing can guarantee that you will avoid microlights, especially at low altitude, but knowing they're there and planning your reactions if you should suddenly see one gives you at least "one-up" in our see-and-avoid world. ■

—adapted from an article in AIR SCOOP by Lt Col N. L. Komnick, USAFE

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IP doesn't stand for Infallible Performance

IPs were listed as a definite cause factor in 17 Class A, 12 Class B, and 75 Class C accidents for the 20-month period ending 31 August 1982. The causes included procedure violations, overconfidence in the student pilot's ability, overconfidence in self, faulty judgment, inexperience and command supervision, and, by far the most common cause, too late with corrective action. Let's review some of these accidents to see if they could have been prevented.

Procedure violations

It is the IP's responsibility to insure he is proficient in his area of training. He should be totally familiar with operators manuals and other regulations governing flight of his aircraft.

• A UH-1 IP was on the controls during an NOE training flight. Visibility was poor, and the IP became disoriented and deviated from the intended flight route. Flying about 5 feet above vegetation, the Huey hit a wire. The IP had failed to remain within the parameters for NOE flight outlined in FM 1-51.

• The right main landing gear of a U-21 failed to retract during climbout. The crew tried to get a safe gear indication and then landed with the gear unlocked. The gear collapsed during rollout after landing. The IP did not use the correct emergency procedures called for in the operators manual. He did not use the backup manual gear lowering system and did not apply light braking force to the gear after touchdown.

• The pilot of a UH-60 inadvertently shut down both engines during a simulated single-engine approach at night. The IP took control and turned toward the runway. Contrary to the operators manual, he allowed main rotor rpm to decay below 90 percent, flared the aircraft, and pulled collective pitch too low to stop the rate of descent. The aircraft crashed tail low and was destroyed.

Overconfidence in student pilots

IPs must not develop excessive confidence in the abilities of student pilots undergoing training. The unexpected must be expected, no matter how good the student pilots have performed in the past.

• A UH-1 IP had demonstrated two NOE decelerations. The pilot had completed two slow decelerations (one of them satisfactorily) and was doing a faster third one. At a speed above effective translational lift, the pilot incorrectly applied abrupt aft cyclic and insufficient collective pitch. The aircraft rotated about the mast and both tail rotor blades hit the ground. Directional control was lost, and the aircraft crashed. The student pilot had not demonstrated he was capable of performing the maneuver at a speed above effective translational lift after having done one successfully at a speed below effective translational lift.

• Another UH-1 IP allowed his student pilot to continue a landing until the aircraft hit the ground on the tail stinger and skid heels. The tail rotor drive shaft was severed and the tail boom damaged. The IP did not take or command control of the aircraft throughout the maneuver. He was confident in the pilot's ability to terminate at a safe recovery point.

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IP did not follow procedures in operators manual after pilot inadvertently shut down both engines.

IP performance

• A third UH-1 IP permitted his pilot to descend below the prescribed point of initial pitch application during a low-level autorotation. When the IP tried to recover with power, antitorque control was lost and the aircraft crashed. The pilot had been performing all of his contact maneuvers in a superior manner, and the IP was confident the pilot would complete the autorotation successfully.

• The pilot of a U-21 was making a single-engine approach to landing. He allowed his airspeed to dissipate below VMC as the aircraft approached the landing threshold. The IP, who had flown with the pilot before and was confident in his ability to fly the aircraft in all flight regimes, allowed the pilot to continue until a safe recovery was impossible. The aircraft became uncontrollable during an attempted go-around and crashed.

IP overconfidence in self

Just as an IP must not become overconfident in the abilities of his student pilots, he must also guard against overconfidence in himself. He must be aware of his capabilities and never exceed them.

• A UH-1 IP was evaluating a student pilot during a simulated instrument takeoff. The aircraft rolled rapidly to the right and crashed. The IP was looking to his right rear at a nearby aircraft and did not notice the change in the attitude of the aircraft in time to recover. He said he had ridden through many "hairy" instrument takeoffs and had always been able to assume control in time to recover from a poor maneuver.

• A CH-54 IP directed an approach with a slingload, with one engine at idle, to a confined area to simulate a one-engine-inoperative emergency procedure. The maneuver, not required in any course of instruction nor included in the ATM, exceeded the power available to safely terminate at the selected landing site. The slingload went through some trees and then hit the ground. The main rotor blades then hit the trees and the helicopter crashed. The IP had shown by past performance a tendency to tax his flying skills to his personal limits. To have initiated this maneuver would require a high degree of confidence in his ability to fly a critical approach, with no margin for error.

Faulty judgment

Sometimes IPs initiate or contribute to an accident through their faulty judgment.

• An OH-58 IP gave the pilot a simulated engine failure over a soft , boggy soil covered with thick, bunchy grass. At touchdown, the toes of the skids dug into the soil, and the aircraft came to rest on its left side. Suitable areas, runways, and taxiways with hard surfaces were available nearby.

• The left engine propeller of a U-3 malfunctioned during a simulated single-engine approach. After taking control of the aircraft, the IP chose not to go around or retract the landing gear to insure he could reach the runway. The aircraft was damaged when it landed off the runway. The IP did not believe the aircraft would fly on one engine.

Inexperience and command supervision

Inexperience and command supervision are lumped together because commanders should insure their IPs are properly qualified and proficient in the area of training they are to conduct. Some commanders haven't done this.

• A newly assigned IP was not given local area orientation training or a briefing of the prerequisites for emergency procedures before beginning his instructing duties. One of his students

IP was overconfident in pilot's ability to do an NOE deceleration at a speed above effective translational lift.

Newly assigned IP was not briefed on the prerequisites for emergency procedure training before beginning his duties. He was teaching a maneuver he had not performed in about 6 months.

required additional training in autorotations to sod. The IP was told where to find an LZ he could use for the required training. The LZ was located and a confined area approach was made. The IP hovered the UH-1 over the sod to check its suitability for autorotations. The student pilot then made a maximum performance takeoff. The IP had not performed a sod autorotation in about 6 months and did not demonstrate an autorotation before having the student do one. The student began his simulated forced landing and began to decelerate about 100 feet agl. He applied initial collective pitch about 10 to 15 feet agl. As the aircraft neared the ground, the student pilot applied cushioning pitch without proper antitorque pedal application, and the helicopter yawed to the left. The IP took the controls but was unable to prevent the aircraft from touching down on the aft part of the left skid, bouncing, and coming to rest inverted.

• An IP and pilot were on a UH-1 high altitude mission in mountainous terrain. The IP had no hands-on mountain flying training and no mountain experience in more than 6 years. On short final, the pilot was unable to maintain directional control, and the aircraft began to turn to the right. The pilot tried to fly out of the turn instead of landing as required by the operators manual. Flight control inputs were ineffective and the aircraft crashed. The battalion commander had not checked the qualifications of his IPs who were managing and conducting the high altitude mountain training.

• A UH-1 student pilot was told to do a practice autorotation from a hover. Excessive application of right pedal early in the maneuver was detected and corrected by the IP, who allowed the maneuver to continue. The IP then waited too late to correct the student pilot's failure to apply cushioning pitch. When the IP did begin to take corrective action, the student suddenly applied collective. The aircraft climbed and fell about 20 feet, landing hard. The IP involved and another IP who witnessed the accident both said they had received little to no training in recovery techniques required for common student errors.

Too late with corrective action

Late corrective action by the IP is almost always a factor when accidents occur because of some incorrect action on the part of the student pilot. In some cases, IPs were not staying close to the controls. In other cases, IPs were "on top" of the controls but unable to prevent the accident.

• During termination of an autorotation with turn, an OH-6 student pilot was late with initial pitch while in a decelerating attitude. The tail skid hit the runway and separated, allowing the tail rotor blade to hit the runway. The IP was too late with corrective action.

• A UH-1 student pilot was attempting an instrument takeoff from a level surface. Collective pitch was applied abruptly, causing the helicopter to roll to the right. The IP applied corrective control inputs but not in time to keep the aircraft from coming to rest on its side.

• During an autorotation, a UH-1 student pilot applied initial pitch without maintaining aircraft alignment with the antitorque pedals. The IP was unable to realign the aircraft with the antitorque pedals because his feet were incorrectly positioned for a quick response. The aircraft yawed to the left, touched down on the right skid, and rolled over inverted.

Understandably, for maximum training benefit, IPs must allow student pilots to go as far into a maneuver as possible before assuming control of the aircraft. But when there is any doubt in the instructor's mind as to the safety of a particular phase of a maneuver, he should assume control immediately. The trick is to be able to anticipate rough situations just moments away and then take over.

To prevent accidents like these, commanders need to be especially careful about the selection of their IPs. After selection, commanders should insure that each IP is proficient in what he will be teaching. Insist that IPs demonstrate a maneuver before having student pilots try it. Make sure regulations and SOPs are strictly followed and prohibit the performance of unauthorized maneuvers. Support your IPs in their responsibilities. Don't demand more of them than can be reasonably expected. And remember, IPs are not infallible just because they **are** IPs.

IPs can improve their accident rate by never acting in an unsafe manner. If you don't think you are proficient enough to teach a certain maneuver or don't feel physically and emotionally capable of performing your duties, tell your commander. He just might listen. Obey all regulations and SOPs. Do not take shortcuts. Your students will quickly pick up any shortcuts and continue to jeopardize flight safety.

IPs must have confidence in their abilities but guard against overconfidence in themselves and their students. Always be prepared to take corrective action. And IPs must rely on their best judgment as to when to take control of the aircraft. This is one area of operation that cannot be dictated by rules. Knowledge, training, and experience must tell the IP when he should take over.

If commanders and IPs will remain aware of the fact that IPs are human and just as capable of human error as anyone else, many IP accidents can be prevented. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Aircraft landed hard at field site, damaging skids, chin bubble, and underside of aircraft. □ (H series) Main rotor blades hit trees during takeoff, damaging blades. □ (H series) Compressor stall occurred during landing. Aircraft yawed 15 degrees left and right. □ (H series) Technician was doing maintenance operational check. Aircraft had been at 6600 rpm for 30 to 45 seconds when it started rapid spin to left. Technician immediately rolled off throttle. Aircraft continued to spin to left and hit a jeep. Chin bubbles were broken and radio mount was damaged. Technician probably put in too much left pedal and then aggravated spin when he rolled off throttle. □ (H series) Crew was conducting unauthorized high-speed maneuver into confined area while en route to another field site. While in nose-high decelerative attitude, copilot saw wires about 50 feet in front of aircraft. Pilot increased collective in an attempt to stop aircraft. Bottom of skids hit three wires. Two wires broke and the third wire traveled along the tail boom and severed antenna. Aircraft was landed without further damage. Pilot did not do a high recon or insure completion of a low recon before descending below the barriers. Pilot and copilot were confused as to who was the pilot in command. Both pilots had been observed before the accident flying in a complacent and overconfident manner.

UH-1 Class E mishaps □ (H series) Egt rose to 690 degrees during takeoff. Caused by crack in power turbine case. □ (H series) Master caution and hydraulic lights came on. Hydraulic power was lost. Caused by failure of hydraulic pump input line. □ (H series) Failure of tail rotor hydraulic servo cylinder caused rudder pedals to bind during flight. □ (V series) Stiff spot was noticed in right rear quadrant of cyclic during flight. Caused by flat spot in magnetic brake. □ (M series) Engine oil temperature gauge fluctuated during takeoff. Caused by failure of engine oil cooler thermostat flow control valve. □ (H series) Master caution and left boost pump lights came on. Caused by failure of boost pump. □ (H series) Engine rpm could not be reduced below 6600 during shutdown. Caused by failure of fuel control.

Attack helicopters

AH-1 Class C mishaps □ (S series) Aircraft encountered blowing dust as pilot hovered around corner of tree line. Main rotor blades hit tree branches, damaging blades. □ (S series) Pilot was trying to relocate from simulated firing position in high right crosswind condition. Aircraft was in constant 2- to 5-degree right bank but was being pushed left into tree line. Pilot saw tree branches being drawn into rotor system and increased right cyclic and power. Tail rotor effectiveness was lost. Pilot was able to land without further incident. One main rotor blade was damaged. Suspect crosswind conditions were greater than forecast.

AH-1 Class E mishaps □ (S series) Aircraft vibrated during landing. Caused by failure of left and right viscous dampners. □ (S series) Pilot of trail aircraft told pilot of lead aircraft that a panel in the area below ammo bay appeared to be unsecured. Aircraft was landed. Panel was secured by only four screws. This was not discovered on preflight. □ (G series) Transmission oil light came on, and engine oil temperature and transmission temperature increased. Caused by failure of turbine blower fan bearing.

Cargo helicopters

CH-47 Class E mishaps □ (C series) No. 2 engine chip detector light came on during flight. Caused by internal engine failure. □ (C series) Transformer rectifier caution lights came on during

runup. Generators would not come on line. Inspection revealed both generator shafts had sheared.

CH-54 Class E mishap □ (A series) Crew smelled fuel fumes and landed. Caused by failure of packing on fuel shutoff valve.

Observation helicopters

OH-6 Class A mishap □ Engine bleed-off occurred when power recovery was attempted during autorotation rpm check. Aircraft was over water. Glide was extended to shore and aircraft landed hard, damaging tail boom, skids, and main rotor blades. 8297

OH-6 Class C mishap □ Pilot pulled initial pitch too high during night autorotation. During touchdown, nose was slightly low. Pilot pulled aft cyclic too quick and main rotor hit and severed tail boom.

OH-58 Class B mishap □ (C series) Tail rotor struck main rotor of parked OH-58 during approach to landing. Aircraft spun out of control and crashed. 8298

OH-58 Class C mishaps □ (C series) Pilot was told to run up aircraft for engine flush. Tail rotor drive shaft cover, pilot's and copilot's doors, and oil cooler cowling were on ground near aircraft. Pilot told crew chief to move doors away from aircraft. Drive shaft cover and oil cooler cowling were placed on right side of fuselage next to lower anticollision light. During runup, rotor-wash blew oil cooler cowling into tail rotor assembly. □ (A series) Tail rotor blade damage was discovered after maintenance operational check. Tool may have been left on aircraft.

OH-58 Class E mishaps □ (A series) Engine flamed out during runup. Caused by water in fuel control. □ (A series) Pilot allowed aircraft to assume excessive nose-low attitude during take-off to hover. Aircraft hit pavement with both skid toes and lower wire cutter assembly. Aircraft was fully loaded. Performance planning card and hover power check were not completed. □ (A series) High frequency vibration in tail rotor pedals was caused by failure of tail rotor drive shaft.

Fixed wing

C-12 Class C mishap □ (C series) Loud bang was heard and flash of light was seen. Aircraft landed at airfield. Lightning strike caused damage to one blade of No. 1 engine and left outboard flap.

T-42 Class C mishap □ As aircraft broke out of clouds at 3,600 feet, right wing hit a bird. Leading edge of outboard end of wing was dented.

U-21 Class C mishap □ (A series) Unusual sound was heard from left side of aircraft during takeoff, and aircraft yawed left. Self-locking nut had failed, allowing bolt to back out and fall between brake carrier lining and wheel assembly, causing damage to all components.

U-21 Class E mishaps □ (A series) Nose gear would not fully retract after takeoff. Caused by binding nose gear actuator. □ (D series) Flaps stuck in approach position during landing. Caused by failure of flap motor. □ (A series) Right main landing gear down light did not illuminate when gear was lowered. Tower personnel indicated gear appeared to be down and aircraft was landed. Caused by broken wire on down-lock switch. □ (A series) Wide variation in indicated airspeed was caused by leak in static system.

Maintenance

UH-1 Class E mishap □ (H series) Engine N_2 and rotor rpm dropped during

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	1-6 Oct	1	0
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	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59	46	Total to Date	1	0

Mishap briefs

takeoff. Inspection revealed dirty compressor and bleed band inlet filter screen installed backwards.

AH-1 Class E mishaps □ (S series) Master caution and transmission oil bypass lights came on. Caused by corroded wire lead connection on pressure switch. □ (S series) Egt rose from 780 degrees to 850 degrees during power application of about 1 percent. Large decrease in egt occurred when power was reduced. Caused by leak in bleed band or malfunction of variable inlet guide vane actuator. □ (S series) Engine oil pressure gauge indicated zero during landing. Caused by loose wire at cannon plug.

OH-58 Class E mishap □ (C series) Master caution light came on. Two wires were installed incorrectly.

U-21 Class E mishaps □ (A series) Circuit breaker popped and crew smelled smoke. Caused by incorrectly installed overhead console. Mounting screw was too tight, causing electrical switch prong to touch aircraft frame and ground circuit. □ (F series) After landing, crew was told fuel was leaking from right wing. Main fuel line was punctured.

Messages received

• Safety-of-flight technical message concerning one-time inspection of CH-47C and D fiberglass rotor blade damper bracket (CH-47-82-10, 221400Z Sep 82). Summary: All CH-47C and D rotor blade damper brackets should be inspected for cracks. Contact: Michael West, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight operational message concerning ground runups while CH-47 aircraft are grounded (CH-47-82-11, 222130Z Sep 82). Summary: CH-47 aircraft are still grounded. This message allows runup of CH-47s at least once every 7 days. Contact: Michael West, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight technical message concerning one-time inspection of UH-60 flight controls mixer limiter bearings and mixer limiter roller (UH-60A-82-16, 222135Z Sep 82). Summary: Damage to the longitudinal limiter bearing in the mixer has been reported. This damage is attributed to excessive loads transmitted back into the mixer from the rotor head when a blade fold is attempted with the four pitch control rods still connected. These excessive loads result in cracking and occasional separation of the bearing outer race which could become lodged in the mixer and restrict control motion. To prevent this condition, all four pitch control rods must be disconnected before blade folding. This message imposes a one-time inspection of bearings and changes the TM to emphasize proper blade folding procedures.

• Maintenance information message concerning AH-1 rotor blade overspeed inspection (MIM-82-AH-1-03, 222015Z Sep 82.).

• Maintenance information message concerning functional check of pitot static systems and instruments (MIM-GEN-MEA-82-02, 212015Z Sep 82).

Changes to TMs

The following changes to TMs have been released:

• Change 27, dated 9 Aug 82, to TM 55-1520-235-10.

• Change 22, dated 2 Aug 82, to TM 55-1520-228-23-1.

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

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Accident review: mountain training mission

Synopsis

The UH-1H pilot ran out of pedal during an approach to landing in a mountainous area. The aircraft began to yaw to the right. Rotor rpm was lost during an attempted go-around. The Huey spun into a ravine and crashed.

History of flight

Elements of the battalion were conducting high-altitude mountain training and civil action support missions. The operation consisted of one OH-58, one CH-47, and three UH-1Hs, along with necessary support equipment and personnel.

Early one morning, a UH-1 took off on a training flight. Aboard the helicopter were an IP, pilot, crew chief, and passenger, who was to take over as pilot during the second part of the mission. The flight to the training area progressed normally, with the passenger doing the required aircraft performance computations, including updating the performance planning card which was inadequate because it did not meet the criteria outlined in task 1005, TC 1-135. The passenger used a pressure altitude of 11,000 feet during his computations for the landing site. Pressure altitude at the site was 11,460 feet, resulting in a difference in maximum torque available of 2 psi. The passenger's estimated power required to hover at 5 feet was 35 pounds, when a power requirement of 37 pounds of torque was actually required. The passenger did not update the performance planning card accurately nor did the IP validate any of the performance figures with the dash 10 performance charts.

The last area to be worked before the scheduled pilot change consisted of a landing site on a saddle between two peaks at 11,500 feet msl. The first approach the pilot attempted was described as being slightly steeper than a normal approach on a heading of 030 degrees. It felt good to the crew until just before termination. At an estimated altitude of 5 feet agl and a ground speed described as "a little faster than a man could run," the pilot had applied maximum left antitorque pedal, and the aircraft started to yaw to the right. A successful go-around was made.

A second approach was attempted perpendicular to the ridge line on a landing heading of 360 degrees which appeared to be more into the wind. At an altitude of 3 to 5 feet agl, just before termination, the pilot had again applied maximum left antitorque pedal and, again, the aircraft began to yaw to the right. The IP went to maximum engine beep as the pilot tried another go-around. The pilot applied right cyclic into the yaw in an attempt to fly out of the condition.

The right yaw progressed to a spin and the low rpm warning light and audio came on as the aircraft crossed the intended landing area in the direction of a ravine on the downwind side of the saddle. As the aircraft entered the ravine, the passenger noted and called out 5900 engine rpm and 41 pounds of torque.

Mountain training mission

The aft part of the aircraft struck some rock outcroppings in the ravine and came to rest on the left top side of the fuselage. The four occupants exited the aircraft with no injuries.

Crewmember experience

The 30-year-old IP had more than 2,000 rotary wing hours, with 1,500 in the UH-1H. The IP had not operated or trained in a high altitude environment in more than 6 years. Ground school was the only training/requalification given to the IP before he undertook his duties in the mountainous environment.

The 45-year-old pilot had more than 2,500 rotary wing hours, with almost 1,900 in the UH-1H. He did not attend the unit-conducted ground school covering mountain operations before this training cycle, which was a prerequisite established by the battalion, and he had not flown at high altitudes since completing the mountain training cycle the previous year.

Commentary

The first time the pilot aborted his approach to the landing site, he was able to apply forward cyclic and regain control. The crew attributed the need for a go-around to the effects of variable winds. The pilot then changed landing directions and attempted a second approach to the same area. On this attempt, the approach was reported to look good at 50 feet agl (the minimum go-around altitude in accordance with TC 1-10) and continued to look good until about 5 feet agl. At this point, the pilot applied a combination of collective pitch to add power and left antitorque pedal to maintain heading and counteract the torque.

When the aircraft began to yaw to the right, the pilot attempted a go-around by applying cyclic into the right yaw, contrary to TC 1-10 and the operators manual, which stipulates a hovering autorotation in this situation. During the attempted go-around, the pilot continued to apply collective pitch which caused N_2 and main rotor rpm to decay. Subsequent flight control inputs were ineffective and the aircraft crashed.

The accident was caused by a combination of incorrect actions by the pilot and a lack of supervision by the IP and battalion commander. The IP's inexperience, combined with his knowledge of the pilot's flying abilities and experience the previous year in mountainous terrain, caused him to place excessive confidence in the pilot's abilities.

The exercise was under the direct supervision of a battalion staff officer and was being conducted without a written SOP which should have included requirements for currency/standardization for performance of high altitude missions/training. The battalion commander had acknowledged the existence of such an SOP in response to a previous accident report recommendation. The commander was overconfident in the abilities of his staff officer and standardization instructor pilots who were managing and conducting the training. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Transmission oil pressure light came on and oil pressure gauge showed loss of pressure during approach. Pilot started emergency descent, saw wires and took evasive action, but aircraft hit and broke cable. Cable fell on power-lines and broke them. Aircraft was landed with only minor scratches to underside of aircraft.

UH-1 Class E mishaps □ (V series) Engine fuel pump light came on. Caused by failure of differential pressure switch. □ (H series) Pilot's greenhouse cracked during flight. Temperature change of 20 to 30 degrees occurred within a 10- to 15-minute period. □ (H series) Binding in pedals during takeoff was caused by defective magnetic brake. □ (H series) Master caution and transmission oil hot lights came on. Caused by failure of transmission temperature thermostat. □ (H series) Cyclic control would not move forward from center more than 2 inches during flight. Caused by defective lateral servo. □ (H series) Copilot saw oil coming from engine deck during hot refueling operation. Caused by hole in engine oil line. □ (H series) Failure of thermostat flow control caused engine oil temperature to exceed normal limits during flight.

UH-60 Class C mishap □ As aircraft was being hovered to parking area at night, main rotor blade hit tree. Three tip caps were damaged.

UH-60 Class E mishaps □ Stabilator warning horn sounded, and master caution and stabilator lights came on. Caused by failure of No. 1 stabilator actuator. □ Unusual noise was heard from engine area during taxi. Inspection revealed foreign object damage to first stage compressor blades of No. 2 engine. Previous flight was conducted in instrument meteorological conditions. Outside air temperature was 1° C. at 4,000 feet msl. Trace icing was evident on airframe during previous flight. Crew change was completed without aircraft shutdown.

UH-60 aviation-related mishap □ Helicopter was towed from hangar to maintenance pad. Service member then got off tractor to remove tow bar. Chocks were not placed under tires of tractor. When tow bar was disconnected, tractor rolled into aircraft stabilator, bending trailing edge.

Attack helicopters

AH-1 Class C mishap □ (S series) Pilot sighted "enemy" vehicle and turned aircraft rapidly to left after passing over vehicle. Overtorque occurred. Transmission, main rotor blades, and main rotor hub were replaced.

AH-1 aviation-related mishap □ Crew chief was cleaning pilot's cockpit. Crew chief inadvertently depressed jettison button, resulting in switch activation and jettisoning of four TOW missile launchers and one rocket pod.

Cargo helicopters

CH-47 Class C mishap □ (A series) Pilot taxied aircraft to runup area and tried to turn into the wind. He was unable to turn aircraft using power steering without going off asphalt onto soft grass. Pilot centered power steering knob, locked aft wheel swivel lock, engaged SAS, and asked IP to make hovering turn into the wind. IP elected to turn into the wind by taxiing on aft landing gear. IP started backing aircraft. As he turned right, he felt resistance to rearward movement and heard banging sound from rear of aircraft. IP picked aircraft up to a hover and was told by crew chief that right aft landing gear drag strut had broken and gear was hanging down. Aircraft was hovered to parking ramp and held on the other three landing gear with coordinated thrust and cyclic while maintenance personnel placed a jack under landing gear. Aircraft was shut down without further incident.

CH-47 aviation-related mishaps □ Forward transmission was placed on an improvised dolly. Transmission was not secured to the stand. As stand was being pushed across the floor, one wheel hit a crack in the floor and stopped moving. Transmission fell to floor. □ Truck was being ground guided from hangar. Ground guide misjudged clearance, allowing truck to hit rotor blade of CH-47.

Observation helicopters

OH-58 Class E mishaps □ (A series) Aircraft developed high frequency vibrations in pedals and airframe during hover/taxi. Caused by failure of tail rotor drive shaft. □ (A series) Engine-out light came on. Caused by failure of rpm sensor. □ (C series) Hydraulic pressure light came on. Caused by failure of hydraulic pump.

Fixed wing

C-12 Class E mishap □ (A series) Loud noise was heard during taxi, and nose wheel veered to right and could not be moved. Caused by failure of retaining slots for spring retaining clip, allowing separation of linkage mechanism.

OV-1 Class E mishaps □ (D series) Smoke in cockpit was caused by failure of inverter. □ (D series) Right main brake was leaking hydraulic fluid during taxi for takeoff. Caused by failure of brake disc. □ (RV-1D) Pilot set elevator

trim to zero degrees before takeoff. After acceleration-stop distance was exceeded, pilot had to use both hands to forcibly move control stick to aft position to effect liftoff. Pilot reduced power, leveled aircraft at 700 feet agl, and returned to airfield, landing about one-third of the way down the runway. Pilot placed power levers in ground idle and used brakes to assist in stopping. Elevator trim was locked in full down position while wheel was indicating full up position. Shoulder pin was worn on idler assembly, causing gears not to line up with plate assembly and elevator trim to bind.

U-8 Class E mishap □ (F series) Left engine oil pressure dropped during climb. Oil filter element was clogged with carbon.

U-21 aviation-related mishap □ Tug was hooked up to U-21 to move it from hangar. Left horizontal stabilizer of U-21 was behind propeller of a C-12. Propeller of C-12 had been positioned so stabilizer of U-21 would miss propeller. In the meantime, an individual preflighting the C-12 changed the position of the propeller. Tug driver started tug and began pulling U-21 before left wing walker was in place. Horizontal stabilizer of U-21 hit propeller of C-12.

Maintenance

AH-1 Class E mishap □ (S series) Master caution and transmission oil hot lights came on. Caused by damaged pins in cannon plugs for warning light system.

CH-47 Class E mishaps □ (C series) No. 2 engine condition lever was positioned to ground for HIT check on No. 1 engine. IP noticed rotor rpm decreasing and illumination of rectifier lights. Both engines were secured. Jam nut on minimum beep resistor adjustment screw was overtorqued and stripped, allowing adjustments on resistor to change. □ (C series) Pilot noticed binding when cyclic was moved right without depressing control centering button. Caused by dirty centering spring cylinder assembly.

OH-58 Class E mishaps □ (A series) N_2 tachometer went to zero during hover. Safety wire for tachometer generator was not installed, causing cannon plug to disconnect and tachometer to fail. □ (C series) Hydraulic caution light came on. Controls were stiff and feedback was felt through controls. Running landing was made. Return line to left cyclic servo was loose at servo fitting. Line was not torqued properly, allowing hydraulic fluid to leak from fitting.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	1-2 Mar	**0**	**0**
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**5**	**2**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Safety-of-flight technical message concerning update status of actions to restore operational readiness capability of CH-47 fleet (CH-47-83-01, 162030Z Feb 83).

• Safety-of-flight maintenance mandatory message concerning changes to urgent change No. 35 of TM 55-1520-210-23-1 (UH-1-83-01, 111900Z Feb 83). Summary: Some technical errors were published in change 35 which could affect the safety of UH-1H aircraft. This message lists changes to change 35. Contact: Dick Mooy, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning UH-60 engine output shaft (UH-60A-83-01, 112000Z Feb 83). Summary: Message revises 040730Z Nov 82 TSARCOM message concerning engine output shaft and TM 55-1520-237-PMS-1. Contact: Robert Lawyer, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300. ■

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 88 □ 2 Mar 1983

AH-1 skid gear

More and more attack units are installing built-up skid shoes on aircraft used for emergency procedures training (EPT). This lengthens the life of the skids and reduces maintenance and downtime.

Another practice to reduce maintenance and prevent a catastrophic failure is to remove the cross tube fairings. There is no restriction on the aircraft when the fairings are removed, and removal permits inspection of the saddle for cracks prior to each EPT period. ■

Designation as PIC during series transition

An aviator can be designated a PIC after aircraft qualification and prior to weapon system qualification, IAW TC 1-136, page 2-1, NOTE, "When the interim time between **aircraft qualification** and the start of weapon system training exceeds 30 days, a requirement must be established for hours, tasks, and iterations which provide for the maintenance of basic skills acquired during **aircraft qualification**." This allows the commander latitude to continue effective unit training. The PIC in the foregoing example would remain ARL 3 until weapons qualification was accomplished. ■

AH-1 transitions

Inquiries from the field indicate that not all commanders and IPs are aware of the requirement to live-fire the weapon systems to complete aircraft qualification. TC 1-136 indicates the number of hours training time required for gunnery tasks. To complete the gunnery tasks associated with operating weapon systems, a target must be "effectively engaged" or "destroyed" (read Task description). To accomplish this requirement, rounds must go downrange. The only time live-fire would not be necessary is when the aviator is already qualified in a particular armament system (i.e., HUD, RMS, HSS, M28, M197, M65, and M73) installed on the transitioning aircraft. An aviator who is AH-1G weapons qualified is not automatically qualified in any AH-1 installed weapon system.

When it appears that total training time is going to exceed 180 days, insure a waiver, from the appropriate MACOM, is requested prior to the end of that period.

NOTE TO OPS OFFICERS: Insure that when qualification entry is made on the 759 closeout, that the particular type "S" model is annotated (i.e., (modified), (prod), (ECAS), or (MC)). ■

Armament system preflight

The weapons system (rocket launcher, TML, M197, or M28) preflight must be performed anytime the system is installed. The first item in all -CLs is armament system - SAFE. The aviator must follow the "Before Exterior Check - All Armament, Preflight - Safing Procedures" in chapter 4 of the appropriate -10. For ease and logical progression, each weapon system should be preflighted as it comes in the aircraft preflight -CL. As an example, for the wing-check in the -CL, preflight the rocket launcher and/or TML, as appropriate. During cockpit procedures, accomplish aircraft before starting, then armament before starting, perform aircraft run-up, then weapon systems checks. ■

Questions and answers

QUESTION: I have just received URGENT Change 18 to TM 55-1520-237-10. A notice at the top of the page reads: "Change 18 is being printed prior to Change 17 because of priority. Change 17 will be forthcoming. TM changes must be filed in numerical sequence." Does this last sentence mean that I cannot file or use Change 18 until I have received and filed Change 17?

ANSWER: No. The reason Change 18 was published prior to Change 17 was because it contained information that required distribution as soon as possible. When Change 17 is received, it will be filed in proper numerical sequence. CAUTION, be careful not to remove Change 18 pages when filing Change 17.

QUESTION: Some DOD FLIP instrument approach charts depict the symbol Ⓐ (alternate minimums not standard). Is the symbol applicable under the provisions of the new AR 95-1?

ANSWER: When all of the provisions of paragraphs 4-2f & g are met, the application of the symbol Ⓐ is not necessary.

QUESTION: AR 95-1, paragraph 4-16, authorizes commanders to procure "commercially compiled" instrument approach procedures. What "commercially compiled" publications may be used?

ANSWER: Jeppesen publications are the only commercially compiled instrument approach procedures available in the US that may be used. ■

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.

Shortfax

CH-54B main rotor head diaphragm seals defective

It has been reported that a nonapproved diaphragm seal for the main rotor head on CH-54B aircraft has been issued to the field under NSN 1615-00-455-2389, P/N 80-8786.

This nonapproved seal may chemically react to the lubricating oil in the rotor head which seems to break down the rubber diaphragm, resulting in oil leakage. If this seal completely fails in flight, all lubrication is lost for the upper and lower vertical hinge pin bearings as well as the horizontal hinge and spindle bearings, which could result in catastrophic failure of the main rotor head.

TSARCOM message, 141945Z Dec 82, DRSTS-MEC, subject: Category I EIR -Seal, Diaphragm, states that diaphragm seal, P/N 80-8786, is not to be used on the CH-54B main rotor head.

TSARCOM message, 171530Z Jan 83, DRSTS-MEC, subject: Seal, Diaphragm, NSN 1615-00-455-2389, states that only diaphragm seals with vibro-etch, P/N 65103-11003-102, REV. V. D/R 718786REF, be used on the CH-54B main rotor head. This is a Sikorsky part

number and can be found on the metal portion of the seal.

The Safety Center recommends that CH-54B units visually inspect their PLL stock and any nonapproved seals be disposed of and replacement seals ordered.

If you have any questions concerning these seals, contact Mr. Ted Acup, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470. ■

Would you take a chance?

The pilot-in-command (PIC) of a UH-1 saw that the aircraft was getting close to a tree as it was descending into a landing zone. He then saw a couple of twigs fly off the top of the tree. The copilot, who was flying the helicopter, felt a slight vibration in the controls. As the landing was completed, the PIC, suspecting a blade strike, took the controls to check for any unusual vibration or feedback. Feeling none, he took off to return to his airfield 3 miles away to check the blades.

Other than hit the tree with the rotor blade, what did this crew do wrong? If you're an aviator and you don't know, something's wrong.

Postflight inspection at the airfield revealed a gash on one of the main rotor blades. Total damage cost was almost $34,000.

What the crew did wrong was move the aircraft after suspecting the tree strike. They should have had the aircraft checked by maintenance before even thinking of moving it. No doubt they knew this but just took a chance that there was no damage to the blade. And that's what it was—a chance.

Would you risk your safety and that of your aircraft on chance? ■

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Watching and directing

Webster defines supervision as "a critical watching and directing." And aviation accidents continue to occur because supervisors are not critically "watching and directing." Constant supervision and the elimination of substandard performance is the only way to keep aircrews from destroying aircraft and killing themselves and their passengers.

There are several levels of supervision—from the commander on down. No matter what level of supervisor you are, the accident prevention program can never be successful unless you understand and believe in the need for integrating safe practices into all (even those so-called routine) phases of operations. By your attitude and example, you can generate the enthusiastic professional approach to flying which is necessary to accomplish the mission.

When supervisors fail to follow prescribed procedures **all of the time**, abide by regulations **all of the time**, and carefully select the best qualified crew for a mission, accidents such as the following occur.

• Before beginning aviation operations in support of a field training exercise, the unit commander did not insure that aircraft accident prevention procedures were established. Although an SOP existed for night tactical operations, the unit had no specific procedures for night operations or airfield operations as required by AR 95-5. A pre-exercise maneuver briefing was not conducted for the aviation personnel, and aircraft were operating from a confined area at night without sufficient visual aids to insure safe operations. As an AH-1 crew was preparing to take off from the confined area, the aircraft drifted right and the main rotor blades hit several trees.

• A UH-1 pilot had failed an examination on emergency procedures. No action was taken to provide the pilot with additional training or upgrade his knowledge of emergency procedures. Five months later, he reacted incorrectly to an in-flight emergency and crashed.

• An OH-58, flying at an estimated airspeed of 80 to 90 knots and 150 feet above the ground, hit and severed two wires. Control was lost and the aircraft crashed, killing the pilot and passenger. The terrain flight did not conform to FM 1-51. The detachment commander repeatedly emphasized the dominant consideration in mission performance was keeping the supported personnel happy at any cost. He was aware of and consented to the scheduling of his pilots on single-pilot missions when they had received no special or refresher training for the terrain involved in the mission support. Morale in the aviation detachment was low and behavior was undisciplined.

• An OH-6 pilot, taking off from a dusty LZ at night, lost visual reference. He hovered for about 20 seconds and then turned on his landing light, deteriorating his night vision. The helicopter drifted into trees and came to rest on its left side. This accident occurred at 2345. The pilot had slept only 5½ hours the night before, arising at 0330. The weather was extremely hot, much hotter than the pilot was accustomed to. The unit SOP did not address crew rest limits and there was no crew rest policy in effect. This led to a general lack of appreciation throughout the unit for the cumulative conditions that can lead to fatigue.

• A UH-1 pilot whose instrument qualification had expired 4 months before

Watching and directing

attempted flight in instrument meteorological conditions. He became disoriented and the aircraft crashed, killing one person and seriously injuring three others. The unit commander permitted the pilot to fly in weather which was conducive to inadvertent IMC.

We could go on and on with examples of supervisory error accidents, but these clearly give you an idea of the costly results of omissions by some supervisors.

Many aviators are willing to try to do more than they are capable of successfully accomplishing. New aviators, particularly those fresh out of flight school, are endowed with a great deal of vitality and curiosity, along with an adventurous spirit. There is nothing they can't do—particularly if they are encouraged to do it, have seen it done, or have been left to their own design while gaining experience. Commanders must know the capabilities and limitations of their aviators. An article on supervision in AEROSPACE SAFETY magazine says it best: "The authority to order a flight carries with it an absolute responsibility to supervise. The need for those who authorize flights to consider the flying experience, capabilities and qualifications of the aircrew can never be taken lightly. Whether the flight is to be advanced training by an exceptional pilot or a simple training exercise by an inexperienced student, the person ordering that flight must be certain that the task to be performed is not beyond the capability of the individual involved. If it is clear from the evidence of an accident investigation that an individual was being extended beyond his limits, how much sooner should this fact have been spotted—and remedied—by his supervisor?

"A particularly vulnerable phase in a pilot's career comes in the early stages of his first squadron tour when he is being trained to become a productive operational pilot. Individuals, even of apparent equal ability, progress at different rates; inexperienced pilots generally do not admit to their limitations, even if they know them, and some will have had difficulty making the grade or will have exhibited potentially dangerous traits in their first months in the squadron. Crews need very close supervision if their self-confidence and skills are to be developed without at the same time overtaxing their ability and confirming bad habits. It is tragic that this care and protection all too frequently are found missing."

A few people may be able to supervise without much conscious effort, but most people have to work hard at it. Most supervisory tasks are governed by orders, regulations, standard procedures, and other instructions. And it's not enough just to insure the existence of these orders, regulations, etc. Supervisors must insure their aviators are familiar with and always abide by them.

Following are some things you as a supervisor can do to keep from being listed as a cause factor in an accident.

• As stated earlier, know those who work for you. Learn their personalities and character. Be alert to changes in the behavior of your aviators as they react to personal and professional stresses. Bad habits and disregard for established procedures and regulations often come to light when it is too late.

• Set a good example. "Do as I say, not as I do" won't work. If you don't demonstrate and believe safety, neither will your subordinates.

• If you're a commander, you must become actively involved with the daily flight operations of your unit.

• Insure you have a crew rest policy and it is strictly enforced.

• Tailor your unit training program to specific mission requirements. No two programs will necessarily be exactly alike.

• Closely supervise aviators who have just had pilot-error accidents, whether Class As or Cs. The mistakes involved are often identical. Be firm with those aviators whose accidents were caused by carelessness, inattention, or a breakdown in professional discipline. Only positive corrective actions will prevent them from repeating.

• Be alert to the opinions of each pilot's ability, as expressed by other pilots. Listen to your safety officer.

• Establish an effective system for exposing operational hazards and then eliminate the hazards.

• Refuse to lend the stamp of approval to improper methods or procedures. Once you tolerate unsafe practices, your credibility is in jeopardy.

• Pair your most experienced aviators with your least experienced.

• Attend and participate in safety briefings and safety council meetings.

Remember that while mission accomplishment is paramount, the mission is never accomplished unless the aircrews and aircraft return safely to fly again another day. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

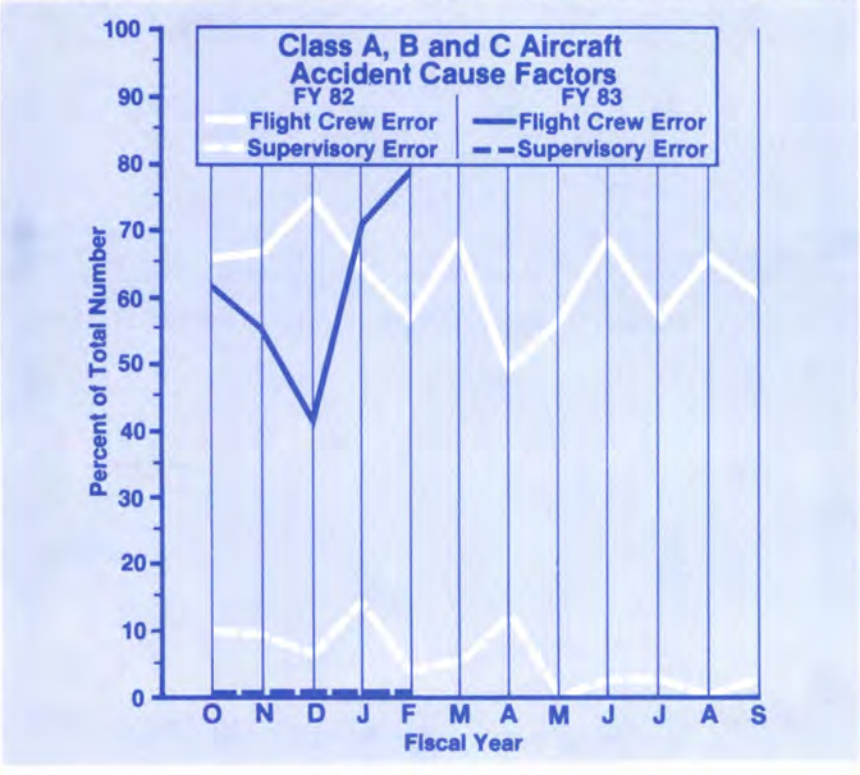
Utility helicopters

UH-1 Class E mishaps □ (M series) During hover prior to takeoff, loud bangs were heard from engine area, N_2 rpm fluctuated, egt rose, and aircraft yawed left. Flames were seen coming from tailpipe. Compressor stall was caused by a vane from the centrifugal compressor in engine separating. □ (H series) Master caution light came on and crew smelled strong odor. Suspect grounded wire in master caution system. (H series) Master caution and hydraulic pressure lights came on, followed by stiffness in controls. Caused by defective hydraulic pressure switch. □ (H series) Tail rotor pedal binding in flight was caused by failure of tail rotor servo cylinder. □ (H series) Crew felt slight jolt in airframe, accompanied by increase in vibration level. Postflight inspection revealed excessive play in lower pitch change link bearing on white blade. There was also red dust particles on pitch change horn assembly at bearing. □ (H series) Left fuel boost pump light came on and squealing noise was heard from left pump area. Caused by defective fuel boost pump.

UH-60 Class C mishap □ Aircraft was flying with slingload consisting of ½-ton truck. Load began oscillating and hook opened. Truck fell to ground and was destroyed.

Attack helicopters

AH-1 Class E mishaps □ (S series) Low rpm light came on and N_2 tachometer went to zero during runup. Caused by sheared drive shaft. □ (S series) When IP tried to lower collective during hover, collective stuck and then went to full down. IP could not pull up collective. Aircraft touched down with no damage. Caused by failure of collective cylinder actuator. □ (G series) Aircraft started to vibrate during landing. Caused by broken lift link.



Cargo helicopters

CH-47 Class E mishaps □ (B series) As aircraft was landed, oil leak was seen from rigid line from forward transmission oil strainer. Caused by failure of sleeve on end of oil line. □ (C series) No. 2 hydraulic boost and SAS caution lights came on. Caused by failure of O-ring seal in No. 2 upper SAS yaw link.

Observation helicopters

OH-6 Class C mishap □ Postflight inspection revealed bonding separation on trailing edge of tail rotor blade, two retaining bolts sheared off, support bolt for lower stabilizer sheared off, and broken ADF antenna. Suspect moisture in tail rotor blade froze and was slung out, causing the skin separation which started the sequence of events.

OH-58 Class E mishaps □ (A series) Instrument panel lights failed during flight. Pilot used flashlight to return to airfield and land. Compass light wiring had shorted out, causing circuit breakers to pop. □ (C series) Aircraft was No. 3 in a flight of 5. As aircraft approached top of hill, flight decelerated in order to fly under wires. As copilot slowed to 20 knots, aircraft began to spin to right at an altitude of about 15 feet. Spin could not be controlled, and after two 360-degree revolutions copilot closed throttle and entered hovering autorotation. Aircraft touched down slightly tail low in a plowed field, with no damage. Winds were much stronger than forecast. □ (C series) Pilot became preoccupied with "aggressor" aircraft position and allowed his aircraft to drift into tree branches. Leading and trailing edges of main rotor blade were damaged. □ (C series) N_1 tachometer dropped to zero and engine-out light came on during NOE flight. Caused by failure of tachometer generator.

Fixed wing

C-12 Class E mishap □ (A series) IP and pilot were on check ride. Pilot was making simulated single-engine approach and landing. Immediately upon touchdown, pilot applied excessive braking. Both wheels locked on right main gear and both tires blew out. Outboard wheel on left main gear locked up and tire was blown.

T-42 Class E mishap □ No. 2 ammeter dropped to zero during takeoff. Caused by broken battery wire leading to alternator post.

U-21 Class E mishaps □(A series)No. 1 engine would not restart after it was shut down during test flight. Caused by defective spark ignitors. □ (RU-21H) Crew received indications that right fuel transfer pump was not transferring in flight. When fuel transfer switch was placed in right test position, caution light came on. Caused by failure of boost pump.

Maintenance

UH-1 Class E mishaps □ (H series) When throttle was reduced during autorotation, throttle bypassed flight idle solenoid stop. Solenoid was not adjusted correctly. □ (H series) Crew heard noises from main transmission well. Hydraulic control became intermittent, hydraulic light came on, and hydraulics were lost within 10 minutes. Running landing was made. Caused by worn hydraulic filter inlet line, which allowed seepage of fluid.

CH-47 Class C mishap □ (C series) Crew chief located in rear of aircraft heard banging noise and told pilots to land immediately. Postflight inspection revealed that lower engine cowling had torn off at lower hinge and separated in flight. Flight engineer said he had properly closed and fastened dzus fasteners on cowling before flight. This was verified by copilot. Engine cowling had just been worked on at sheetmetal shop. Cowling had been chafing against No. 1 engine and N_1 actuator, causing it to jam. Corrective action taken was to file and bend cowling outward for clearance. This action apparently allowed cowling to bow outward and subjected it to more dynamic slipstream pressure. The increased vibration and twisting caused cowling to come loose.

CH-47 Class E mishaps □ (B series) Crew detected smoke in aircraft. Loose oil line fitting allowed oil to spray on engine. □ (C series) No. 2 hydraulic boost and No. 2 SAS caution lights came on. Hydraulic line was installed incorrectly, causing it to chafe.

OH-58 Class E mishap □ (A series) Rpm warning light came on and N_2 dropped. Postflight inspection revealed packing was missing from fitting of right side bleed air line at diffuser scroll.

C-12 Class E mishap □ (A series) When gear handle was placed in up position after takeoff, red lights came on. Gear up limit switch was out of adjustment.

U-21 Class E mishap □ (RU-21H) No. 2 engine oil temperature fluctuated between 40 and 80 psi. More than an hour later, oil pressure dropped below 65 psi. Thin stream of oil was seen on left side of No. 2 engine nacelle. Aircraft was landed. Caused by incorrectly tightened engine oil cooler output line, which leaked at fitting.

Messages received

- Maintenance information message concerning UH-60A temperature sensitive monitors on hydraulic pump modules (MIM-UH-60A-83-MEA-83, 182045Z Feb 83).

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

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	1- 9 Mar	0	0
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	5	2

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

CH-47s have wheels, don't they?

Yes, they do! Some of the old "old ones" have eight and the rest have six. We all know that Chinooks land on wheels and their associated landing gear assemblies. We also understand that wheels are generally circular frames of hard material that may be solid, partly solid, or spoked and are capable of turning on an axle.

Yep, that is what those little circular things do on a Chinook—they turn on an axle! Unfortunately, as of late some folks have been trying to get the aft wheels in the Chinook to turn one way while the aircraft is going another. It is sort of like simultaneously making a right or left turn while trying to continue straight ahead—something usually breaks. In the case of the CH-47, it is the aft landing gear and/or drag braces.

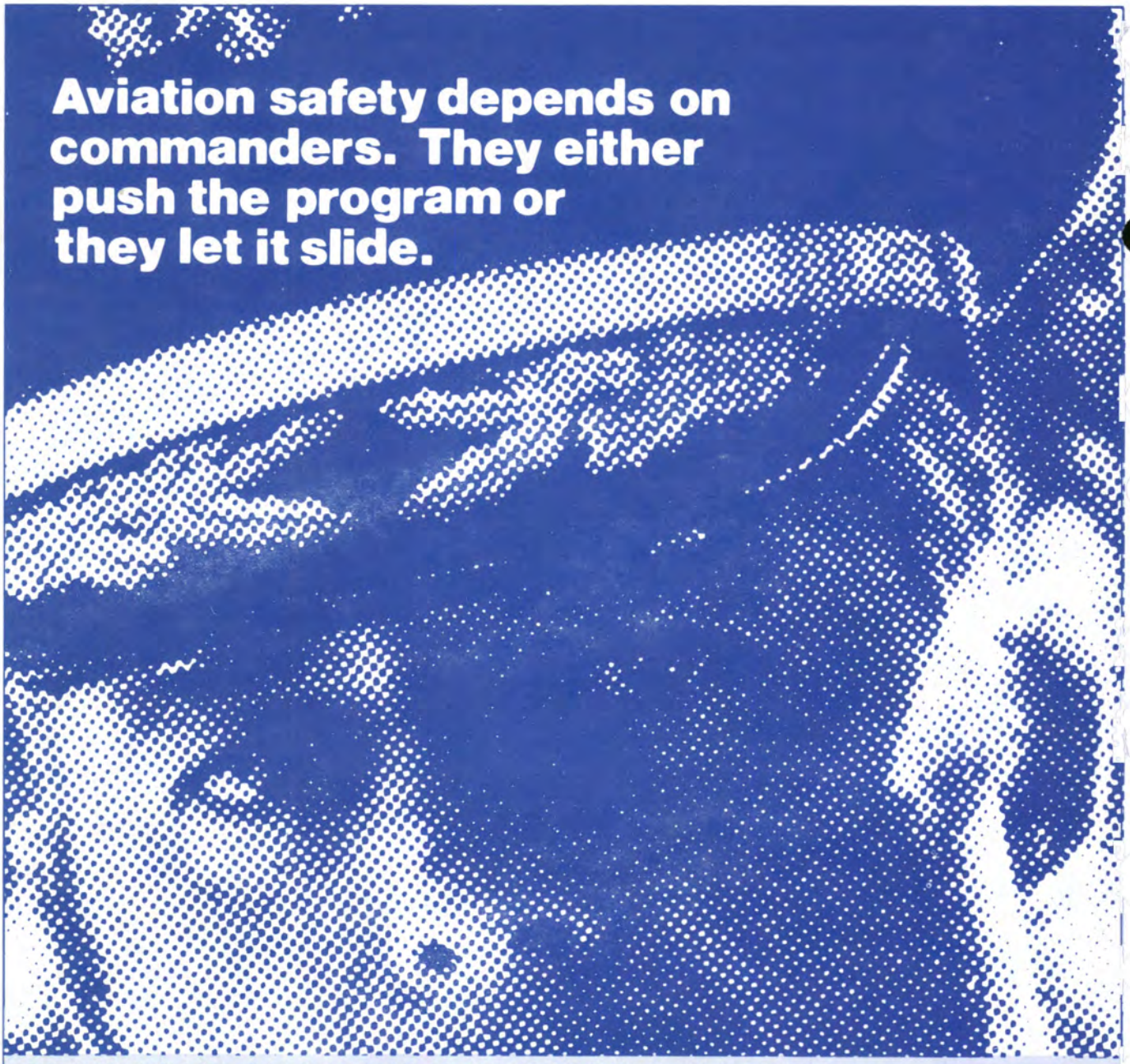
Now for those of you who have never seen a "three-footed" Chinook, it is a sad sight. With a landing gear missing, maintenance personnel usually pile up mattresses to act as the "fourth foot" and with precise maneuvering and skill, the pilot sets her down very, very gently. Some folks are so good they forego the mattresses and with "great skill" land on three good gear and a jack.

This all seems sort of risky. Sure, if you do have a landing gear come off, you don't have much choice but to set her down on a stack of mattresses, but we don't recommend using the jack method. It would make me very nervous wondering about ground resonance and if, during the typical Chinook's vibratory shutdown, she would stay on top of that little ole jack. Quite a mess if she were to fall off!

Fortunately, CH-47 landing gear assemblies are made of pretty stout stuff and they don't normally come off unless we help them. Sometimes swivel locks don't lock. They for sure won't lock unless the swivel lock switch is in the swivel lock position. Also keep in mind that even when the **aft wheel swivel switch** is in the **swivel lock** position, the aft landing gear will not normally center and allow the swivel locks to engage and lock both gear in the trail position unless there is little or no load on the gear. An example would be making a turn with power steering, stopping part way through the turn, centering the power steering knob, and then locking the swivel locks. Aft wheels are trailed and swivels locked, right? Wrong! They are still at the same angle they were when the helicopter's turn was stopped part way through. This would be a bad time to attempt to two-wheel back taxi the aircraft. The "load" is still on the aft gear and the centering cam doesn't have enough power to center it. Remember, if the aft gear isn't in the relatively "trailed position" the swivel locks will not engage regardless of the position of the aft wheel swivel switch.

So you hookers treat those old girls gently and practice your precision hovering and setdowns with all four feet attached.

If you have questions or comments on this article, call Major Ron Isbel, AUTOVON 558-4198/4202. ■



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Accident review: OH-58 engine power droop

Synopsis

As the OH-58A was crossing a ridgeline, main rotor and engine rpm drooped below the minimum necessary to maintain flight. The aircraft landed hard, resulting in substantial damage to the tail boom and skids.

History of flight

The OH-58 was scheduled for a support/training mission. The pilot arrived at the airfield late and hurried his preflight inspection. He did not use the aircraft checklist and did not complete a performance planning card. He decided to use the same card he had used for previous flights.

The aircraft took off from the airfield, with the pilot and a passenger on board. After about 30 minutes, the pilot returned to the airfield and the passenger got out. The pilot then decided he would give two maintenance people from his unit an orientation flight over the training area. After flying about 20 minutes, one of the passengers asked the pilot if he could fly north of the training area to a spot he wanted to check out. The pilot flew to the spot, passed over it, and turned around to return to the airfield.

The pilot, who had been flying at 70 knots and 500 feet agl, decided to descend to a lower altitude until they were clear of an Air Force training area. As the helicopter crossed a ridge line, the low rpm audio and low rotor rpm warning light activated. Believing he had an engine power droop, the pilot lowered the collective slightly, waiting for rpm to recover. By this time, the aircraft had cleared the ridge line and was about 300 feet above the ground.

To the right of the aircraft were powerlines and a highway. To the left was downhill, sloping terrain, which the pilot decided to use as an emergency landing area. Neither the pilot nor the passenger in the left rear seat noticed anything unusual about the instruments, other than the low rpm audio and light, or aircraft performance before the accident or during the power loss.

Rpm did not recover, and the aircraft continued to descend. The pilot tried to extend his glide to reach the selected landing area by maintaining collective pitch slightly up. In doing so, he overflew several suitable forced landing areas.

On short final, the pilot noticed the landing area he had selected was not as suitable as he had thought because of small ravines in the direction of landing. He realized his airspeed was too fast for a safe landing, so he decelerated and pulled the remaining collective about 10 to 15 feet above the ground. Rotor rpm decayed excessively, and the aircraft dropped 6 to 8 feet to the ground, hitting hard in a nose-high attitude, with about 15 knots of forward airspeed. The skids were torn from the aircraft, and the tail boom was severed by the main rotor blades. The three occupants were not injured.

Crewmember experience

The 30-year-old pilot had more than 1,700 rotary wing hours, with more than 700 in the OH-58A.

Commentary

Because of an engine malfunction, main rotor and engine rpm drooped below the minimum necessary to maintain flight. The pilot had recently had an N_2 droop on the same aircraft, and the engine had recovered quickly. The pilot expected it to respond quickly this time, but it did not. When it became evident engine/rotor rpm could not be regained, the pilot did not enter autorotation or select a forced landing area within the autorotative capability of the aircraft. He tried to extend his glide to what he thought was a more suitable landing area.

Aircraft damage would probably have been less severe if sufficient main rotor rpm had been available for collective pitch cushioning at termination of the landing. Suitable forced landing areas were available to the pilot had he chosen to enter autorotation earlier.

The pilot had flown this same aircraft every day for 2 weeks before the accident. He did not use the checklist during his preflight on the day of the accident. He also did not compute a new performance planning card because temperature, pressure altitude, and weight were similar to the previous days' conditions. These actions did not contribute to the accident but are indicative of a tendency to become complacent and overconfident after flying the same aircraft on similar missions day after day. ■

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 16 Jun 82 issue (8255) ☐ Pilot attempted a second approach to a pinnacle at an altitude of 11,800 feet msl after copilot had aborted the first approach because of inadequate engine power. Second approach was attempted without recomputing aircraft performance data despite the indication that adequate power was not available. Engine rpm was lost during the approach, and aircraft entered an uncontrollable spin and crashed. Pilot's judgment was affected by a hypoxic condition which resulted from an upper respiratory problem, probable self-medication, and a high operational flight altitude.

UH-1 Class B mishap in 14 Jul 82 issue (8266) ☐ Aircraft was loaded above maximum allowable gross weight. During final approach to mountain pinnacle, copilot allowed approach to become shallow and slow. Approach was terminated short of intended landing area, resulting in an attempted out-of-ground-effect hover. Copilot applied 60 pounds of torque and aircraft entered a settling with power/loss of tail rotor authority condition. Just before impact, PIC took control to try to make a go-around. Situation could not be corrected, and aircraft landed hard. PIC was probably suffering from acute and/or chronic fatigue. He had flown 205 hours during the 60 days preceding the accident, 131 of these hours in the past 30 days. Most of the hours were flown as a flying club IP.

UH-1 Class A mishap in 1 Sep 82 issue (8276) ☐ Copilot was landing to dusty LZ at night. He allowed the approach to terminate at a hover in blowing dust created by main rotor downwash instead of continuing the approach to the ground. Copilot lost visual reference to the ground, and aircraft drifted right and forward. Knowing trees were nearby and unable to accurately estimate his speed or distance from the trees, PIC took control and abruptly lowered collective pitch while aircraft was over sloping terrain. Aircraft landed hard, rolled right, and came to rest inverted.

UH-1 Class A mishap in 15 Sep 82 issue (8282) ☐ PIC occupying left seat hovered to his right instead of to his left during demonstration of hovering, sideward flight around a small tree. PIC habitually flew in the right seat and usually made hovering turns to the right where his visibility was better. While hovering to the right from the left seat, visibility was restricted by the aircraft structure and PIC did not see a small mound of dirt to the right side of the aircraft. As a result, the heel of the right skid, while the aircraft was in right sideward movement, hit a small mound of dirt, causing aircraft to roll to right. Critical angle of bank was exceeded, and aircraft came to rest inverted.

8276

Attack helicopters

AH-1 Class A mishap in 18 Aug 82 issue (8272) ☐ During night aerial gunnery qualification training from out-of-ground-effect hover, IP fired 8 to 12 rockets in rapid succession. As he was

8266

reaching forward to safety armament system, copilot told him aircraft was descending into trees. IP applied collective pitch but became confused and uncertain as to whether aircraft could be flown out of the treetops. He bled off main rotor rpm and allowed aircraft to descend through trees. Aircraft landed hard, with full collective pitch applied and extremely low main rotor rpm. Rapid firing of rockets had a temporary adverse effect on the night vision capabilities of the crew. IP did not coordinate copilot's activities to help in monitoring altitude or obstacle clearance. When IP reached forward to safety the armament system, he may have inadvertently moved the collective, causing aircraft to descend.

Cargo helicopters

CH-47 Class A mishap in 25 Aug 82 issue (8274) ☐ Soldier was killed when struck by a piece of plywood propelled by rotorwash of helicopter. Soldier did not heed repeated warnings of the dangers associated with CH-47 rotorwash.

Observation helicopters

OH-58 Class A mishap in 16 Jun 82 issue (8239) ☐ Downgraded to Class B. Engine malfunctioned during takeoff. Pilot was forced to land from a low altitude and airspeed with low rotor rpm onto unsuitable terrain. Aircraft landed hard. Cause of engine malfunction could not be determined.

8279

OH-58 Class B mishap in 1 Sep 82 issue (8279) ☐ Main rotor and engine rpm drooped below the minimum necessary to maintain flight because of engine malfunction. Pilot lowered collective pitch, expecting the engine to recover. It did not, and rpm continued to decay below the level required to cushion an autorotative landing. Aircraft landed hard in nose-high attitude. Cause of engine malfunction could not be determined.

8275

OH-58 Class A mishap in 8 Sep 82 issue (8280) ☐ Pilot told copilot to hover to the right. As copilot applied right lateral cyclic, aircraft yawed right and turned about 180 degrees. Conditions conducive to loss of tail rotor effectiveness (tailwind, high gross weight, and airspeed below effective translational lift) were present. Copilot attempted to fly out of the maneuver by applying forward right cyclic and reducing power. This allowed the aircraft to turn downwind, which required even more power and left pedal to maintain directional control. The addition of power and left pedal further decreased the effectiveness of the tail rotor, and the aircraft spun right another 360 degrees. Control was lost and aircraft crashed.

Fixed wing

U-21 Class B mishap in 25 Aug 82 issue (8275) ☐ During simulated single-engine landing, with No. 1 engine at zero thrust and with full flaps, IP commanded single-engine go-around from an altitude of 400 feet agl. Rated student pilot partially advanced power on No. 2 engine, retracted landing gear, and raised flaps. Nose of aircraft pitched up, resulting in loss of airspeed. Aircraft developed high sink rate and began to roll left. IP took control and added power to No. 1 engine in an effort to stop left roll and arrest the high sink rate. There was insufficient altitude to complete a power-on recovery. IP retarded both throttles, leveled aircraft, and landed straight ahead. Two factors definitely contributed to this accident. The IP ordered a single-engine go-around from a full-flap landing configuration after the final landing check had been completed. This is prohibited by the operators manual. The pilot did not maintain positive aircraft control, probably because of the heavy control forces necessary to maintain control in the full-flap configuration and his hesitation in performing the procedure since he knew it should not have been attempted. Another factor which may have contributed to the accident was the medication being taken by the IP. The IP was taking drugs prescribed by a civilian doctor and had not obtained a clearance to perform flying duties from a military flight surgeon. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Post-flight inspection revealed damage to transmission well panel, aft transmission well bulkhead, and fuselage plumbing lines.

UH-1 Class E mishaps □ (H series) Pilot heard noise and saw a vertical crack in the window in his door. In a few seconds, horizontal cracks appeared and most of the window blew out. □ (H series) Crew smelled fuel during flight. Caused by failure of fuel fitting on hose. □ (H series) Pilot smelled something burning during approach to field site. After landing, crew was unable to locate source of odor. When aircraft was picked up to hover, smoke was seen coming from battery compartment. Caused by overheated battery. □ (V series) Rotor tachometer dropped to zero, and rpm warning light came on. Caused by failure of tachometer generator.

UH-60 Class C mishaps □ As pilot was landing in LZ, he noticed some people along the tree line ahead of him. He divided his attention and allowed aircraft to drift right. Main rotor blades hit trees, damaging one blade and four tip caps. □ While flying contour, pilot descended into open field. As aircraft approached end of field, pilot began a climb to clear trees. Pilot did not see one tree which was higher than the others. Right chin bubble hit tree, and pilot pulled more collective. Tail section of aircraft then hit the same tree. Pilot flew to open field and landed.

UH-60 Class E mishaps □ No. 2 primary servo caution light came on during hydraulic leak test. Caused by malfunction of primary servo transfer module. □ Pilot noticed increased force loads on longitudinal and lateral axis during cyclic control check. Caused by failure of roll trim servo.

Attack helicopters

AH-1 Class C mishap □ (S series) Aircraft was overtorqued during pullout from dive, and mast bumping occurred. Push-pull tubes, rod end bearings, mast assembly, and center fairings were damaged.

AH-1 Class E mishaps □ (S series) Pilot turned ECU on during hover to takeoff. Canopy fogged over and cockpit filled with smoke and fumes. Forward No. 2 engine bearing seal did not seat properly because of cold weather, and hot oil fumes entered ECU. □ (S series) Master caution and engine oil pressure lights came on. Caused by failure of engine oil pressure switch. □ (S series) Main rotor blades hit tops of trees during NOE flight.

Cargo helicopters

CH-47 Class E mishap □ (B series) Flight engineer reported excessive hydraulic leak from aft transmission area, and No. 2 flight boost light came on. Caused by failure of hydraulic line to hydraulic manifold.

Observation helicopters

OH-58 Class C mishaps □ (A series) Aircraft did not seem to respond to initial collective pitch application at 10 feet altitude during standard autorotation. Aircraft landed hard, became airborne, and landed 33 feet further down the runway. □ (C series) Rated student pilot allowed airspeed to decrease and high rate of descent developed during standard autorotation at night. IP took control but was unable to prevent hard landing.

OH-58 Class E mishaps □ (A series) Crew smelled smoke in cockpit during pickup to hover. Caused by hole in heater duct. □ (A series) Transmission oil pressure light came on. Caused by faulty pressure switch. □ (A series) Low rpm audio and light activated during flight. Master caution and transmission chip detector lights came on during landing. Failure of transmission caused illumination of master caution and chip lights. Suspect electrical short caused low rpm indications.

Fixed wing

C-12 Class E mishaps □ (A series) No. 2 fire pull handle light came on during descent. Caused by defective fire detector. □ (C series) Right auxiliary fuel cap came off in flight but remained attached to servicing line. Some fuel siphoned and then stopped. Fuel cap was defective. It would not reseat and would not lock.

OV-1 Class C mishap □ (D series) Aircraft returned from training flight and No. 2 engine was shut down for a student change. When engine was restarted, fireguard shouted "Fire!" Start was aborted and prop levers moved to "fuel off," as fireguard disappeared to right rear of aircraft. Fireguard reappeared, still shouting "Fire," but he

Mishap briefs

made no attempt to put out fire with ground extinguisher. No. 2 fire handle was then pulled and both extinguishers discharged, putting out fire.

OV-1 Class E mishap □ (D series) Pilot noted that prop rpm on No. 1 engine was 1510 during takeoff. Washer on No. 1 propeller operating rod which safeties disconnect feature had failed, allowing rod to extend.

U-3 Class E mishap □ (A series) No. 1 engine rpm dropped to zero during flight. Dowel pin that secures tachometer drive bevel gear to oil pump drive gear was sheared.

U-21 Class E mishaps □ (A series) Right main gear down light would not indicate safe during landing. Caused by broken wire to down-lock switch. □ (RU-21H) When gear handle was placed up during takeoff, red lights remained on. Gear handle was recycled, but lights remained on. Landing gear power circuit breaker popped on second recycle. Crew reset circuit breaker and cycled gear handle again. Red lights went out, and green gear-down lights came on. Crew of another aircraft said gear appeared to be down. Landing was made without incident. Caused by malfunction of left landing gear actuator.

Maintenance

UH-1 Class E mishaps □ (H series) Transmission oil pressure gauge fluctuated during flight. Caused by loose cannon plug. □ (H series) When pilot energized starter, crew chief noticed fuel leak in engine compartment. Caused by incorrectly tightened fuel line fitting at fuel control filter. □ (H series) Oil was seen leaking from underneath aircraft during hot refueling operation. Caused by incorrectly installed transmission external oil filter O-ring.

AH-1 Class E mishaps □ (S series) Cyclic felt stiff and appeared to be binding during runup. Cyclic friction was adjusted too high and wire bundle to gunner's cyclic was too tight, causing binding. □ (S series) Fuel was seen draining from aft fuel cell sump drain after shutdown. Piece of grit was found in drain valve.

OH-58 Class E mishaps □ (C series) Master caution and hydraulic pressure lights came on. Feedback was felt in cyclic and collective. Postflight inspection revealed hydraulic line from hydraulic pressure filter to hydraulic manifold chafed against transmission oil cooler hose. □ (A series) Fuel boost light came on during takeoff. Caused by loose electrical wire to fuel boost pump.

U-21 Class E mishap □ (JU-21A) When gear handle was placed up after takeoff, loud bang was heard from under floor, and gear remained in down and locked position. Clutch disengage lever would not disengage. Tower flyby was made to insure gear was down, and aircraft was landed. Two days before, a landing gear retraction test was done. Manual extension clutch disengagement mechanism had not fully disengaged and would not allow landing gear motor to retract gear.

Messages received

• Safety-of-flight emergency message concerning one-time inspection for certain 204 series main rotor blades on UH-1 (except B, C, and M models) aircraft (UH-1-83-02, 252300Z Feb 83). Summary: Recently, a production run of repaired main rotor blades under ►

FY 83 Class A Accident Countdown

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	September	10	13	September		
	Total for Year	59*	46**	Total to Date	6	2

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

contract DAAJ09-81-D-0004 was issued to the user. Normal blade repair procedures may have been deviated from. It has not been determined at this time if these blades are good or bad. A determination will be made as soon as possible. Contact: Dick Mooy, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight emergency message concerning one-time inspection for certain 540 series main rotor blades on UH-1C and M and AH-1 aircraft (AH-1-83-01, UH-1-83-03, 252305Z Feb 83). Summary: Same as above. Contact Jimmy Simon and Ed Soteropoulos, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight emergency message concerning one-time inspection for certain 206 series main rotor blades on OH-58 aircraft (OH-58-83-01, 252310Z Feb 83). Summary: Same as above. Contact: Rich Smith, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection for certain 206 series main rotor blades on OH-58 aircraft (OH-58-83-02, 032350Z

Mar 83). Summary: Message includes three serial numbers which were not on message OH-58-83-01. All OH-58A/C helicopters must be reinspected. Contact: Richard Smith, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight technical message concerning one-time inspection for certain 204 series main rotor blades on UH-1 (except B,C, and M models) aircraft (UH-1-83-05, 032359Z Mar 83). Summary: Message provides instructions for the inspection and retorquing to be performed on root and tip balance weight retaining nuts and the removal of suspect blades. Contact: Dick Mooy, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight emergency message concerning one-time inspection for certain 204 series main rotor blades on UH-1 (except B,C, and M models) aircraft (UH-1-83-07, 050200Z Mar 83). Summary: Aircraft are grounded until search is conducted for six additional main rotor blades listed in UH-1-83-05 message. Contact: Dick Mooy, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• UH-60 maintenance information message concerning changes to source, maintenance, and recoverability codes for pitch trim assembly and yaw boost servo (MIM-83-UH-60A-MEA-04, 251930Z Feb 83).

• T53 engine maintenance information message concerning phase maintenance requirement for the inspection of the splines on the fuel regulator drive shaft and accessory drive gear shaft (MIM-T53-83-MEA-01, 281930Z Feb 83).

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

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 23 □ 23 Mar 1983

Accident review: mountain flying

Synopsis

The UH-1H was on a search/training mission in mountainous terrain. Rotor rpm was lost, and the antitorque system became ineffective during an approach to a pinnacle. The helicopter crashed into trees and was destroyed.

History of flight

The crew was assigned a mission to take a search team consisting of seven people to a site in the mountains and drop them off. The search team was going to look for an aircraft that had crashed several months earlier. The pilot-in-command (PIC), copilot, crew chief, and one passenger took off from an airfield and flew to a town to pick up the search team.

Three members of the search team boarded the helicopter and were flown to a landing site on the mountain. Arriving at the site, the PIC did a high flight recon and the copilot computed the landing data. The PIC was unable to land at the first proposed landing site because of the degree of slope and his uncertainty about the snow-covered terrain. The UH-1 was then flown to another landing site at an altitude of 11,800 feet msl, where the three members of the search team were unloaded.

The aircraft left the landing site, refueled at a local airport, and flew back to the town to pick up the remaining four members of the search team. Returning to the landing site, the copilot told the crew chief to drop a smoke grenade to determine the wind direction. The smoke indicated the wind was generally from the west and the velocity was light. The copilot began an approach to the west using an approach angle somewhere between steep to normal. About

20 to 30 feet above the ground, the PIC told the pilot that rpm was decreasing. The aircraft began a shallow right turn, and the copilot made a go-around.

Once control of the aircraft was regained, the PIC took the controls and immediately tried a second approach into the same landing site. During this approach, the PIC maintained 34 to 35 pounds of torque almost until touchdown. He said he applied a little more torque as he came over the edge of his intended landing site, and the rpm began to bleed off rapidly. A go-around was initiated, but the aircraft began a slow spin to the right. The PIC pulled additional collective pitch to clear a rock formation, then applied forward cyclic and reduced the collective to gain rpm as the aircraft spun toward lower terrain.

When the PIC realized the aircraft was going to hit the trees regardless of his flight control inputs, he decelerated to dissipate forward airspeed and pulled all remaining collective pitch to cushion the impact. The aircraft hit several trees during the descent, severing the tail boom. Continuing to turn, the aircraft hit two trees about 2½ to 3 feet in diameter and 60 to 70 feet tall. The force of the impact caused the trees to uproot and fall in the downhill direction on the 70-degree slope. The aircraft came to rest inverted on top of the two trees.

One of the passengers was killed as a result of a tree penetrating the passenger area. Five of the occupants sustained major injuries, and the other two sustained bruises and abrasions.

Crewmember experience

The 33-year-old PIC had more than 700 rotary wing flight hours, with more than 600 in the UH-1H. He had no mountain experience before his current unit assignment and had not flown in mountainous terrain in 5 months.

The 38-year-old copilot had more than 1,600 rotary wing hours, with more than 700 in the UH-1H. He was not trained in mountain flying operations.

Commentary

Performance planning errors, failure to comply with regulatory directives, and disregard for the loss of rpm during a prior approach attempt were the main causes of this accident.

The PIC did not recompute landing data after significant changes had occurred which he knew would affect aircraft performance capabilities. On the second insertion, there was one more passenger, with his survival equipment, on board, as well as 50 additional pounds of fuel. And the air temperature at the high altitude landing site had ➤

Mountain flying

increased during the 1½ hours between insertions. TC 1-135 requires recomputation of performance data when load/environmental conditions change significantly.

The PIC attempted a second approach to a pinnacle after the copilot had aborted the first approach because of inadequate engine power. The second approach was attempted without recomputing aircraft performance data despite indications that adequate power was not available.

The PIC was suffering from a chronic upper respiratory problem which should have disqualified him from flight duties. Inadequate medical selection/screening allowed him to enter flight training. He had made his condition known to medical authorities during his initial flight physical examination; but no evaluation was conducted and he was inappropriately classified as medically qualified. He had sought medical attention for his ailment numerous times during the past 12 years and had been hospitalized twice for treatment.

The PIC's medical condition, combined with probable self-medication, use of cigarettes, and a high operational flight altitude, caused him to become hypoxic and make, what was for him, uncharacteristic errors in judgment. Pulmonary function tests conducted after the accident revealed that the PIC enters a hypoxic state at 6,000 feet msl.

Even though TC 1-10 establishes a training program for mountain qualification, there is inadequate regulatory guidance governing evaluation and currency requirements for aviators operating in mountainous terrain. AR 95-1 and TC 1-135 do not specify a certain period or elapsed time in which an aviator must have flown in mountainous terrain to maintain currency and/or qualification. Neither is there a requirement for an aviator to demonstrate proficiency in planning or performing a flight into mountainous terrain to an instructor pilot/standardization instructor pilot during the Annual Aviator Proficiency and Readiness Test evaluation period. However, TC 1-134 encourages the commander to establish additional ATM requirements based on situations peculiar to his area of operations.

A recent analysis was done of all recorded UH-1 and OH-58 accidents that occurred above 5,000 feet msl during a 7-year period. Thirty-four accidents were studied. Thirteen of the 34 did not occur in mountainous terrain. Twenty aircraft crashed in mountainous terrain because of inadequate or nonexistent performance planning by the crewmembers. Four of the crews attempted takeoff with their aircraft over allowable gross weight limits. One accident resulted from engine failure; but if the engine had not failed, the mission would probably have terminated in an accident because a review of performance planning revealed adequate power would not have been available at the intended landing site.

Six people were killed and 24 injured in the 16 UH-1 and 5 OH-58 accidents that occurred in mountainous terrain.

Eighteen of the accidents occurred in the United States. Thirteen occurred below 10,000 feet msl, 1 was between 10,000 and 11,000 feet msl, three were between 11,000 and 12,000 feet msl, and four were above 12,000 feet msl.

Recommendations were made in 10 of the accident investigation reports that mountain qualification training programs be established and/or upgraded. Recommendations were also made to include mountainous terrain flight in the ATM program. Each of the accidents resulting from nonexistent or inadequate performance planning could have been prevented with a thorough understanding of performance planning and flight techniques for aviation operations in mountainous terrain. ■

The most valuable tools

What would you pay for some of the most valuable tools in existence? Furthermore, these tools can distinguish temperature variations and are sensitive to touch. It is impossible to put a price tag on these tools—they are your **hands**! Though these fabulous tools are the best in the world, they have one large drawback. Believe it or not they are subject to injury by being caught in machines, flight controls, canopies and crushed by heavy objects or cut by a variety of sharp-edged tools such as chisels, knives, or saws. Drills will penetrate them and they may also be damaged by burning, be it with fire, hot soldering irons, solvents, or chemicals, unless you always remain alert. Why do these things happen to these tools? Because they are unable to think for themselves. **Protect them**.

Your hands are invaluable. **Keep alert** while you work and above all **think**. For instance, think before you make any adjustments to moving flight control surfaces where you have to insert your hand inside the panels. Has the electrical and hydraulic power been secured? Is the cockpit clear of personnel, to prevent someone from moving the controls? Before you apply or reapply electrical or hydraulic power to the aircraft, is the area clear? Is someone working in the hellhole who could possibly go undetected? Does anyone have his or her hands/arms inside a panel making an adjustment? In the past, maintenance personnel have gotten hands and arms severely injured due to hydraulic power being applied to the aircraft without their knowledge. There have been numerous cases, throughout the years, of people getting hands, arms, and even bodies severely injured. Just think how it would be to go through life without these valuable tools. ■

—from Aviation Maintenance Crossfeed

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Main rotor blade hit tree during takeoff.

UH-1 Class E mishaps □ (V series) Pilot attempted engine start with rotor blade tied down. Pilot was awaiting arrival of VIP, and blade was loosely tied because of windy conditions and other aircraft operating in close proximity. Using dash 10 checklist, pilot called clear and crew chief confirmed clear. Blade appeared to be untied and showed some movement at 12% N_1. Tiedown pulled loose at approximately 20% N_1. □ (H series) Feedback was felt through cyclic control during hover. Caused by failure of irreversible valve O-ring. □ (H series) Noise was heard from transmission area as collective was increased for takeoff. Caused by defective collective servo cylinder. □ (H series) Engine fuel pump light flashed on and off several times during autorotation. Caused by defective fuel pressure switch. □ (H series) Fuel filter caution light came on during hover. Caused by fuel filter contamination. □ (H series) Master caution and right boost pump lights came on. Caused by failure of boost pump. □ (H series) Flight idle solenoid was inoperative and governor control circuit breaker popped during runup. Caused by two shorted wires in copilot's collective lever. □ (H series) Engine oil pressure dropped to zero during approach to landing. Caused by defective oil pressure indicator.

Attack helicopters

AH-1 Class C mishap □ (S series) When aircraft was turned to miss a UH-1 in its flight path, sun blinded pilot. Aircraft hit tree, causing damage to fairings, windshields, extension tube, and rib assembly.

AH-1 Class E mishaps □ (S series) Tail rotor hit small tree as aircraft was being repositioned. Ground guide used incorrect guiding signals. □ (S series) Transmission oil pressure light came on and oil pressure went to zero during landing. Caused by cracked fitting on transmission sump. □ (S series) Aircraft yawed 20 degrees left and crew heard high-pitched whining noise. Caused by malfunction of SCAS. □ (S series) Transmission oil pressure gauge indicated about 100 psi during landing. Caused by failure of pressure transducer. □ (S series) N_2 surged and tgt fluctuated during takeoff. Caused by failure of N_2 tachometer generator.

Cargo helicopters

CH-47 Class C mishap □ (C series) Soldier was inside tent at tactical training area. CH-47 on resupply mission landed in vicinity of tent. While maneuvering, aircraft flew directly over tent, knocking tent and camouflage system down. Soldier was hit in the back of the head by flying debris, either a gas can or a tent pole.

CH-47 Class E mishaps □ (B series) Flight engineer noticed high frequency vibrations in vicinity of No. 2 engine drive shaft. Caused by failure of engine transmission. □ (C series) While aircraft was hovering, crew chief told pilots he felt unusual vibration and heard strange noises in vicinity of No. 2 engine. Caused by separation of two exit vane exhaust assembly blades. □ (C series) Master caution and No. 1 SAS lights came on. No. 1 hydraulic light then came on, and No. 1 flight boost pressure gauge went to zero. Caused by broken hydraulic line. □ (C series) No. 2 engine transmission hot light came on. Caused by failure of temperature sensing bulb.

Observation helicopters

OH-58 Class C mishap □ (C series) Postflight inspection revealed damage to main rotor blade tip cap. Aircraft had been flying at NOE altitudes for 7½ hours. Five and one-half hours into the flight, pilots of AH-1 saw OH-58 hovering with the tail in a bush. AH-1 pilots radioed OH-58 pilot. OH-58 was picked

up to a high hover and repositioned clear of bush. Suspect blade strike occurred during this time.

OH-58 Class E mishaps ☐ (A series) Pilot heard noise in compartment and fuel boost pump light came on during shutdown. Caused by failure of boost pump. ☐ (A series) Transmission oil pressure light came on during landing. Caused by failure of oil pressure transmitter switch. ☐ (C series) N_1 gauge fluctuated and engine-out light came on during landing. Caused by failure of N_1 tachometer generator.

Training helicopters

TH-55 Class C mishaps ☐ As student pilot was making autorotation, instead of aft cyclic to flare, he applied forward cyclic. Sink rate accelerated rapidly. IP applied aft cyclic to level aircraft and collective to stop sink rate. Tail skid and tail rotor blades hit ground and separated from aircraft. IP pulled all remaining collective pitch and kept aircraft level, preventing main rotor blades from severing tail boom. Aircraft came to rest upright. ☐ Student pilot was having difficulty controlling rpm and told IP that throttle did not feel right. IP took controls and had no problem with the throttle. Student pilot made another approach and again complained that throttle was sticking. With aircraft at a stabilized 3-foot hover, IP placed his right hand on student pilot's throttle to check its operation. As he did, aircraft descended and landed hard, damaging landing light, left rear oleo strut, and drag braces. Neither pilot had full control of the aircraft. Student thought he made a positive transfer of controls to IP. IP thought student was still controlling the cyclic. Maintenance found nothing wrong with throttle.

Fixed wing

OV-1 Class E mishaps ☐ (B series) Aircraft began to yaw to right during takeoff. Pilot applied left brake and aborted takeoff. Left main tire was flat. Excessive braking caused tire to skid. ☐ (D series) Aircraft pitched down and yawed right during flight. VIDS indicated zero torque on No. 2 engine. Engine was feathered, and aircraft was flown to destination and landed. Suspect failure of No. 2 engine was caused by failure of engine oil line. ☐ (RV-1D) Cockpit filled with smoke during takeoff. Directional flow valve failed in open position, allowing continuous flow through ECU direct from engine. ☐ (RV-1D) When pilot tried to extend speed brakes during descent for landing, hydraulic gauges showed zero pressure and windshield wipers were inoperative. Gear was blown down, and no-hydraulics landing was made. Caused by ruptured hydraulic line to power steering unit.

Maintenance

UH-1 Class E mishaps ☐ (H series) Main generator kicked off line during hover. Caused by incorrect adjustment of voltage regulator. ☐ (H series) When spare inverter was turned on during runup, transmission oil pressure did not respond and oil pressure light stayed on. Transmission oil line in No. 1 hellhole quick disconnect was not seated correctly, causing pressure buildup and failure of oil filter gasket. ☐ (H series) Pilot noticed peculiar odor coming from bleed air heater vents. Master caution and hydraulic pressure lights came on, followed by surges in flight controls. Running landing was made. Hydraulic pressure line to lateral servo irreversible valve was chafed and cracked, causing loss of hydraulic fluid.

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	1-23 Mar	2	5
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	7	7

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL36362 □ STACOM 89 □ 23 Mar 1983

Operator's Manual and Checklist update

Listed below are the effective dates of the current aircraft operator's manuals and checklists with the number and date of the latest change. Please check your weekly AG Publications Center Bulletin for subsequent changes.

Fixed Wing TM 55-1510-	Aircraft	Basic Manual	Last Change	Basic Checklist	Last Change
201-10/4	RU-8D				
	U-8D/G	3 Apr 78		Jul 78	
201-10/5	U-8F	21 Mar 78	4, 23 Nov 82	Jul 78	3, 24 Nov 82
204-10/3	OV-1B	9 Mar 79	4, 23 Mar 82	Feb 79	2, 23 Mar 82
204-10/4	OV-1C	10 Apr 79	5, 2 Apr 82	Apr 79	2, 5 Apr 82
208-10	T-42A	27 Feb 79	2, 12 May 82	Feb 79	1, 7 Jan 82
209-10	U-21A	29 Oct 82		Oct 82	
209-10-1	RU-21A/D	29 Oct 82		Sep 82	
213-10	OV-1D/RV-1D	4 Aug 78	7, 28 May 82	Nov 78	3, 12 Dec 81
214-10	RU-21B/C	28 Oct 82		Oct 82	
215-10	U-21G	29 Dec 82		Dec 82	
215-10-2	RU-21H (GR-V)	29 Jan 83		Nov 82	
216-10	U-3A/B	11 Dec 78	2, 5 Apr 82	Dec 78	1, 9 Feb 82
218-10	C-12A/C/D	7 Oct 82		Oct 82	
TO1C-7A-1	C-7A	1 Oct 70	10, 11 Jan 80	Oct 70	13, 11 Jan 80
	T-41	31 Oct 74	2, 18 Mar 77	Oct 74	

Rotary Wing TM 55-1520-	Aircraft	Basic Manual	Last Change	Basic Checklist	Last Change
209-10	CH-47A	9 Jan 79	5, 11 Jan 83	Dec 78	3, 26 Nov 82
210-10	UH-1D/H	18 May 79	17, 27 Oct 82	Feb 79	5, 24 Mar 82
214-10	OH-6A	17 Dec 76	11, 11 Jan 82	Dec 76	4, 8 Feb 82
217-10-1	CH-54A	8 Apr 77	3, 20 Aug 82	Mar 77	2, 10 Oct 79
217-10-2	CH-54B	15 Apr 77	3, 23 Aug 82	Mar 77	3, 4 Aug 82
219-10	UH-1B	16 Jan 69	19, 28 Jul 82	Dec 68	8, 11 Apr 79
220-10	UH-1C/M	8 Sep 80	11, 10 Dec 82	Sep 80	3, 7 Dec 82
221-10	AH-1G	18 Mar 80	2, 5 Feb 82	Mar 80	
227-10-1	CH-47B	23 Aug 78	5, 21 Sep 82	Dec 78	3, 30 Oct 80
227-10-2	CH-47C	23 Aug 78	11, 23 Nov 82	Nov 79	4, 15 Apr 82
228-10	OH-58A	7 Apr 78	25, 1 Nov 82	Jul 78	14, 27 Oct 82
223-10	TH-55A	30 Sep 76	4, 2 Jul 82	Oct 76	6, 1 Dec 82
234-10	AH-1S (MOD)	17 Nov 76	14, 25 Aug 82	Nov 76	3, 30 Nov 79
235-10	OH-58C	7 Apr 78	28, 13 Aug 82	Jul 78	16, 10 Sep 82
236-10	AH-1S (PROD)	11 Jan 80	4, 22 Dec 82	Jan 80	2, 22 Dec 82
237-10	UH-60A	21 May 79	19, 14 Feb 83	Dec 78	14, 15 Feb 83

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.

Mishap briefs

Bleed air valve was stuck in open position. Suspect fumes from cracked hydraulic line were drawn into bleed air ducts and entered cockpit through heater vents.

AH-1 Class C mishap □ (S series) Damage to No. 2 tail rotor drive shaft was found during preventive maintenance daily inspection. Plastic residue was found below tail rotor drive shaft at No. 2 hanger bearing, and rubber screwdriver handle cover was found where tail rotor drive shaft goes into air ejector area. Screwdriver was found on top of oil cooler.

AH-1 Class E mishap □ (S series) After trigger was released at about 65% during engine start, engine began to run down, and master caution and engine fuel pump lights came on. Caused by loose wire on fuel shutoff valve cannon plug, preventing valve from opening.

CH-47 Class E mishaps □ (C series) Crew chief noticed oil leak during runup. L-7 engine shaft was installed in L-11 engine. □ (C series) No. 2 hydraulic boost pressure dropped and caution light came on during takeoff. Hydraulic line fitting was only finger tight, and 4 quarts of oil leaked out of hydraulic reservoir.

OH-58 Class E mishap □ (A series) Pilot heard grinding noise and felt high frequency vibration during climb. Caused by incorrect screw and washer stackup installed on tail stinger.

U-8 Class E mishap □ (F series) No. 1 engine surged and returned to normal. Pilot noticed oil leak and oil pressure starting to drop. Engine was secured and aircraft landed. Generator worked loose from retaining studs, shearing generator shaft and six retaining studs. Vacuum pump was hit by generator, causing oil leak from vacuum pump oil passage.

U-21 Class E mishap □ (A series) Airspeed indicators began to decrease toward zero just after liftoff, and altimeters failed to operate. Caused by incorrectly installed glare shield, which pinched pneumatic pressure line.

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

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Were the passengers briefed?

As an aircraft crewmember, you know what to do when you get in your aircraft, how to buckle and unbuckle your restraint system, where the fire extinguishers and survival kits are, and what to do if you crash. You know that your chin strap should be secured and your sleeves rolled down. But do your passengers know these things?

Overfamiliarization with routine and emergency procedures may make it difficult for the pilot and his crew to realize that their passengers know little or nothing about such things.

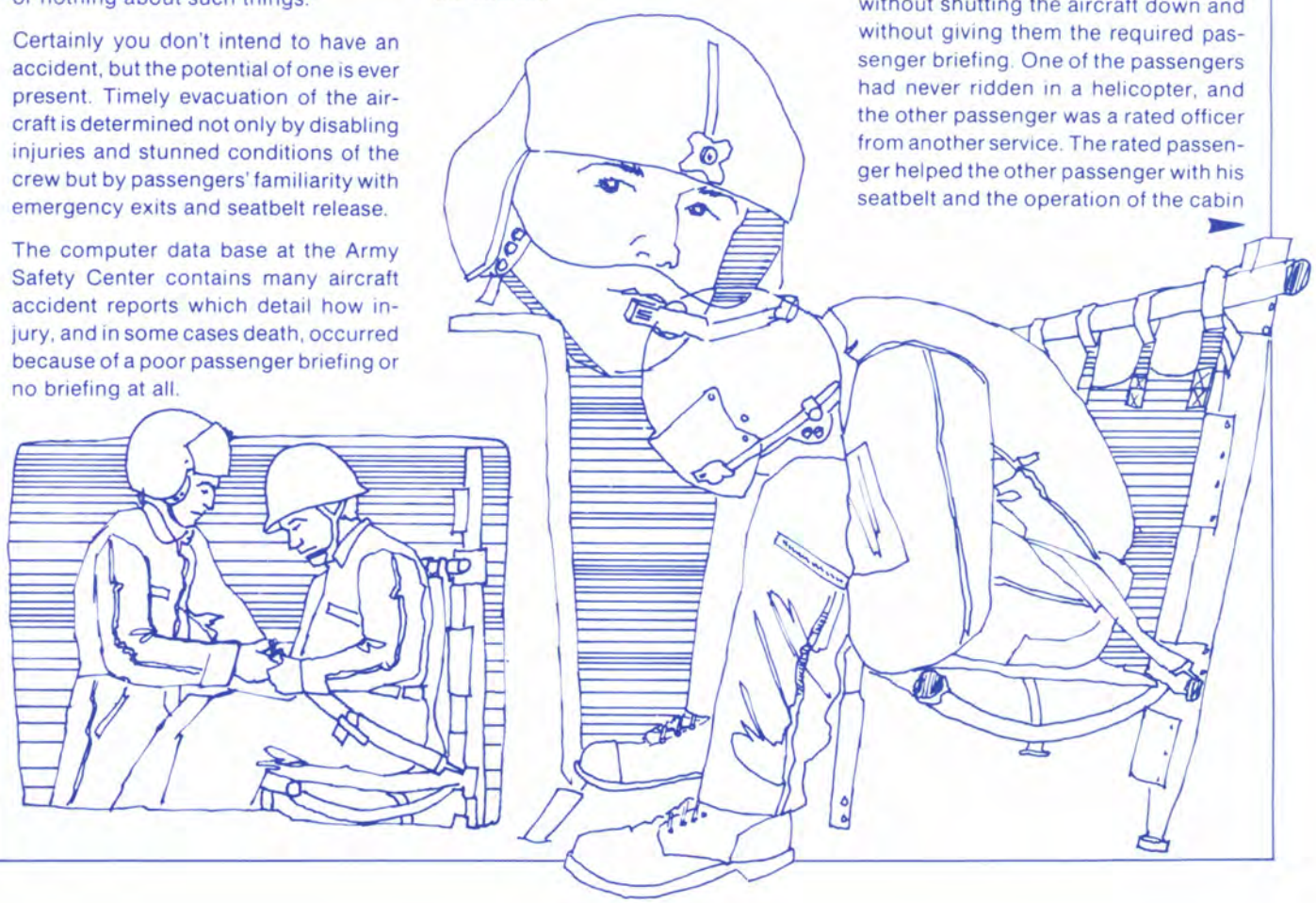
Certainly you don't intend to have an accident, but the potential of one is ever present. Timely evacuation of the aircraft is determined not only by disabling injuries and stunned conditions of the crew but by passengers' familiarity with emergency exits and seatbelt release.

The computer data base at the Army Safety Center contains many aircraft accident reports which detail how injury, and in some cases death, occurred because of a poor passenger briefing or no briefing at all.

• The pilot of a U-21 did not give his passengers a safety briefing. Most of them did not know how to open the main entrance/exit door and did not know of any other exits in the aircraft. The U-21 crashed and caught fire. When one of the passengers tried to open the main door, he didn't know how to remove the safety chain and could not open the door. The copilot then helped the passenger with the door. Fortunately, the copilot, unlike the pilot, was conscious and able to help. The pilot had to be removed from the aircraft.

• A UH-1 lost power and crashed through trees. A postcrash fire destroyed the aircraft. Five people on board, including three passengers, sustained major injuries. Two other people sustained minor injuries. According to the accident report: "No passenger briefing was conducted prior to flight and no warning was given about the emergency situation during flight, both of which contributed directly to passenger injuries."

• An OH-58 pilot landed to pick up two passengers. He boarded the passengers without shutting the aircraft down and without giving them the required passenger briefing. One of the passengers had never ridden in a helicopter, and the other passenger was a rated officer from another service. The rated passenger helped the other passenger with his seatbelt and the operation of the cabin



Were the passengers briefed?

doors. As the pilot took off from the confined area, he induced a loss of effective tail rotor control, and the aircraft entered a spin to the right and crashed. The two passengers sustained major injuries. One of the passengers would have walked into the turning rotor blade after the crash had he not been forced to the ground by rescue personnel.

• There were 10 people on board a UH-1, seven of them passengers. The passengers were not briefed because the pilot-in-command (PIC) assumed they had been briefed during previous training missions, and he was in a hurry to take off. Two different types of seatbelts were installed in the aircraft. Seatbelts were available for all of the occupants, but one of the passengers was unrestrained during the flight and accident sequence. A sense of mission urgency caused the pilot to assume the risk of one passenger being unsecured rather than have the passengers on the right side of the aircraft rearrange themselves so that everyone had a seatbelt. The unsecured passenger was jammed between the crew chief's and the pilot's seats and was luckily not injured when the aircraft crashed during landing. One of the passengers sustained minor injuries because he was not wearing his seatbelt correctly.

• An individual flying for the first time in an AH-1 was not restrained by a lapbelt or shoulder harness. He was killed when the aircraft crashed. Medical experts said his chances of surviving the accident would have been virtually assured if he had been properly restrained.

• Late last summer, a UH-1 landed hard and rolled over when visual reference to the ground was lost. The passenger, who did not receive a briefing before the flight, was fortunate to walk away from the accident with no injuries. He stated after the accident: "About 10 feet off the ground, I started unstrapping. But I reached and grabbed the seat to hold on so I wouldn't get thrown out."

• Sometimes passengers are given a briefing, but not a complete briefing. Two passengers in an OH-58 aircraft were told about exits and how to use the seatbelts. They were not briefed on the location and use of survival equipment and were unaware that both pilots were carrying PRC-90 survival radios in their individual survival vests. When the aircraft crashed, both pilots were killed. One passenger was critically injured and one sustained major injuries. The passenger with the major injuries used all of the pen gun flares and a strobe light in an attempt to contact searchers. The passenger finally attracted the attention of the searchers 7 hours after the accident by pounding on the aircraft fuselage. The critically injured passenger died about 4 hours before the aircraft was found. He might have lived if the survivor had known to use the survival radio and gotten help earlier.

"About 10 feet off the ground, I started unstrapping."

The PIC of an Army aircraft is required to insure that all passengers are briefed. When complete shutdown of the aircraft is just not feasible, the PIC should insure that some other crewmember helps the passengers with their safety belts and briefs them on such things as approach and departure from the aircraft, smoking, exits, clothing, weapons and ammunition, and security of equipment.

Each aircraft operators manual contains an outline to use for **required** passenger briefings. Some units supplement the crew's briefing by furnishing cards, single sheets, or booklets to passengers who ride in their aircraft.

Following is an example of a passenger briefing contained in the Commanders' Aviation Mishap Prevention Plan, published by the Army Safety Center. This briefing is a guide and is the minimum requirement for passenger information.

Army Aircraft Passenger Briefing

Flight plan: Inform passengers of route of flight, weather, and ground activity.

Approach and departure from aircraft: The proper direction to approach or depart the aircraft to avoid rotor blades, tail rotor, propellers, or exhaust heat.

Seat location: When passengers occupy seats from which they can contact aircraft controls, caution passengers against intentional or inadvertent interference with the controls during flight and upon entering or leaving the aircraft.

Smoking: Smoking within 50 feet of an aircraft on the ground is prohibited. Smoking may be permitted at the discretion of the pilot-in-command except under the following conditions:

- During all ground operations.
- During and immediately after takeoff.
- During fuel transfer operations.
- Immediately before and during landings.
- At any time any occupant detects POL fumes.
- When oxygen is being used.
- Any time an emergency is in progress.
- During terrain flights.
- During internal transport of flammable or explosive cargo.

Emergency entrances, exits, and equipment: Identify existing entrances, exits, and equipment and demonstrate operation for access. Some examples are:

- Copilot's jettisonable door.
- Pilot's jettisonable door.
- Cabin escape hatch.
- Cabin doors.
- Cargo loading ramps.

- Cargo loading ramp escape hatch.
- Rescue hatch door.
- Jettisonable cabin windows.
- Jettisonable cargo door.
- Cutout/kickout panels.
- First aid kit.
- Troop alarm and jump lights.
- Emergency escape axe.

Emergency signals (in aircraft with alarm systems):

- Prepare for ditching—6 short rings.
- Prepare for bailout—3 short rings.
- Prepare for crash landing—6 short rings.
- Water contact—1 sustained ring.
- Crash landing—1 sustained ring.
- Takeoff—1 sustained ring.

Safety belts and shoulder harnesses: Each passenger must be made familiar with the use and operation of safety belts, and each passenger will use a safety belt during landings, takeoff, and in rough air, and at all other times as directed by the pilot.

Helmets: If passengers are equipped with helmets, helmets will be worn with chin straps secured.

Overwater flight: If all or part of flight is to be conducted over water and emergency landing cannot be effected to land, the pilot will insure all passengers and crew are provided flotation equipment and are familiar with the location and general use of all life support equipment and methods of egress from aircraft after water contact.

Parachutes: If parachutes are required, each passenger will be instructed in the operation of the parachute equipment and know the location and proper operation of emergency exits and will be assigned a particular emergency exit.

Survival equipment: Insure that all passengers are familiar with location and general use of all survival equipment (radios, etc.).

Fire extinguishers: Insure that the passengers know the location and proper operation of fire extinguishers.

Clothing: Sleeves of shirt will be rolled down during entire flight. Gloves, if available, will be worn.

Hearing protection: Insure that all passengers without helmets wear earplugs or circumaural protectors.

Protective masks: If toxic chemicals are carried inside aircraft, all passengers will have protective masks readily available which have been adjusted and fitted prior to takeoff.

Weapons and ammunitions:

- No loaded weapons will be carried aboard aircraft.
- Passengers will not fire from aircraft.
- Explosive devices (grenades, etc.) will be properly secured.
- No foreign ammunition will be carried on aircraft unless cleared by EOD team.

Refueling: Passengers must offload during refueling and remain at least 50 feet from aircraft.

Security of equipment:

- All equipment not attached to person or in hands shall be secured. Unsecured equipment may become a missile during a crash sequence.
- Placing hard or sharp objects under troop seats may cause injury to passengers in a crash sequence.
- Extended radio antennas (back pack and vehicle) must be kept well clear of rotor system.
- Loose equipment not secured around landing pad or field may be sucked up into rotor system or engine intake, causing damage.
- Caution passengers on throwing anything from aircraft while in flight or on ground. This could make contact with rotor system, causing damage.

Body position (for emergency landings): Bend forward at the waist with feet planted firmly on the floor. The chest rests on the knees and the position is held by enfolding and locking the arms around and behind the thighs with the hands.

Offloading:

- Under normal conditions, wait until word is received from crewmember.
- Under emergency crash condition, offload as soon as possible, aid injured personnel, and move away from crashed aircraft to avoid possible aircraft fire.

Regardless of the method used to brief passengers, the important thing is that they **are** briefed—before every flight. It's your legal and moral responsibility. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft hit wires during takeoff from field site and crashed. Wires were not marked on the unit's or the pilot's hazard maps. 8313

UH-1 Class C mishaps □ (H series) Main rotor blades hit tree during NOE flight, damaging both blades. □ (V series) As aircraft was hovering to parking spot, crewmembers were signaled by ground personnel. Aircraft was immediately shut down. Vertical fin tail rotor drive shaft cover had not been secured, had blown open, and was damaged. Caused by inadequate preflight inspection. IP was trying to expedite his training flights because of an impending thunderstorm.

UH-1 Class E mishaps □ (H series) Aircraft pitched up and to right during hydraulic test. Abnormal pressure was felt from right forward quadrant. Hydraulic switch was turned back on and control regained. Caused by malfunction of cyclic servo. □ (H series) Ground unit did not police LZ after use and left empty sandbag. Sandbag blew up through rotor system as aircraft was taking off. □ (H series) Crew heard grinding noise from transmission pylon area. Master caution and hydraulic lights came on. Feedback and stiffness were felt in controls. Running landing was made. Cracked T-tube and T-boss fitting caused loss of hydraulic fluid. □ (H series) Engine overspeed during emergency governor operation was caused by hole in gas producer. □ (H series) Rpm could not be maintained during hover. Caused by defective governor solenoid. □ (H series) Transmission oil pressure dropped to zero during takeoff. Caused by defective oil pressure indicator.

UH-60 Class C mishap □ As aircraft touched down, stabilator struck tree stump which was hidden by tall grass. Stabilator skin was damaged.

UH-60 Class E mishaps □ Main module sump light came on during taxi. Caused by failure of main module gearbox. □ Backup pump light came on during landing. No. 1 reservoir low light and first and second stage tail rotor lights came on. Caused by rupture in No. 1 tail rotor servo hydraulic line. Rupture was in an area not serviced by mechanics.

Attack helicopters

AH-1 Class E mishaps □ (S series) Aircraft was flying in total darkness near a ridge. As aircraft was descending to a hover firing position, glare from mortar round, aggravated by a scratched canopy, caused momentary spatial disorientation. Pilot stopped descent at 1,500 feet agl. Copilot called overtorque at 102 percent. Pilot stopped overtorque at 105 percent. □ (S series) Crew heard loud popping noise and aircraft yawed left and right. Suspect compressor stall due to ingestion of asphalt dust in compressor section. Aircraft had just been hovered in asphalt dust cloud. □ (S series) Aircraft began oscillating along roll axis during climb-out. Caused by failure of transducer control.

Cargo helicopters

CH-47 Class D mishap □ (B series) Aircraft was at 3-foot hover. While soldier was trying to mount jungle penetrator, penetrator disconnected from winch cable. Soldier and penetrator fell to ground. Flight engineer did not rig belly hoist in accordance with operators manual.

CH-47 Class E mishaps □ (B series) Transmission chip detector light came on. Caused by ferrous material on transmission chip detector plug. □ (C series) Pilot noticed control problem during flight. On final approach, crew chief detected fuel leak from No. 1 engine manifold drain. Caused by failure of main seal on No. 1 SAS system flow valve and No. 1 engine fuel control case drain seal.

Observation helicopters

OH-58 Class C mishaps □ (A series) Aircraft was about 50 feet above the ground at 40 knots when pilot started shallow right turn. As aircraft crossed a small ridge line, tail kicked up and aircraft began slow spin to right. There was an 8- to 10-knot tailwind. Pilot thought he had an out-of-trim condition and applied left pedal. Rate of spin increased. As aircraft passed through the 90-degree position, pilot realized tail rotor effectiveness was lost. Pilot reduced power and tried to fly out of the spin. This did not work, and aircraft spun around six or seven times. Pilot then entered autorotation and spin stopped. Aircraft landed tail low and bounced before coming to rest upright on 15-degree slope. Rear cross tube was bent. □ (A series) During approach to starting point of NOE route, copilot began left turn. Aircraft began to settle 5 to 10 feet above the treetops. Copilot applied power to stop descent and looked at the instruments to verify his power and rpm. Chin bubble then hit tree. Pilot was looking at his map and was not aware of a problem until he heard the aircraft hit the tree. □ (C series) Main rotor blade hit tree during hover.

OH-58 Class E mishaps □ (A series) Pilot had his door open during rapid refueling operation. UH-60 hovered behind OH-58, and rotorwash caused door to blow open, breaking lower hinge.

(continued on next page)

Mishap briefs

□ (C series) Rotor tachometer generator failed, causing rpm needle to fluctuate during flight.

Training helicopters

TH-55 Class C mishap □ IP was teaching student pilot to hover. With aircraft at 3- to 5-foot hover, student was operating cyclic control and IP had control of collective and pedals. Aircraft pitched nose down. Student jerked cyclic to the rear and leaned left, pushing down on the collective. Tail stinger hit the lane and broke, allowing tail rotor blades to hit the lane. IP pulled in collective, not realizing tail rotor blades were damaged. Aircraft spun to right. Hovering autorotation was made, and aircraft landed upright.

TH-55 Class E mishaps □ Engine quit when IP reduced throttle from 2700 to initiate simulated engine failure. Inspection of fuel servo revealed possible contamination. □ Tachometer needles started dropping and engine ran rough. Caused by cracked No. 2 fuel injector line.

Fixed wing

C-12 Class E mishaps □ (A series) Acrid electrical odor in cockpit was caused by overheated vent blower. □ (C series) Landing gear system failed to retract after takeoff. Caused by defective landing gear motor controller.

OV-1 Class C mishap □ (D series) Lightning struck aircraft as it was descending through 6,500 feet msl. Rudder tip cap, lower fuselage, and UHF/VHF antenna were damaged.

T-42 Class C mishap □ Postflight inspection revealed damage to No. 2 propeller blade tips. Suspect damage occurred during landing when aircraft bounced two or three times.

U-8 Class E mishap □ (F Series) When gear was retracted, nose gear indicator did not show that gear came up. Gear handle was placed in down position, and gear indicated down and locked. Caused by malfunction of nose gear actuator rod end clevis.

Maintenance

UH-1 Class E mishaps □ (H series) After landing to pickup zone, gunner noticed fluid on ground under aircraft. Inspection revealed hydraulic fluid was leaking from cyclic servo. Hydraulic fitting on servo was cross-threaded during installation. □ (H series) Master caution and right fuel boost lights came on. Positive wire terminal was bent and broke in flight on right fuel boost pump, causing pump to stop. Suspect poor connection of wire during maintenance.

UH-60 Class C mishap □ Maintenance personnel left cleaning towel in tail rotor drive shaft tunnel area. When rotor system was engaged, electrical harness was damaged.

UH-60 Class E mishap □ Crew of No. 4 aircraft noticed that No. 3 aircraft had loose IR suppressor strut. Bolt was missing from top of right side strut.

CH-47 Class E mishaps □ (C series) Transmission oil hot light came on. Electrical wires to No. 2 engine transmission temperature bulb and combining transmission temperature bulb were chafed and grounding out. □ (C series) Chafed and frayed generator electrical wire caused both generators to go off line during flight.

OH-58 Class E mishaps □ (A series) Hydraulic caution light came on and hydraulic pressure was lost 15 seconds later. Hydraulic line at filter connection was incorrectly torqued. □ (A series) Airspeed indicator went to 30 knots during takeoff, and smoke came from behind left side of console. Caused by incorrectly installed grommet in landing

(continued on back page)

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	1-30 Mar	**3**	**5**
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**8**	**7**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

light assembly. □ (A series) Crew chief acting as fireguard did not fasten engine compartment door after engine start. Door was slightly damaged during flight. Fireguard was newly assigned.

OV-1 Class E mishap □ (D series) Pilot received gear in transit indication after takeoff. Gear would neither extend nor retract. Pilot used emergency gear extension and landed. Gear dump valve had not been reset on completion of gear selector valve change.

Messages received

• Safety-of-flight emergency message concerning one-time inspection for certain 540 series main rotor blades on UH-1C and M and AH-1 series aircraft (AH-1-83-04, UH-1-83-08, 120200Z Mar 83). Summary: All blades previously reported by the contractor as being acceptable could not be verified as serviceable. All questionable blades will be removed and shipped to CCAD. Contact: Jimmy Simon or Ed Soteropoulos, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300. ■

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

Butane lighter unreliable

A recent TSARCOM maintenance advisory message (ALSE-83-2, 282030Z Feb 83) warns that the butane lighter, NSN 9920-00-999-6753, is unreliable and should be removed from survival vests. Replace the lighter with matchbox, NSN 8465-00-265-4925, filled with matches, NSN 9920-00-985-6891. An alternate match is NSN 9920-00-889-3367, or you may use "strike anywhere" kitchen matches. When placing the matches in the box, be sure to place the heads away from the striker.

Also remove the lighters from cold climate, hot climate, and overwater kits, and replace them with matches. Lighters may be disposed of locally.

This lighter was declared unreliable as a result of a Cat I Quality Deficiency Report (QDR). No more QDRs are required since the lighter has already been removed from service requirements.

Point of contact at TSARCOM is John Abernathy, AUTOVON 693-3112. ■

Somebody goofed!

Adapter, NSN 5120-00-619-9776, used with the power wrench to torque the Huey and Cobra main rotor retaining was cast too thick and won't do the job. The "fat legs" will not seat on the trunnion and will cause the wrong torque reading and possible damage to the rotor mast. So scrap the old one and ask for adapter, NSN 4920-00-432-3316. Continue to use the old adapter socket wrench, NSN 5120-00-619-9779. ■

Cracked SPH-4 helmet shells

Cracked shells of SPH-4 helmets (National Stock Numbers 8415-00-144-4981 and 8415-00-144-4985) are not authorized to be repaired in accordance with TM 10-8415-206-13 and will be disposed of through property disposal channels. If other maintenance and repair are required, write Commander, TSARCOM, ATTN: DRSTS-MCAPL, 4300 Goodfellow Boulevard, St. Louis, MO 63120, or call Mr. Boone Hopkins, AUTOVON 693-3112/3114, commercial 314-263-3112/3114. ■

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Dusty area precautions

US Army Aviation Training Library
Fort Rucker, Alabama 36360

Approaching or taking off from a dusty area can be hazardous at any time, and downright treacherous at night. The accident record shows that Army helicopter pilots are doing a good job of coping with these hazards. However, we can bet on at least one accident a year caused by loss of visual cues in blowing dust. Following are examples of the most recent of these accidents.

• A UH-1 pilot was on a night medevac mission to pick up a patient whose injuries were not serious. To get as close to the patient as possible, the pilot accepted a very dusty airstrip as his landing point. The landing site was selected by an untrained member of a ground patrol. There were grassy areas within 100 meters of the dusty airstrip.

The pilot made a shallow, fast approach to the dusty strip. The searchlight was extended 45 degrees down and forward, and the landing light was retracted and not in use. A cloud of dust engulfed the aircraft, and the pilot lost outside visual contact while still 10 to 15 feet in the air. Unable to judge his speed or altitude because of the dust and glare, the pilot lowered the collective abruptly, resulting in a hard landing.

• Another UH-1, with the copilot at the controls, was on a resupply mission at night. After the supplies were dropped, the copilot flew the aircraft over a landing zone to check the barriers and determine direction for the landing. The aircraft searchlight was on and positioned almost straight ahead. As the copilot began his approach, the pilot warned him that the landing zone was extremely dusty and told him to land to the ground.

As the aircraft neared the ground, the copilot, who had never landed at night to a dusty area, lost sight of his intended touchdown point. He terminated his approach at a 3- to 5-foot hover (contrary to the operator's manual), and the UH-1 was engulfed in a dense cloud of dust. The copilot lost all external visual cues, and the pilot urged him to land the aircraft.

The UH-1 then began to drift to the right. Knowing trees were nearby and aware that the aircraft was drifting toward the edge of the landing area, the pilot took the controls and abruptly lowered collective pitch while the aircraft was drifting over sloping terrain. The right skid hit the ground first, and the aircraft rolled to the right and came to rest inverted.

• An OH-6 pilot had been operating in and out of a dusty landing zone for two days during daylight hours. Several aircraft were parked in the LZ near a trail that was used extensively by ground

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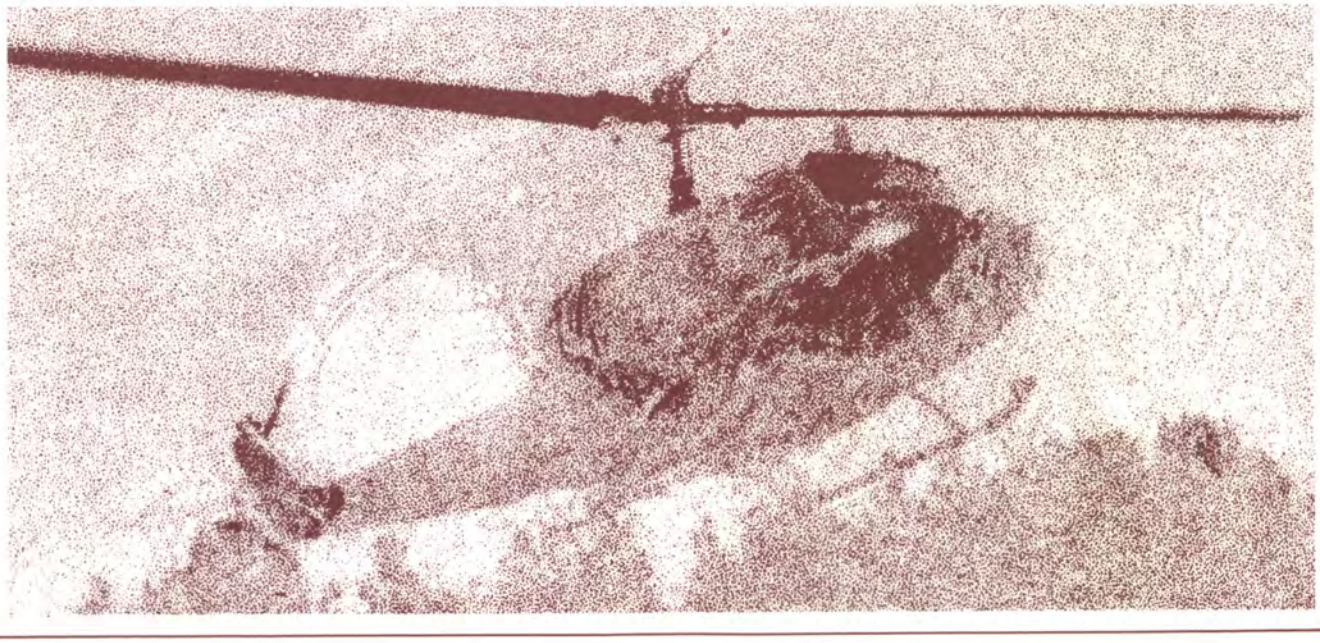

Dusty area precautions

vehicles. Five of the aircraft, including the OH-6, were to be moved at night to another landing zone.

As the OH-6 pilot brought his aircraft to a hover, he immediately lost visual reference with the ground because of the blowing dust created by the rotorwash. The navigation lights were on, but the landing light was off. The pilot turned on the landing light, but the reflected glare caused by the dust further reduced visibility. The landing light was turned off. Instead of landing immediately or making a maximum performance takeoff, the pilot sustained the hover for about 20 seconds. The aircraft drifted into a tree and crashed on its left side.

The windshield of the helicopter was coated with a cleaning compound residue. The pilot and observer cleaned the top half of the windshield during the preflight but left residue on the lower part of the plexiglass. The color and consistency of the residue were similar to the blowing dust, further restricting the pilot's ability to see the ground.

Sometimes it may be necessary to operate in dusty areas, but often there is an alternative. There may be another area within a short distance that would do just as well, as in the case of the medevac pilot. Always check out the alternatives before committing yourself to a dusty area.

If you have to operate in and out of dusty areas, you should be completely familiar with the procedures in your aircraft operator's manual and the following instructions from TC 1-13, Hot Weather Flying Sense:

"**Taxiing instructions.** When it is absolutely necessary to taxi in sand and dust, get the helicopter airborne as quickly as possible in order to minimize sand and dust intake by the engines and the danger of a 'whiteout.'

"**Takeoff.** A running takeoff is preferred for a wheel-type helicopter; otherwise, a maximum performance takeoff is recommended. If rotor blades stir up sand and dust, this maneuver should be executed as rapidly as possible to avoid loss of visual reference and to prevent damage to the engine and flight control system.

"**During flight and descent.** Avoid flying through sand or dust storms, when possible. Excessive dust and grit in the air will cause considerable damage to internal engine parts, excessive bearing wear, and erosion of the rotor blades.

"**Landing.** The best procedure to minimize blowing sand and dust is a running landing. If the terrain does not permit running landing, an approach to touchdown should be made.

"**Caution.** If operation in sand cannot be avoided, landing should be made using an approach angle that is greater than the angle used for normal approaches if a running landing is not possible. The approach angle should be compatible with available power. If a running landing can be made, the touchdown roll should be kept to a minimum to preclude the possibility of overloading the landing gear. All doors and windows should be kept closed during landings and takeoffs to help prevent sand from entering the cockpit and cargo area. These procedures will lessen sand clouds and insure greater visibility. Hovering and prolonged operation in sand should be avoided because unpredictable foreign object damage can result."

By knowing and using correct procedures for operating in dusty areas, you can stay out of that dust cloud. Once you're in it, it's hard to get out with your helicopter, and possibly yourself, intact. ■

UH-1 was engulfed in a dense cloud of dust during approach to landing zone.

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap □ (H series) Aircraft entered instrument meteorological conditions. Pilot initiated vertical helicopter instrument recovery procedures (VHIRP). Aircraft hit a tree, damaging copilot's door, window screen, and left cargo door window. 8314

UH-1 Class E mishaps □ (H series) Crew saw smoke in cockpit during takeoff. Caused by burned electrical resistors. □ (H series) Engine oil temperature rose and engine oil pressure dropped during flight. Caused by failure of thermostat. □ (H series) Master caution and left fuel boost lights came on. Caused by failure of fuel boost pump. □ (H series) Fuel quantity gauge fluctuated for about 10 minutes and then went to zero. Caused by failure of fuel transmitter. □ (V series) While transferring fuel from auxiliary tank to main fuel cell during flight, crew smelled fumes. Postflight inspection revealed fuel leaking from belly of aircraft. Caused by failure of fuel transfer line.

UH-60 Class E mishap □ Stabilator warning horn sounded during takeoff. Caused by failure of linear servo accelerometer.

Attack helicopters

AH-1 Class C mishap □ (S series) Tail rotor blades hit tree during hover. Both blades were dented.

AH-1 Class E mishaps □ (S series) Pilot felt feedback in cyclic and severe lateral vibration during approach. Main rotor pitch change link bearings were excessively worn. □ (S series) Pilot heard unusual noise from engine compartment, and torquemeter began fluctuating. Caused by failure of fuel control. □ (S series) Master caution light came on. Caused by failure of transmission oil pressure switch. □ (S series) Transmission oil pressure reading dropped to 0 and then fluctuated between 0 and 40 psi. Caused by failure of transmission pressure transducer.

Cargo helicopters

CH-47 Class A mishap □ (C series) Details unknown. Investigation in progress. 8315

CH-47 Class C mishap □ (C series) Main rotor blades hit tree during NOE flight.

CH-47 Class E mishaps □ (C series) No. 1 engine chip detector light came on. Caused by defective chip detector plug. □ (C series) Crew chief noted excessive movement and noise in No. 8 drive shaft during flight. Caused by failure of bearing.

Observation helicopters

OH-58 Class C mishaps □ (A series) Copilot engaged starter button. When N_1 rose to 16 percent, copilot rolled throttle to flight idle. N_1 rose to 20 percent with no rise in TOT and remained there. Start was aborted. Finding no reason for the hung start, copilot asked pilot to investigate. Pilot attempted another start and got the same results as the copilot had gotten. A third start was attempted 90 seconds later. N_1 rose to 15 percent and throttle was opened to flight idle. TOT rose rapidly to 1,000 degrees. Throttle was in flight idle position for about 6 seconds before it was rolled off. Pilot was told that flames continued to come from exhaust stack. Pilot motored starter to bring TOT down to acceptable temperature. Pilot did not delay the third start long enough to allow excess fuel in engine to drain. □ (A series) IP was demonstrating low-level autorotation at night. As he entered autorotation, IP applied excessive rear cyclic, causing aircraft to balloon slightly. Because of abnormal tail-low attitude and glare created by landing light, IP applied initial and cushioning pitch too high, causing rotor rpm to bleed below minimum range. On contact with the ground, aircraft rocked forward, causing severe spike knock and pylon whirl. Aft fuselage section buckled and tail boom was bent.

OH-58 Class E mishaps □ (A series) Transmission oil hot light came on. Caused by broken wire to sensing unit. □ (A series) Rotor tachometer dropped to zero during landing. Caused by failure of tachometer generator. □ (A series) Rpm low light came on during takeoff. Caused by failure of governor. □ (A series) Pilot encountered heavy snowshower shortly after leaving field site and landed immediately. During coastdown of main rotor system, gusty winds caused main rotor stops to contact mast.

Fixed wing

OV-1 Class E mishap □ (D series) No. 2 generator, No. 3 inverter, and master caution lights came on. Caused by excessively worn accessory gearbox bevel gears.

U-21 Class C mishap □ (JU-21A) As aircraft was taking off, two dogs started across runway. Larger dog stopped on runway centerline. IP used full reverse and maximum braking, and aircraft

stopped about 20 feet from dog. Foreign object damage to propeller was found on return to home base.

U-21 Class E mishaps □ (A series) Engine would not start after demonstration of autofeather system. Caused by failure of engine igniter. □ (A series) Aircraft began left rolling motion during descent. Pilot placed flap selector switch in up position. Crew verified that all flap panels were up, with the exception of the right inboard at approximately 25 percent. Aircraft was landed without damage. Caused by defective actuator. □ (A series) Fuel was seen siphoning from rear of inspection plate on top of No. 2 engine. Single-engine landing was made. Caused by failure of gasket.

Maintenance

UH-1 Class E mishaps □ (H series) Crew noticed sparks in left chin bubble during flight. Chafed wiring bundle had shorted out. Clamp was not used to prevent chafing. □ (H series) Fire warning light came on. Loose cannon plug backing plate allowed moisture to enter plug, resulting in grounding condition.

UH-60 Class E mishap □ Severe vibration was felt as collective was increased during takeoff. Upper flap stop failed to disengage at full rpm for flight because of corrosion.

AH-1 Class E mishaps □ (S series) Forty-two-degree gearbox chip detector light came on. When crew chief put gearbox cover on, he caught chip detector wire under the cover, causing a short. □ (S series) Master caution and transmission chip detector lights came on. Caused by loose chip detector wire.

CH-47 Class E mishap □ (C series) After takeoff, pilot noticed change in engine sound and increase in rotor rpm and No. 1 engine torque. Minimum beep was out of adjustment.

OH-58 Class E mishap □ (A series) Engine oil bypass light came on, and mechanic saw puddle of oil on compass rose. Stripped threads at accessory drive gearbox allowed nipple tube/restrictor assembly to blow out under pressure.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**3**	**5**
3rd Qtr	April	7	6	1-6 Apr	**2**	**0**
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**10**	**7**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Safety-of-flight maintenance mandatory message concerning one-time inspection of flight controls—directional control lever assembly (UH-60A-83-02, 231430Z Mar 83). Summary: Several occurrences have been reported of bearings shifting laterally in the lever housing. The attaching control rods capture the bearings; however, the shifting of these bearings could cause chafing damage of the mating parts. Consequently, an inspection for shifting of the bearings and damage to mating parts is required. If inspection indicates that bearings have shifted or that there is surface damage due to rubbing of the mating parts, repair is required. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-use message concerning potential operator safety hazard on AH-1S aircraft equipped with the laser augmented airborne tow telescopic sight unit (TSU) (SOU-AH-1-83-01, 182030Z Mar 83). Summary: Two instances have been reported with improperly manufactured/installed laser filter wheels in the TSU. Aircraft will be inspected to determine if they are equipped with the TSU, P/N 3234-001-123. Contact: Jimmy Simon or Ed Soteropoulos, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning several corrosion preventative maintenance requirements for the AH-1 (MIM-83-AH-1-MEA-02, 221630Z Mar 83).

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

Landing gear briefs

Fixed wing aviators, mechanics, and quality control personnel, take a few minutes to review the following selected FY 83 landing gear mishaps. Some of these could have been prevented if better preflights/postflights had been conducted, more detailed inspections performed, and adequate quality control procedures followed.

U-21A - Class E ☐ Nose gear would not fully retract after takeoff. **Caused by binding nose gear actuator.**

U-21A - Class E ☐ Right main landing gear down light did not illuminate when gear was lowered. Tower personnel indicated gear appeared to be down and aircraft was landed. **Caused by broken wire on down-lock switch.**

U-8 - Class E ☐ Right main landing gear actuator failed in intransit mode, preventing full extension of gear and allowing it to collapse during landing. Aircraft slid off runway. **Gear failure was the result of accelerated wear caused by incorrect assembly.**

U-21A - Class E ☐ Left main landing gear did not indicate down and locked during approach. Gear was manually extended. **Caused by failure of down-lock switch.**

C-7 - Class E ☐ Steering control was lost during taxi. Leak in nose gear area **was caused by split in steering actuator hydraulic hose.**

U-21A - Class E ☐ When gear was lowered for landing, right main gear light would not come on. Visual check by tower personnel revealed gear appeared to be down. Landing was made without incident. **Gear-safe switch was out of adjustment.**

U-21A - Class E ☐ Nose wheel steering was ineffective during taxi. **Caused by excessively worn steering link assembly.**

U-8F - Class E ☐ Landing gear would not retract fully after takeoff. Gear was pumped down and aircraft landed. **Caused by stripped splines on spur gear.**

U-8F - Class E ☐ Right main gear indicated unsafe on downwind leg. Gear was manually extended but still indicated unsafe. Tower personnel indicated gear appeared to be down, and aircraft was landed. **Caused by excessive torque on clevis bolt.**

U-8F - Class C ☐ Nose gear did not indicate up during after-takeoff check. Gear was recycled numerous times, and nose gear did not indicate up or down. Nose gear collapsed during rollout. **Inspection revealed clevis broke at bolt where clevis attaches to end assembly of nose gear actuator.**

U-8F - Class E ☐ When pilot placed landing gear handle in down position, left main gear indicated in transit. **Caused by broken wire from main gear down-lock switch to gear indicator.**

U-8F - Class E ☐ Left main landing gear did not indicate down. Emergency procedures were accomplished, and aircraft was landed. **Caused by broken wire to landing gear indicator.**

C-12A - Class C ☐ Gear control handle was placed in up position after takeoff. Crew heard noise and red light in gear control handle remained on. When gear control handle was placed in down position for landing, handle light remained on. Crew heard noise that sounded as if gear motor started and then stopped. Manual gear extension handle could not be pushed down. Aircraft was landed gear-up on foamed runway. **Cause unknown at this time.**

RV-1D - Class E ☐ Right main gear indicated unsafe after takeoff. **Caused by overserviced strut.**

RV-1D - Class E ☐ Landing gear would not retract when gear handle was placed in up position. **Suspect valve linear direct control landing gear dump was left unseated.**

C-12C - Class E ☐ Red gear handle lights would not extinguish when gear handle was placed in up position. **Nose gear actuator device assembly was out of adjustment.**

C-12C - Class E ☐ When gear handle was placed in up position after takeoff, red lights came on. **Gear-up limit switch was out of adjustment.**

If you have questions or comments on landing gear problems, call MAJ Ron Isbel or MSG Len Read, Army Safety Center, AUTOVON 558-4198/4202. ■

Shortfax

Suspected contaminated water

Change 1, NAVAIR 13-1-6.5, dated January 1983, page 10-4, contains the following warning:

WARNING - Canned water dated 1953 and 1962 is suspected to be contaminated and should be replaced.

For more information, contact the DARCOM Project Office for ALSE, AUTOVON 693-3307. ■

ALSE pamphlet available

The DARCOM Project Officer for ALSE (DRCPO-ALSE) is finalizing and updating the ALSE pamphlet. Please call Sue or Linda at AUTOVON 693-3307 and give them your address and the number of copies you will need or, if you prefer, send a self-addressed official label to Commander, U.S. Army TSARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Boulevard, St. Louis, MO 63120. Identify the number of copies needed in the lower left-hand corner. ■

Share your successes . . . your problems, too

Want to see your name in print? Need help in solving a safety problem? Found a solution to a problem? Would you share your solution?

Most problems are not peculiar to just one unit or installation. Someone else out there may need your help or may have already solved your problem. We'd like to get a column started on contributions from the field. So please take a few minutes to jot down your problems, solutions, ideas, or personal experiences you would be willing to share. You don't have to send a polished article. Just put your thoughts on paper. We'll do the polishing.

The purpose of FLIGHTFAX is to prevent accidents. We need your help to do this. Send your contributions to Commander, U.S. Army Safety Center, ATTN: FLIGHTFAX, Fort Rucker, AL 36362. ■

Problem with refueling receiver latch tools

Some units, particularly those in cold weather areas, have been having a problem with the latch tool, P/N 745009-1, attached to the UH-1 closed circuit refueling receiver. The latch tool is used when gravity refueling.

After a period of time, the black plastic latch tool starts to break up. Plastic chips collect in the throat opening of the refueling receiver. The breaks appear to start at the holes where the wire rope assembly passes through the latch tool.

If you are having this problem with your UH-1s, send a Quality Deficiency Report to TSARCOM, ATTN: DRSTS-ME, 4300 Goodfellow Boulevard, St. Louis, MO 63120, with a courtesy copy to Commander, U.S. Army Safety Center, ATTN: PESC-SS, Fort Rucker, AL 36362. ■

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US Army Aviation Training Library
Fort Rucker, Alabama 36360

Real aviators don't read dash 10s

Real aviators

• Never read dash 10s: "Everyone knows the dash 10 is for nurds. Safety is for sissies."

• Don't believe in briefs, debriefs, or checklists: "Whoever learned about flying by talking about it?"

• Don't believe in preflights (unless someone is watching them): "This aircraft has had its daily, hasn't it? If it flew in, it'll fly out."

• Always have nicknames like Sluggo, Speedy, Ace, Dusty, Ski, or Big (anything).

• Never write up gripes: "Leave those for the nuggets."

• Always have personalized flight gear, to include the mandatory helmet lightning bolts and nametags with Sluggo, Speedy, Ace, Dusty, Ski, or Big (anything) on them.

• Always add at least 1,000 hours to their flight time when in a bar (2,000 if females are present).

Recommended real aviator diet

Breakfast
• Bowl of cigarettes
• Gallon of coffee (add sugar if night flying tonight)
• ½ dozen donuts (except if flight physical within 2 weeks)

Lunch
• 2 or 3 Hershey bars (must be consumed during climbout)
• Diet Pepsi

Supper
• 2 TV dinners
• ½ gallon Baskin-Robbins
• 1 pitcher of margaritas (salt on glass mandatory)

Real aviators

• Never submit dash 10 changes: "They should have written it right in the first place. Why change something I ain't gonna read anyway?"

• Always log all their night time as instrument time.

• Never memorize all those niggly limitations: "They wouldn't have painted little white and red stripes on the gauges, right?"

• Think crew rest is when the autopilot is on.

Things you'll never find in a real aviator's flight suit

1. Dash 10 pocket checklist
2. TCA, sectional, or any other **current** chart
3. Earplugs
4. Flashlight (real aviators don't fly at night)
5. Flight gloves (who wears flight gloves?)

10 things you'll always find in a real aviator's flight suit

1. Screwdriver or a "Snoopy" dzus key
2. Twelve-bladed Swiss Army knife complete with Phillips screwdriver
3. Butane lighter
4. 10-year-old Falcon Code list
5. Vick's nasal spray
6. 4 old Contac s
7. 2 Caesar's Palace poker chips
8. Little black book alphabetized by cities with good country-western bars adjacent to AAFs
9. Program from last year's AAAA Convention
10. Dice cup

Real aviators

• Don't believe in DD-175s; they file in flight.

• Don't believe in TCAs and all that other ATC garbage: "It's my word against some controller, and, after all, I'm the **real aviator**!"

• Don't study tactics: "Leave that for the eggheads and ground-pounders in Washington."

Squadron positions

Real aviator

• Maintenance test pilot ("I can really wring it out . . . push it to the limits.")

• Stan pilot ("He got it started, out and back, and shut down without looking at the book once. He done real good!")

• Instrument check pilot ("He remembered it was white on top, black on the bottom for the whole hop. He done sorta good.")

Real aviators

Dash 10 reader

Commanding officer ("Doesn't fly enough to be a **real aviator**.")

Executive officer ("Too worried about setting a good example to be a **real aviator**.")

Safety officer ("Real Pansy.")

Maintenance officer ("Spends far too much time preflighting.")

Administrative officer ("Ever heard of a **real aviator** who pushed paper?")

Operations officer ("He's too worried about whether he divulged any classified info on his last phone call.")

Flight surgeon ("You must be kidding!")

Real aviators

- Never exercise: "You only have X amount of heartbeats . . ."
- Never fool with instrument hoods: "It interferes with my scan."
- Never report overspeeds, overtemps, overtorques, etc., because **real aviators** "never have overspeeds, overtemps, overtorques, etc." Besides, "some four-eyed engineer has added a fudge factor."

Real aviator vocabulary and cliche' guide

"Gizmo(s)"

"Doodad(s)"

"It came off my hand, Sarge."

"I swear it never came close to redline."

"You have to go out, you don't have to come back."

"What do you mean I need an alternate?"

"If he knows so much, how come he's not a flier?"

"Name me someone who doesn't blow a tire now and then."

"Mayday"—a term used by doctors in Cessnas and Air Force transport drivers.

Real aviators

- Don't believe in aerodynamics; they just "cob it."
- Always wear rings while flying (except wedding rings on cross countries).
- Always plan their annual leave during dash 10 evaluation.

What do they do when they get out?

Real aviators	**Dash 10 readers**
Crop duster	Airline pilot
Bush pilot	FAA consultant
Air America (etc.) pilot	NTSB investigator
Used car salesman	Insurance salesman
Bookie	Stockbroker
Numbers runner	Banker
Stuntman	Department store floorwalker
Get bolder	Get older

Real aviators

- Never go around.
- Never go around thunderstorms.
- Never go around anything.

Famous last words by real aviators

"Just throw it in the back there."

"It's better to die than look bad."

"If it's not leaking a little, this isn't a real (fill in aircraft type)."

"It's probably just the gauge."

"The weather was fine when we took off."

"Let me show you how it's really done!"

"Hugging the ground really develops my flying skills."

"What mountains?"

"I've got this route memorized."

"We can go a little further if we just (pick one)":

- Lean out the mixture.
- Pull one out of FLY.
- Feather No. 1.
- Get it down in ground effect.

"If this SOB will hover, it'll fly."

"You've got it!!!"

"OK, No. 3, we're not going to make it. Tuck it in and let's look good!"

Commander's guide for accident investigation report endorsements

"He was our best pilot . . . a **real aviator.**"

—adapted from APPROACH

Status of pyrotechnics

Following is a list of all lots of pyrotechnics with Department of Defense Identification Codes (DODIC) L117, L118, L119, and L275 currently suspended, restricted, or assigned priority of issue by TB 9-1300-385-1 and 2, TWO 24-AA-ORD-010, and TO 11A-1-1.

DODIC	Lot	Type of suspension	Status
L117	PAL-2-30	PSIU	Demil
	PAL-2-31	PSIU	Demil
	PAL-2-32	PSIU	Demil
L118	16-ESC-67	PSIU	Demil
	25-ESC-67	PSIU	Demil
	5-PAI-1066	PSIU	Inspect 100%
	14-PAI-66	PSIU	Demil
	15-PAI-66	PSIU	Demil
	26-PAI-1266-104	TSIU	Pending investigation
	102-PAI-1967	PSIU	Demil
	1-PAI-1969	PSIU	Demil
	1-PII-1969	PSIU	Demil
L-119	MBA-5-4	PSIU (Condition Code H)	
	MBA-5-14	Training use only	Test, see T.O. 11A-1-1, Change 2
	MBA-5-14a	Released for issue and use	Release #4506
	MBA-5-18	PSIU (Condition Code J)	
	MBA-5-19	Released from temporary suspension	Release #4505
L275	All stock manufactured prior to Jan 60	PSIU	Demil
	All Kilgore (K) lots manufactured in 1960	PSIU	Demil
	All Harvell-Kilgore	PSIU	Demil

DODIC	Lot	Type of suspenson	Status
L275	(HK) lots manufactured in 1962		
	All Propellex (P) lots manufactured in 1969, 70 or 72	Assigned priority of issue unless otherwise suspended/restricted	
	16-FND-0470	Training use only	
	22-FND-0670	PSIU (Condition Code H)	Demil
	HK-1-0363	PSIU	Demil
	HK-48-0663-195	Training use only	
	4-HK-1964	PSIU	Demil
	4-HK-1066	PSIU	Demil
	9-HK-0965-104	Training use only	
	20-HK-0367	PSIU (except emergency combat)	
	31-HK-0367	PSIU (except emergency combat)	
	31-HK-1266	PSIU	100% Inspect
	40-HK-0365-195	PSIU	Demil
	78-HK-0263	PSIU	Demil
	85-HK-0565-195	PSIU (Condition Code H)	Demil
	90-HK-0565	Training use only	
	111-HK-0767	Training use only	
	111-HK-1967	Training use only	

DODIC	Lot	Type of suspension	Status
L275	132-HK-0867	PSIU (See test in T.O. 11A-1-1, Change 2)	100% Inspect
	135-HK-0867	Training use only	
	135-HK-1967	Training use only	
	91-HK-0667	Training use only	
	1-KC-0672	PSIU	Demil
	2-KC-0577	(Condition Code A)	Release #4371
	5-KC-1170	Training use only	
	8-KC-1971	PSIU	Demil
	9-KC-1073	(Condition Code A)	Release #4346
	9-KC-1971	PSIU	Demil
	12-KC-0974	Training use only	
	13-KC-0971	PSIU	Demil
	14-KC-1173	Training use only	
	16-KC-1971	PSIU	Demil
	21-KC-1274	(Condition Code J)	
	90-KC-0667	Training use only	
	91-KC-1967	Training use only	
	96-KC-0767	Training use only	
	97-KC-0765	Training use only	
	97-KC-0767	Training use only	

DODIC	Lot	Type of suspension	Status
L275	111-KC-1967	Training use only	
	114-KC-0767	PSIU	Demil
	115-KC-0767	PSIU (except emergency combat)	
	117-KC-8/67/0	PSIU	Demil
	119-KC-0867	(Condition Code B)	
	123-KC-0867	PSIU (See test in T.O. 11A-1-1)	100% Inspect
	132-KC-1967	PSIU	100% Inspect
	134-KC-0867	PSIU	Demil
	135-KC-1967	Training use only	
	6-KC-0777	Training use only	
	3-P-0969	PSIU	Demil
	11-P-0371	PSIU	Demil
	12-P-0371	PSIU	Demil
	12-P-0569	PSIU	Demil
	16-P-69	PSIU	Demil
	17-P-0769	PSIU	Demil
	31-P-0771	PSIU	Demil
	73-P-1271	PSIU (Condition Code J)	
	12-F-0569	PSIU (Condition Code H)	
	KGM-1-5	PSIU	

TSIU - Temporarily suspended from issue and use
PSIU - Permanently suspended from issue or use
DEMIL - Demilitarization authorized

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Main rotor blade struck tail rotor drive shaft cover during shutdown, severing drive shaft between 42-degree gearbox and No. 4 hanger bearing. Caused by high winds.

UH-1 Class E mishaps □ (H series) Engine quit as pilot entered low-level autorotation. Caused by failure of electrical solenoid. □ (H series) Unusual noise was heard from engine section during autorotative descent. Caused by failure of transmission quill assembly. □ (H series) Hydraulic boost failed as IP was demonstrating slope landing. Caused by cracked pressure line from hydraulic filter to check valve. □ (H series) High frequency noise and vibration during landing were caused by failure of No. 4 hanger bearing. □ (H series) Pilot was told that fuel or oil was leaking from the underside of his aircraft during takeoff. Caused by defective overspeed governor. □ (H series) Master caution and chip detector lights came on during hover. Caused by tail rotor gearbox malfunction.

UH-60 Class E mishaps □ Aircraft was carrying slingload of four empty fuel drums. One drum swung loose from stack and hit left rear area of aircraft, puncturing hole in tail boom. Collapsible drums were not rigged correctly. They were hooked by one end plate instead of two. □ Master caution and right input module chip detector light came on. Caused by faulty master warning panel. □ Master caution and No. 2 engine chip detector lights came on. Caused by internal failure of engine.

Attack helicopters

AH-1 Class B mishap □ (S series) Aircraft was being used for night vision goggle training. Pilot was wearing night vision goggles with daylight filters. As pilot was attempting low-level autorotation to runway, he allowed aircraft to touch down in tail-low, right-skid-low attitude. Tail rotor hit runway during touchdown and main rotor blades flexed down, severing tail boom. Aircraft then turned 180 degrees during 600-foot slide down the runway before coming to a stop. SIP was late with corrective action. 8316

AH-1 Class C mishap □ (S series) Aircraft hit tree during contour flight, damaging both left-side TOW missile launchers.

AH-1 Class E mishaps □ (S series) Master caution and transmission oil pressure lights came on. Caused by failure of transmission oil petcock valve in oil cooler compartment. □ (S series) Master caution and aft fuel boost lights came on. Caused by failure of pressure switch. □ (S series) Copilot brought aircraft to a hover between two treelines during NOE flight. Aircraft began to settle because of turbulent winds. Copilot added power to check settling condition before contact was made. Overtorque light came on and torquemeter indicated 101 percent. Maintenance inspection after landing revealed no damage.

Cargo helicopters

CH-47 Class E mishaps □ (B series) During approach to confined area, crew chief told pilot that hydraulic line in ramp area was leaking. Caused by cracked elbow fitting. □ (B series) Forward longitudinal cyclic speed trim did not retract as aircraft was decelerated for landing. Caused by failure of speed trim actuator. □ (C series) Loud bang was heard, followed by loss of power from No. 1 engine. Inlet guide vanes failed and were ingested by first, second, and third stages of compressor.

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**3**	**5**
3rd Qtr	April	7	6	1-13Apr	**3**	**0**
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**11**	**7**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

Observation helicopters

OH-58 Class A mishap ☐ (A series) Aircraft was flying about 300 feet above the water 300 to 400 yards offshore. As pilot attempted to stop a slow right turn, aircraft continued to turn to right. Uncommanded turn accelerated into a spin. Pilot could not fly out of the spin, closed the throttle, and entered autorotation. Spin stopped just before aircraft entered the water. Aircraft floated for about 15 minutes and then sank. Both pilots exited the aircraft unassisted and were picked up by nearby boats. 8317

OH-58 Class C mishaps ☐ (A series) Tail rotor blades hit tree during NOE flight. ☐ (A series) Pilot was attempting takeoff to a hover with a gusty tailwind. Insufficient aft cyclic was applied, and nose of aircraft dropped, causing wire cutter to strike ground. Tip of wire cutter was broken.

OH-58 Class E mishaps ☐ (A series) Fumes were detected in cockpit during runup. Caused by overheated console light rheostat. ☐ (A series) Pilot heard loud banging sound immediately after takeoff and saw TOT rise from 650 degrees to 900 degrees for 5 seconds. Caused by failure of pneumatic air line scroll fitting.

Fixed wing

C-12 Class C mishap ☐ (A series) As pilot was turning off runway onto taxiway after landing at night. No. 1 engine propeller hit taxiway light. Two blade tips of propeller were damaged.

OV-1 Class E mishap ☐ (RV-1D) Pilot encountered moderate icing conditions, and about 1 inch of ice accumulated on wings. To maintain level flight at 140 knots required 95 percent N_1. Prior to mission abort, No. 2 engine had suspected ice ingestion and compressor stall. Inspection after landing revealed no damage.

T-42 Class E mishap ☐ Pilot received unsafe landing gear indication. Gear had to be lowered manually. Caused by inoperative landing gear motor.

Maintenance

UH-1 Class E mishaps ☐ (H series) Anti-torque pedal stuck after approximately 2 inches of travel during hover. Caused by overtorqued tail rotor chain clevis bolt, which restricted movement of tail rotor chain sprocket. ☐ (H series) Post-flight inspection revealed 42-degree gearbox chip detector plug had come out during flight. Crew chief incorrectly installed plug when he took an oil sample less than 2 hours before. Unit TI and pilot did not detect incorrect installation.

CH-47 Class E mishap ☐ (C series) During start of No. 1 engine, N_1 would not accelerate beyond 34 percent. Visual inspection revealed cloth particles around intake. Shop rag had been ingested into engine intake. Crew chief left rag in intake, and TI did not see it. Crew chief didn't see it on daily inspection, and pilots didn't see it during preflight.

OV-1 Class E mishaps ☐ (D series) No. 3 inverter light came on and power to SLAR system was lost. Loose connections and moisture on engine ammeter fuses caused 30 amp differential in generator output. ☐ (RV-1D) No. 1 engine compressor stall occurred after level-off. Bleed band adjustment was out of tolerance.

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

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Accident review: inaccurate PPC

Synopsis

The UH-1H was the No. 7 aircraft in a flight of 12. As the pilot was attempting an out-of-ground effect (OGE) hover, engine rpm decreased. The aircraft settled through some trees onto sloping terrain and rolled inverted.

History of flight

An air assault was planned as part of a field training exercise. Twelve UH-1H aircraft, with fire team escorts, left their field site and flew to the passenger pickup point. The passengers and equipment were loaded, and the flight departed for the landing zone. En route, without the knowledge of anyone in the flight, including the air mission commander (AMC) who was flying overhead controlling the exercise, they were joined by another UH-1H which was transporting psychological operations (psyops) personnel and equipment.

About 1 kilometer short of the LZ, the last seven aircraft in the flight went into a masking mode of operation while the first five aircraft discharged their passengers and cleared the LZ. While masking, the No. 8 aircraft lost rpm because of a malfunctioning engine anti-ice valve, and the pilot landed.

About the same time, the crew of the No. 7 aircraft was attempting an out-of-ground-effect hover 100 feet above the ground in the forward part of a clear area over sloping terrain. Twice, the copilot beeped up the engine to regain rpm before the pilot tried to gain some forward airspeed and effective translational lift to recover from the low rpm condition. The aircraft settled into a small clearing in the trees. The left skid toe hit the ground on the upslope side of the aircraft. The UH-1 continued to settle, rolled over, and came to rest inverted. The pilot, copilot, crew chief, and six passengers evacuated the aircraft with no problems.

Considerable confusion prevailed for a while due to the distress call from the crew of the No. 8 aircraft during their landing, the emergency beeper on the survival radio of the crew of the crashed aircraft, and music from a loud speaker system mounted on the aircraft carrying the psyops personnel. This aircraft was flying at 100 feet agl over the area. Also adding to the confusion was the fact that the air mission commander's visible count of the aircraft in the area included the psyops aircraft and caused the AMC to think all his aircraft were accounted for. A radio check finally revealed the absence of No. 7 and No. 8. No. 8's location was known and No. 7 was soon found.

Crewmember experience

The 29-year-old pilot had more than 600 rotary wing flight hours, most of them in the UH-1H. The 28-year-old copilot had more than 200 rotary wing hours, with more than 150 in the UH-1H.

Commentary

The pilot had computed a performance planning card (PPC) earlier that day. However, he failed to consider significant environmental and aircraft gross weight changes which occurred later and which had a direct effect on aircraft performance. Aircraft weight used for the PPC was approximately 700 pounds lighter than the actual weight, and the air temperature was 14° C. higher than existing conditions. Therefore, the crew was unaware of the actual power requirements for the load and environmental conditions present.

During the flight to the landing zone, the crew noticed that an N_2 rpm droop occurred whenever an increase in power was requested. They did not correlate the droop to the load or environmental conditions present. They interpreted it to be a minor problem in the throttle linkage. Since they did not have a current PPC, they did not realize they were operating the aircraft at its performance limitations.

The pilot made the decision to maintain position within the formation while NOE in extremely uneven terrain with a quartering tailwind. This decision put the aircraft in a situation where rotor rpm could not be maintained with the load on board during an OGE hover in downwind conditions. These conditions resulted in the pilot demanding engine power in excess of that available. ■

Shipping container explodes, killing one

Because of the continuing need for targets for AH-1 gunnery training, a unit had acquired 65 jet engine shipping containers from a property disposal office. The containers had been placed in a target storage area.

Thirty-five of the containers were needed for gunnery training which was scheduled for the next week. The officer-in-charge of the detail arranged for eight people, a wrecker, and a 2½-ton truck to drag the containers from the storage area to a location about 200 yards away. From there, they would be taken to the range target area by CH-47 helicopters.

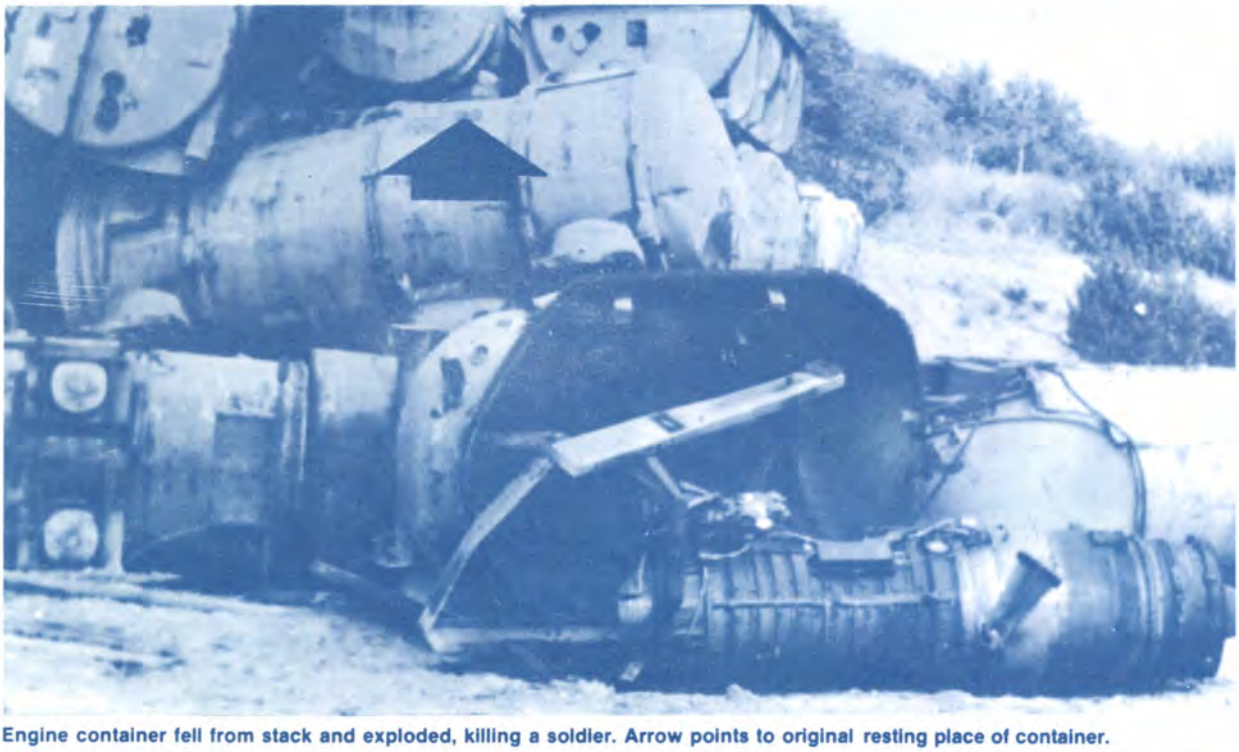
After moving 31 containers, the work detail was watching the wrecker tow away another container. As this container was pulled away, a container on top of the stack fell 9 feet to the ground. The container hit on its end and exploded. The force of the explosion ripped out the 44 bolts which held the top and bottom halves of the container together. The bottom half was supported against the other containers and remained relatively intact throughout the explosion. The top half, weighing about 300 pounds, was propelled through the air. It hit and killed one of the soldiers standing 31 feet away, continued through the air, and came to rest 133 feet from the point of the explosion.

The container that exploded contained an uneconomically reparable/surplus jet engine which was last preserved in 1975. The engine had been operated on AVGAS 115/145. When the engine was preserved, all of the fuel was not removed from the fuel lines and fuel control. The fuel system was not purged with grade 1010 oil preservative according to prescribed procedures.

The container was sealed, pressurized with dehumidified air, and stored. Over the years, the unpurged fuel evaporated and mixed with the pressurized air, forming a highly explosive mixture. When the container fell from the stack and hit the ground, the engine cradle mounts failed, allowing the engine to move within the container and produce a spark which ignited the explosive mixture. Evaluation of the remaining containers revealed that several of them also contained explosive fumes.

Ten engine containers remaining at the property disposal office were checked. Several of them contained volatile air mixtures and at least three contained explosive gas/air mixtures which presented a high explosive potential.

This hazardous condition is possible in any engine that has been processed for preservation in sealed containers. If you have any engines in sealed containers, the engines should be checked in accordance with applicable manuals to determine if they contain explosive mixtures. ■



Engine container fell from stack and exploded, killing a soldier. Arrow points to original resting place of container.

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Postflight inspection revealed buckled right skid. Apparently, skid touched down on imbedded ridged rock or some other protrusion during landing on rocky desert terrain.

UH-1 Class E mishaps □ (H series) Binding in cyclic contol during hover was caused by defective bellcrank. □ (H series) High frequency vibration was felt during takeoff. Caused by worn mast assembly. □ (H series) Feedback in cyclic control during hover was caused by defective left lateral servo. □ (V series) Cargo and crew compartment filled with smoke during takeoff. Inspection revealed oil covering engine casing. Caused by failure of No. 1 bearing seal. □ (H series) Fluctuation of torque gauge and fuel pressure during hover was caused by defective fuel control. □ (H series) Engine oil temperature reached 120° C. during climbout. Thermostat was stuck open, preventing oil from going to oil cooler. □ (H series) When throttle was retarded to engine idle during practice autorotation, rpm warning system did not activate. Caused by failure of rpm warning box. □ (H series) Master caution and transmission oil pressure lights came on during hover. Caused by failure of oil pressure switch.

UH-1 aviation-related mishaps □ As aircraft was being ground handled inside congested hangar, main rotor blade hit rotor blade of another UH-1. □ Main rotor blade had been removed from main rotor hub and was being carried to storage area in crowded maintenance tent. Blade was damaged when it hit workstand.

Attack helicopters

AH-1 Class C mishaps □ (S series) Excessive initial pitch was applied at 15 feet during standard autorotation, decreasing main rotor rpm below effective limits. Aircraft fell vertically from about 6 feet. Main rotor blades flexed and hit upper aft pylon cover and IR suppressor. □ (S series) Tail rotor blade hit tree during NOE flight.

AH-1 Class E mishaps □ (G series) Smoke was seen coming from forward battery vents. Caused by overheated battery. □ (S series) Engine oil bypass and master caution lights came on, and engine oil temperature increased. Caused by failure of engine oil petcock valve in oil cooler compartment. □ (S series) Vibration was felt in flight controls and humming noise was heard. Sand ingestion caused premature failure of oil cooler bearing.

Cargo helicopters

CH-47 Class E mishaps □ (B series) Grinding noise was heard during runup. Caused by failure of forward transmission. □ (C series) Pilot felt vibrations and heard noise during climbout. Caused by internal engine failure. □ (C series) Flight engineer heard and felt high frequency vibration in vicinity of No. 8 and No. 9 synchronized drive shaft. Postflight inspection revealed No. 8 shaft was scored and out of round.

CH-47 aviation-related mishaps □ As rotor blade was being lifted to position for installation on aircraft, balancing rope disconnected. Blade fell to concrete floor. □ Pitch change link was being attached to forward rotor head. Lock-out pin was not safety wired in place and slipped out, allowing blade grip assembly to rotate and damage tie bar assembly.

CH-54 Class E mishap □ (A series) No. 1 generator light and master caution light came on during flight. Generator was turned off and flight continued. Thirty minutes later, loud noises were heard from engine area. Caused by failure of No. 1 generator.

Observation helicopters

OH-6 Class E mishap □ Popping noise was heard, followed by high frequency vibration. Small piece was missing from blade tip of tail rotor blade.

OH-58 Class A mishaps □ (A series) Aircraft was at stabilized hover. When pilot tried to move forward, nose of aircraft began to drift right. Aircraft then spun to right. Spin could not be stopped, and pilot initiated hovering autorotation into trees. Aircraft came to rest on left side. Suspect loss of tail rotor effectiveness. 8318 □ (A series) Aircraft, flying 8 to 10 feet above the trees at an airspeed of 15 to 20 knots, was in a shallow, right turn when banging noise was heard. Aircraft then began to spin to right. Pilot could not stop spin, and tail rotor hit a tree. Aircraft settled to ground. Main rotor blades hit the ground and transmission was ripped loose. 8319

OH-58 Class C mishap □ (C series) Pilot of aircraft No. 3 in flight of 6 rapidly decelerated and started a climb, requiring pilot of No. 4 aircraft to perform rapid evasive maneuver. Maneuver resulted in main rotor overspeed.

OH-58 Class E mishaps □ (A series) As pilot was placing equipment in cockpit, UH-60 running up 50 feet ahead of OH-58 came to hover and moved to right. Rotorwash and high gusty winds bent pilot's door backward on hinge. □ (A series) Pilot heard loud grinding noise from engine compartment. As power was applied to terminate approach, loud bang was heard and aircraft yawed and rolled. Caused by failure of free-wheeling unit.

Fixed wing

C-12 Class C mishap □ (D series) Ice and slush from runway were forced into flap area during landing. Flaps were raised after runway was cleared. Ice caused flaps to buckle.

OV-1 Class C mishap □ (D series) Excessive wheel vibration was felt on takeoff roll. Takeoff was aborted. Left main wheel started smoking as aircraft was taxied to parking area. Left main brake and tire and right main tire were destroyed.

U-8 Class E mishap □ (F series) Loud bang was heard and aircraft vibrated and yawed to right. Noting unusual propeller blade track on No. 2 engine, crew reduced power to 22 inches manifold pressure. Right idle mixture control was closed and propeller lever was pulled into feather. Two propeller blades moved to the feather position, but the third did not. Right propeller continued to rotate between 200 and 300 rpm with propeller lever in feather position. Pressure had to be maintained on propeller lever as unfeathered blade tried to pull the two feathered blades from the feathered position. Propeller control lever had to be physically held in the aft position until aircraft was landed. This reduced the vibrations to a controllable level. The stripped threads in blade grip allowed lock screw to loosen, therefore allowing retaining pin to work out of position. This allowed propeller blade to float free in hub.

Maintenance

UH-1 Class E mishap □ (H series) Pilot noticed egt fluctuating between 0 degrees and 500 degrees during flight. Resistance spool was out of adjustment.

AH-1 Class E mishap □ (S series) Transmission oil pressure gauge fluctuated during takeoff. Caused by loose wire at pressure sensor.

OH-58 Class D mishap □ (C series) Crew smelled strong fuel odor during level-off. All crewmembers had headaches and nausea. Incorrect adhesive had been used on a panel adjacent to heater duct. Bleed air caused adhesive to emit odor into cockpit through heater duct.

OH-58 Class E mishap □ (A series) Engine chip detector light came on during flight. Caused by faulty wiring at terminal connections.

TH-55 Class E mishap □ Three loud bangs were heard and engine rpm decreased. Maintenance inspection revealed No. 1 cylinder top spark plug had come out. It had been cross-threaded on installation.

OV-1 Class E mishap □ (D series) Pilot discovered during flight that No. 1 engine chin cowl inboard lower aft latch was unsecured. Scab patch was applied to chin cowl just forward of inboard lower aft latch assembly. Working rivets on scab patch allowed enough free play for latch hook to vibrate over and disengage from latch bar.

U-21 Class E mishap □ (D series) Oil was seen coming from No. 1 engine cowling during flight. Crew chief left oil reservoir cap unsecured after taking oil sample.

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**3**	**5**
3rd Qtr	April	7	6	1-20 Apr	**3**	**0**
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**11**	**7**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Safety-of-flight technical message concerning final update status of actions to restore operational readiness capability of CH-47 fleet (CH-47-83-02, 041900Z Apr 83). Summary: Message reports on status of the CH-47 fleet, transmission requisitioning procedure changes, and deactivation of the readiness action team. Contact: LTC Leroy Horvath, AUTOVON 693-2896, commercial 314-263-2896.

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

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL36362 □ STACOM 90 □ 20 Apr 1983

Marginal WX - Deteriorating WX - IMC

A recent Class B accident resulted in a tree strike after the aircrew encountered inadvertent IMC. The crew was on an authorized NOE mission and initiated a vertical helicopter instrument recovery procedure (VHIRP) as soon as IMC was encountered.

There followed an instance of clear weather, with maneuvering to avoid a hill, a return to IMC, and the tree strike.

Without second-guessing the PIC or determining culpability for the accident, let's look at the prevention lessons indicated by this accident.

Unit SOPs and training programs should spell out alternatives available to the aviator who encounters deteriorating weather conditions. As a minimum, these alternatives should include the following:

■ VHIRP available when operating in an unauthorized NOE area and IMC is encountered.

■ ATC changeover procedures from VFR to IFR flight when on a routine administrative flight and further flight under VFR cannot be accomplished.

■ The aviator should also be made aware of the fact that he can make a precautionary landing when confronted with deteriorating weather and await improved conditions.

The latter course of action can be the best choice but is too often not taken. Some reasons are as follows:

■ A PRAM has to be initiated.

■ A precautionary landing makes the unit look bad.

■ The commander will not look favorably upon such a course of action.

■ Peer pressure (fear of ridicule from fellow aviators).

■ Get-home-itis.

Of the 58 Class A accidents recorded in FY 82, there were 5 wire strikes, 2 IMC accidents, and 1 tree strike. We know that weather was not a factor in all of these accidents, but where weather was a contributing factor, the accident could probably have been avoided by a timely executed precautionary landing before being caught in the soup.

STACOM 57, 18 June 1980, details one aviator's mission which was interrupted by heavy snowshowers. He was forced to make two precautionary landings, encountering delays of 40 and 35 minutes while waiting for conditions to improve. We do not know if his supervisors and peers presented him with an ATTABOY or a DELTA SIERRA, but it takes far less effort to fill out one PRAM than a batch of 2397s. ■

Common ARMS Deficiencies

A review of recent Aviation Resource Management Surveys (ARMS) indicates that unsatisfactory evaluations are usually the result of the following recurring deficiencies (listed in descending order of occurrence).

■ Premission planning.
■ Emergency procedures.
■ Aircraft limitations.
  Engine overspeeds.
  Rotor overspeeds.
  Wind limitations.
  Center of gravity (CG) limitations.
■ Night flight subjects.
■ Aircraft systems.
■ Low-level autorotations.
■ Improper power checks.
■ Improper use of checklist.

Common deficiencies concerning unit aviation management noted during ARMS are as listed below:

■ Maintenance management.
  Inadequate FOD programs.
  Aircraft scheduling not coordinated with maintenance section.
  Lifting devices not inspected on schedule.
■ Individual Aircrew Training Folders (IAFT) not properly maintained.
■ AAPART checkride grade slips and evaluations not properly executed.
■ Individual Flight Records Folders (IFRF) not properly maintained.
  Medical Recommendation for Flight/Grounding (DA Form 4186) not used properly.
■ Tactical training.
  Poor programs.
  Inadequate scenarios.
  No SOPs. ■

Change to OH-58A Checklist

Change 15 to TM 55-1520-228-CL (OH-58A) has been distributed. The "before starting" and "starting" procedures have been changed significantly. The -CL change should not be used until the corresponding change to TM 55-1520-228-10 has been received because all of the "how-to" information is in the -10 change. ■

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.

CH-47 cabin windows lost in flight

Investigation has revealed that installation of the wrong seals and seal fillers on CH-47 cabin windows has resulted in the windows separating from the airframe during flight. Incorrect installation procedures can also result in window loss and inability to release the window in an emergency.

Two types of windows are now in the field. The older type is being replaced on an as-needed basis with a newer, thicker windowpane and larger diameter seals. Each type window has certain seals and seal fillers that must be installed with that type window only. Examination of TM 55-1520-209-23P-1, page 161, figure 27, item 105, shows that the seal filler, P/N 114S2901-15, is the wrong one to be used with the windowpane and seal shown (items 107 and 108). Seal filler, P/N 173S2904-5, should be used instead.

Because there is probably some old type windows and seals still in some units' supply, the possibility of intermixing seals and windows is likely. For the old type windowpane, P/N 114S2721-5, use seal, P/N 114S2901-16, and seal filler, P/N 114S2901-15. For the new type windowpane, P/N 173S2904-3, use seal, P/N 173S2904-4, and seal filler, P/N 173S2904-5.

Installation procedures for the two types of windows are different. The procedures currently in the CH-47 maintenance manuals are for the old type windows and seals. Basically, the difference is in the installation of the seal. The seal, P/N 114S2901-16, for the old type window is fitted to the airframe and **must** be cemented to the airframe skin. If not cemented to the airframe skin, the window could be lost during flight.

The seal, P/N 173S2904-4, for the new type window is **pressure fitted** to the airframe skin and **must not** be cemented to the skin. If cemented to the airframe skin, the window will require excessive force to be pushed out after removing the seal filler in case of an emergency.

These different procedures will be included in future changes to the maintenance manuals.

Also, some CH-47 units have received and are installing a new "bubble type" cabin window in accordance with U.S. Army Aviation Research and Development Airworthiness Release dated 17 November 1982. The new windows, P/N 4145-2916-2, should be installed with seal 173S2904-4 and seal filler 173S2904-5 only. Use of the other seals and seal filler will result in loss of the window during flight.

The next time you install or replace a CH-47 window, be sure to use the correct seals and installation procedures for the type window you are installing.

Point of contact at the Safety Center on CH-47 window problems is SFC James Wheeler, AUTOVON 558-4198/4202. ■

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Do your habit patterns work for or against you?

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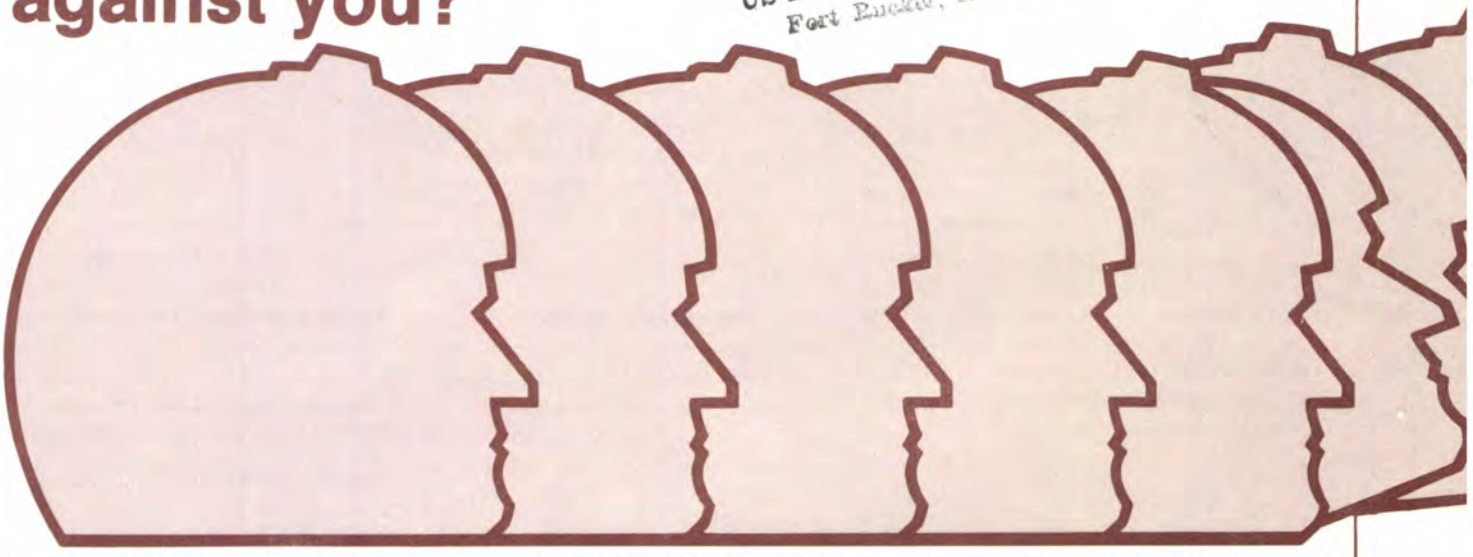


Humans are creatures of habit. We are better at doing the things we have done repeatedly, and we often fall back on old habit patterns in a crisis.

Flying is a habit-oriented process. Ideally pilots like flying to go step-by-step, by the numbers as it has many times past. Often, pilots use their habit patterns to their advantage; but too many times habits produce unwanted results. Here are some common, and probably familiar, examples.

The first time a habit pattern "bit" me was during pilot training when I was trying to develop habit patterns. One of my habits was to do my pretakeoff checklist at a certain point on the taxiway for each runway. Just as luck would have it, the day of my contact checkride the taxi routing was changed because of construction, and guess who busted his checkride for not accomplishing his before-takeoff checklist. Pretty dumb, right? Well, maybe not. . . .

What about the flight lead who almost always flies as number one or number three? The day he's number two, he crosses under to the outside of a three-ship rather than the inside, so the flight ends up echeloned 1-3-2! There are some more subtle examples.

You're approaching initial with your formation echeloned left for the anticipated right break you've always done, when the tower controller says, "Winds two two zero at twelve, altimeter two niner eight zero, expect left break for runway two one left." You hear everything but "left break." Your mind hears just what it expects and tunes out everything else. It may take longer to perceive an unfamiliar element added to a familiar message, and you may not perceive it at all.

What causes these mistakes? We are creatures of habit for both physiological and psychological reasons. We have been trained at the basic animal level to do some of the things we do. In many cases, our habits result from the same conditioned response type training used for laboratory rats and monkeys. Perform in the proper manner and you will be rewarded. Find a way to remember the pretakeoff checklist and you'll pass.

Psychological study tells us that we remember better those things we have repeated numerous times before, like the items we always do in the after-landing checks. Subconsciously, the mind is stimulated by the familiar more readily than the unfamiliar, e.g., hearing only the part of the transmission we expect to hear.

Psychologists also say each individual's personality may affect his propensity to adapt. People have personalities varying from rigid to flexible which affect their reactions respectively. All these human traits (plus more) not only affect but many times determine the way we act under given circumstances.

Habits frequently help pilots during time-critical or task-overload situations.

(continued on next page)

Habit patterns

Not having to think about actions in a traffic pattern such as what to do if you're too fast, too slow, too high, or too low comes in handy when you're trying to cope with an in-flight fire. You already know what to do out of habit. This is because habit actions use the cerebellum which is fast reacting, and not the cortex which is available for other thoughts. However, your habits can bite you in other ways during the same in-flight emergency.

Let's say during those hundreds of previous traffic patterns you always configured for landing in the same place. Now an in-flight fire occurs just before you would normally configure; so you don't configure in the normal place, because you're busy coping with a critical situation. Do you think you'd tend to land gear up? Of course you would.

We can't change ourselves, so what can we do about it? We could just throw up our hands and say we're all human so we're going to make these mistakes.

You could say that, but, personally, I'm enjoying myself here, and I'd like to minimize those mistakes. Recognizing that we can and do react habitually is the first step to fighting this dilemma. I recognize it because I've seen all these mistakes made, and I don't believe they were made intentionally. Once you admit you are likely to make mistakes as a result of habit, there are a few ways you can be on guard and minimize those mistakes.

As in many other aspects of flying, a good rule of thumb is watch "flight complacency." There are many things we do automatically while flying. Some things are done automatically because of task loading. That's fine and we all need to be able to do that; but be on guard for doing things without thinking about them when you aren't busy doing anything else. **Fight complacency.**

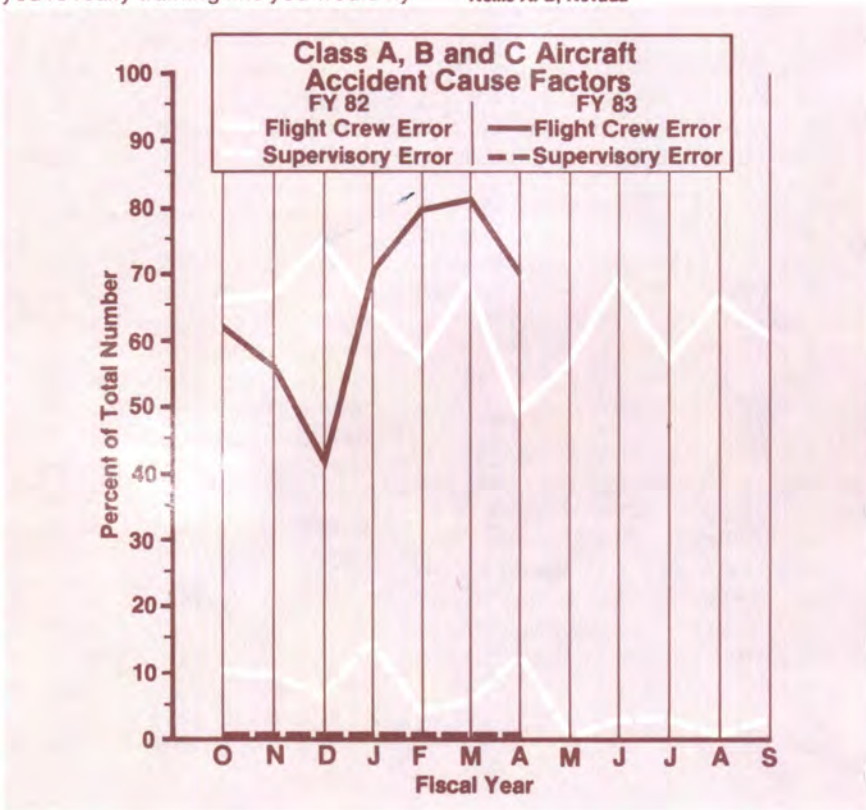
On the ground, periodically reevaluate your habit patterns. Things you ought to flag are checklist, procedural changes, etc. If you don't consciously highlight a procedural change, you're apt to continue that procedure according to old habits.

This philosophy can apply to training, too. Remember when your high school football coach said, "You'll play the game just like you practice"? Likewise, in the heat of aerial combat you're going to revert to habit patterns to accomplish many tasks. Ask yourself if you're really training like you would fly under fire. You'll probably find your responses are often negative.

In addition, beware of occurrences that break the normal sequence of events, or any habitual pattern. Anytime this happens, be alert for errors of omission, starting when the unusual event occurs.

We are habitual creatures by nature, and we can't change it. It has been and will continue to be demonstrated, sometimes with disastrous results. But with a little effort, some of the mistakes can be avoided. First, recognize and be conscious of the problem. Then, be on the alert for areas where you may make mistakes. Being aware of the problem and guarding against complacency is probably the best way to make habits work for you and not against you. ■

—from FLYING SAFETY
Captain Larry New
Nellis AFB, Nevada



Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap □ (H series) Cargo hook failed during takeoff. Load, consisting of OH-58, fell approximately 30 feet to ground. 8320

UH-1 Class E mishaps □ (H series) Pilot applied excessive collective pitch during climb, causing torque limits to be exceeded. □ (H series) Unusual noise was heard from transmission area, and master caution and hydraulic lights came on. Caused by failure of preformed packing and packing retainer on fitting of input side of hydraulic filter. □ (H series) Master caution and engine air inlet lights came on. Caused by defective air inlet switch. □ (H series) Crew smelled burning odor and saw smoke in cockpit after turning on windshield wipers. Caused by failure of windshield wiper motor. □ (V series) Pilot heard grinding noise. Master caution and right fuel boost lights came on. Caused by failure of fuel boost pump. □ (M series) Engine oil pressure light came on during hover. Caused by failure of pressure switch. □ (H series) Master caution and hydraulic pressure lights came on. Pilot was unable to prevent cyclic from moving to left rear with only one hand. Using both hands to overcome control force feedback, pilot forced cyclic forward to a position where he could lock his knees behind the cyclic. Using his knees and right hand on the cyclic, pilot was able to maintain forward flight and began immediate descent. Aircraft was landed with no damage in open field. Hydraulic pump cavitated from the time the caution lights came on until aircraft was landed. Caused by failure of irreversible servo valve.

UH-60 Class C mishap □ While attempting a landing from a hover, rated student pilot noticed that aircraft was drifting right. As tail wheel touched runway, student pilot applied collective pitch and brought aircraft to 10-foot hover. IP took control and landed. Tail landing gear yoke assembly was damaged.

UH-60 Class E mishaps □ Shudder was felt and master caution and tail rotor quadrant lights came on during hover. Aircraft was landed. Right pedal tail rotor cable was broken. Cable showed signs of abrasion. □ No. 1 engine oil pressure rose to full scale during takeoff. Engine was shut down and aircraft landed. Caused by failure of No. 1 signal data converter.

Attack helicopters

AH-1 Class E mishaps □ (S series) Transmission oil pressure rose to 75 psi during flight. Caused by failure of pressure transducer. □ (S series) Master caution light came on. Caused by faulty caution box. □ (S series) Master caution and No. 2 hydraulic lights came on. Caused by failure of hydraulic pump. □ (G series) Master caution, transmission oil bypass, and transmission oil pressure lights came on. Caused by failure of elbow fitting on transmission.

Cargo helicopters

CH-47 Class E mishaps □ (B series) Master caution and No. 2 hydraulic boost lights came on. No. 2 hydraulic pressure went to zero, and crew chief saw hydraulic fluid in vicinity of "C" box area. Caused by cracked hydraulic line. □ (B series) After hot refueling operation, crew chief saw fuel venting from No. 2 fuel control case drain. Caused by failure of fuel control.

Observation helicopters

OH-58 Class A mishap □ (A series) As aircraft crossed over a ridge line at 20 feet agl and 30 knots, shudder was felt. Aircraft entered uncommanded slow

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**3**	**5**
3rd Qtr	April	7	6	1-27 Apr	**4**	**0**
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**12**	**7**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

right turn. After 30 degrees of turn, pilot reduced left pedal and collective. Aircraft stopped turning after 180 degrees. Tail rotor hit a bush. Aircraft snapped right, spun 120 degrees, and hit the ground. Collective was applied, and aircraft again became airborne, spun to right, and hit the ground in a nose-low attitude. 8321

OH-58 Class E mishaps □ (A series) N_2 decreased to 91 percent while aircraft was at 4-foot hover. Caused by malfunction of governor. □ (A series) Master caution and fuel boost lights came on. Caused by failure of fuel boost pump.

Training helicopters

TH-55 Class C mishap □ Engine quit during takeoff. Maintenance test pilot attempted autorotation, but rear of left skid dug into the sod and aircraft rolled onto left side.

TH-55 Class E mishaps □ When initial pitch was pulled during autorotation, student pilot's left antitorque pedal broke and lodged in such a way that IP had no pedal control. Aircraft began to spin rapidly to right. IP used throttle and collective and was able to land with no damage to aircraft. □ High frequency vibrations were caused by worn tail rotor pitch change link.

Fixed wing

U-21 Class C mishap □ (A series) Left propeller struck 50-pound fire extinguisher as pilot was taxiing from parking area. Propeller was damaged.

U-21 Class E mishaps □ (A series) Aircraft had just been refueled. Crew started No. 2 engine and attempted start of No. 1 engine. When inverter was turned off, No. 2 engine flamed out. Crew continued start of No. 1 engine, then tried to restart No. 2 engine. Engine would not start. Inspection revealed large volume of water in fuel cells. □ (A series) Aircraft had landed to pick up passengers. No. 2 engine would not start. Caused by ignitor failure.

Maintenance

UH-1 Class C mishap □ (V series) Crew chief discovered one-fourth-inch dent in leading edge of tail rotor blade during maintenance inspection. Investigation revealed two screws were missing from FM antenna mount on vertical fin. Incorrect screws had been installed in mount. Screws were too short to fully engage into nutplate. Screws vibrated loose and hit tail rotor blade.

UH-1 Class E mishap □ (H series) Pilot felt stiffness in controls, followed by slight right roll. Master caution and hydraulic lights came on. Caused by chafed hydraulic line.

AH-1 Class E mishap □ (S series) Engine oil pressure fluctuated and engine oil temperature was 90 degrees during hover. After shutdown, emergency hydraulic pump check sheared N_2 shear pin. Cause of failure of shear pin was incorrect adjustment of high-side governor stop. Cause of fluctuating oil pressure is unknown.

CH-47 Class C mishap □ (C series) During approach to runway, pilot was told that cowling was open. Inspection revealed that strut assembly had broken and fell across flexpack, damaging strut and No. 1 tunnel cover, which had opened in flight. Tunnel cover was not fastened correctly.

CH-47 Class E mishap □ (C series) No. 1 engine oil low light came on. Crew chief had incorrectly secured oil cap, allowing oil to blow out of engine.

OH-58 Class E mishap □ (A series) Crew smelled battery fluid odor during flight. Vent tube elbow assembly was connected to straight tube by glue only, and battery vent tubes came loose. Airflow over battery was blocked and battery overheated.

C-7 Class E mishap □ Left engine would not develop takeoff power when throttles were advanced. Engine began backfiring at idle power. Caused by incorrect torque on No. 8 cylinder intake pipe gland nut, which allowed nut to back off and loosen intake pipe at cylinder end.

Messages received

• Safety-of-flight maintenance mandatory message concerning inspection of intermediate gearbox support fitting assembly on all CH-54A/B aircraft (CH-54-83-01, 081545Z Apr 83). Summary: Three cracked support fittings have been discovered during intermediate gearbox mount inspections. Failure of these support fittings could result in loss of aircraft. This message establishes a 200-hour phase inspection of the fittings and a 50-hour special inspection. Contact: Michael West, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of UH-60 inlet duct assembly and alignment pin bracket (UH-60A-83-04, 081600Z Apr 83). Summary: During a routine inspection at one field installation, six engine air inlet ducts exhibited cracks emanating from the bleed air exhaust slots located on the bullet nose in line with the duct leading edge. These cracks may have been caused by square end slots and possible misalignment between the inlet duct and engine duct mating flange. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning O-ring splicing and O-ring assortment kit (MIM-GEN-83-01, 061407Z Apr 83).

• Maintenance information message concerning UH-60 right-hand stabilator attachment fitting (MIM-UH-60-83-MEA-06, 082030Z Apr 83).

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

Don't bend engine tubing

Much of the maintenance performed on an aircraft engine involves removal and replacement of various control system components. These components are positioned within a maze of tubing and cabling on or near the bottom of an engine and, in particular, on a turbojet or turboprop powerplant.

Most tubing and components are located in this area to provide accessibility when the engine is installed in the aircraft. Although there is less external plumbing and cabling on the newer engines, there is still tube congestion in the areas where you must work. It may be tempting to bend or push a tube out of the way at times, but it may come back to haunt you later.

Bending a tube can change the established clearance between it and other engine parts. If the tube clearance is reduced below limits, engine vibration may cause it to chafe. It is possible for a tube to chafe completely through.

Since much of the external plumbing contains fuel or oil, chafing can be serious, with equally serious consequences. Any tube that has chafed should be inspected to insure that the wear is within the limits indicated in the manual. The tube should then be repositioned to remove the source of chafing.

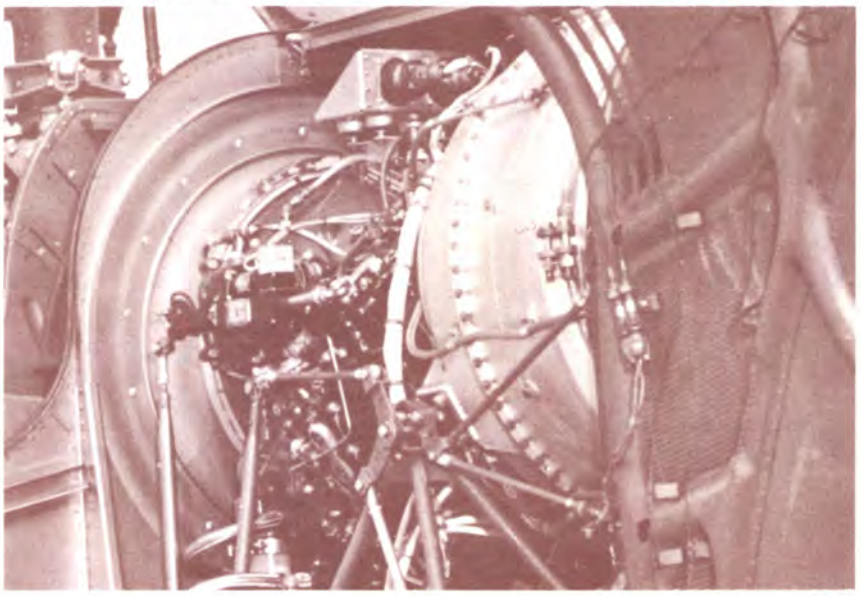
Repositioning tubes

To reposition tubes properly, you must understand the difference between a supported and unsupported section of tubing. Each has a different clearance limit. A section of tubing is considered supported if it is within 6 inches of a loop clamp/bracket combination or a fixed end. A section of tubing is considered unsupported if it is more than 6 inches from a loop clamp/bracket combination or a fixed end.

As previously stated, you must not reposition a tube by bending or pushing it out of the way.

How do you reposition a tube? Depending upon what is causing the unacceptable clearance, you may need only to tighten a clamp, or you may need to replace an entire tube assembly.

If, after inspection, the cause of the unacceptable clearance cannot be determined, try this repositioning technique. Loosen the supporting clamps and "B" nuts. Check the conical gasket to see if it needs replacement. Gently move the tube in the direction required to obtain the proper clearance limit. Holding the tube in position, retorque the "B" nuts, then the clamps. If this doesn't eliminate the clearance problem, the tube assembly probably will require replacement.



Other problems

There are other problems associated with tube bending that should be of concern. Bending a tube can reposition it. When such a misaligned tube is tightened during installation, stresses are created. Engine vibration combined with these added stresses may cause the tube to fracture. Similarly, repeated back-and-forth bending of a tube may cause cracking.

One last tube condition to watch for is damage caused by maintenance on other engine parts. This usually results from striking or scraping the tube with another part or tool.

Closely related to tube clearances are electrical cable clearances. The general rule to follow here is to allow for a 0.030-inch minimum clearance between electrical cables and other engine structures to prevent chafing.

The best way to prevent tube conditions such as cracks, fractures, scraping, misalignment, and bending is to use proper maintenance tools and practices. To eliminate the chafing of tubes and electrical cables, always maintain the proper clearances between them and other parts of the engine in accordance with the manual of instructions.

Constant reference to these sources of information will assist in the proper maintenance of these tubes and cables and prevent many of the problems. ■

—from Flight Safety Foundation's Aviation Mechanics Bulletin

An interesting PRAM

The following PRAM was received from a T-42A user:

"The pilot, who is the unit T-42 SIP, was demonstrating semiannual AAPART maneuvers to another T-42 SIP. A stall series had just been completed with a departure stall as the last maneuver. The aircraft was being accelerated to cruise airspeed. The altitude was 4,500 feet msl. At approximately 140 KIAS, extreme vibrations were felt and the instrument panel was unreadable. The tips of the horizontal stabilizer were moving vertically in excess of 6 inches. Aircraft attitude varied from 15 degrees pitch-up to 10 degrees pitch-down. An elevator trim adjustment was made. Initially the trim wheel was binding, but broke free. This reduced the vibrations.

"The pilot reduced power to find an airspeed which was manageable. An airspeed between 107 and 110 KIAS was comfortable with little vibration. During the descent, 107-110 KIAS was maintained until landing was assured. The pitch control during descent felt like the aircraft was close to a stall. A forced landing was made at a local airport with no further damage.

"The bolt securing the inboard rod-end of the left elevator trim tab tube assembly (P/N 45-526009) was lost. This apparently happened because a cotter pin was not installed, thus allowing the nut to back off. This assumption is made because the cotter pin was missing from the same bolt on the right trim tab tube assembly. The maintenance manual, TM 55-1510-208-23, dated 1 Aug 75, with Change 1 and 2, page 9-3, paragraph 9-16b, is vague about what bolt "stackup" to use. A DA Form 2028 is being submitted on this manual.

"A 300-hour inspection had been completed 1 hour prior to this flight. The elevators had been removed during the inspection. . . . The maintenance team removing the elevators was relatively inexperienced. To remove the elevator, TM 55-1510-208-23 directs to remove the bolt from the outboard end of the trim tab tube assembly. This was accomplished. However, it is obvious the large rod-end (MWO 12 Mar 74, Improved Elevator Trim Tab Actuator) would not go through the slot in the elevator. The TM does not address this situation.

"The maintenance team had the option of removing the outboard rod-end from the tube assembly or remove the bolt from the inboard rod-end. They chose to disconnect the inboard end. This procedure was used on both elevators. After the tube assemblies were removed, they were placed on the horizontal stabilizer. Someone on the maintenance team decided that was not a good idea because they could become lost. Both trim tab tube assemblies were reinstalled to the inboard connecting points. The washers and nuts were replaced on the bolts and hand tightened. The cotter pins were not installed. The nuts are relatively small and so are the cotter pins.

"The maintenance team installing the elevators was more experienced. They considered only one way to remove and reinstall the elevators—remove the outboard rod-end from the tube assembly. Therefore, they did not look at the inboard bolts. The technical inspector had the same impression as the experienced maintenance team. He also may have been preoccupied with a family situation.

"The pilot and maintenance officer preflighted the aircraft for the maintenance test flight. They found everything normal. The pilot is familiar with all attaching bolts and cotter pins. The missing cotter pins are not easy to see due to their location inside the elevators." ■

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 29 □ 4 May 1983

OH-58 tail rotor spin accidents: causes and cures

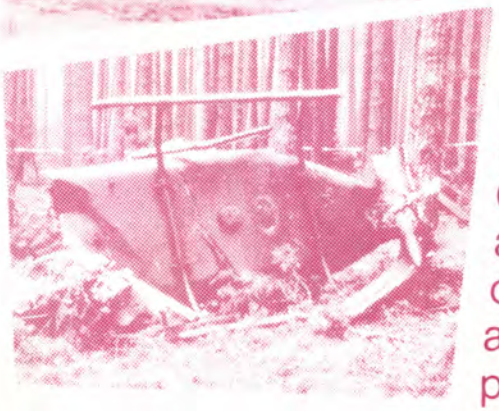
The problem

When the Army accepted the OH-58, the marginal effectiveness of the tail rotor had been documented through developmental testing. At that time, mission demands were such that the deficiency was acceptable, and the operator's manual contained appropriate precautions. Today, mission demands have changed considerably, and the OH-58 is being operated at the upper limits of its performance envelope, leaving little or no margin for error.

Here's what happens

Loss of tail rotor effectiveness is usually identified by a right yaw which cannot be stopped by left pedal application and progresses into a spin. Most likely, the pilot will be maneuvering out of ground effect, below 100 feet agl, at airspeeds below effective translational lift. Winds of 6 knots or greater will be present. The helicopter will be within operating limits published in the operator's manual, with a gross weight of about 2,600 pounds. Power will be near maximum torque available, and left pedal will be close to the maximum possible. All too often, the pilot will be hovering so close to trees that he cannot fly out of the spin before crashing through the trees.

The charts in the operator's manual indicate that the winds must be "tail" or "right crosswind," and high gross weights and density altitudes must be involved to set the stage for loss of tail rotor effectiveness. However, evidence from recent accidents and pilot experiences show that loss of tail rotor effectiveness can occur in left crosswind conditions and at low airspeeds and altitudes **when operating within dash 10 limits.** The point is that the dash 10 charts are incomplete—the control margin chart applies to a steady state, IGE hover. OGE hovers in gusty winds are outside the scope of the published chart and present different problems.



From 1 October 1979 to 15 April 1983, loss of tail rotor effectiveness was a definite cause in 21 Class A and B OH-58 accidents—about 4 out of every 10 OH-58 accidents during this period.

OH-58 tail rotor spin accidents

Recent accidents

Following are brief synopses of the three most recent cases of loss of tail rotor effectiveness.

• The OH-58 pilot was flying up a ravine. There was a left quartering tailwind of 15 knots, gusting to 25 knots. The aircraft crossed over a ridgeline at 20 feet agl and 30 knots. A shudder was felt, and the aircraft entered an uncommanded right spin. The pilot reduced left pedal and collective, and the aircraft stopped turning. Because of the loss of altitude during the recovery, and sloping terrain, the tail rotor hit a bush and the ground. The pilot, not realizing he had tail rotor damage, applied collective and forward cyclic. The aircraft spun violently to the right and crashed.

• The OH-58 pilot on a tactical training mission was hovering out of ground effect, with a headwind of 8 knots. When the pilot tried to move his aircraft forward, the aircraft entered a right spin. Collective was lowered, pressure on left pedal reduced, and the spin stopped. When collective was increased, the aircraft began to spin to the right again. The pilot lowered the collective, closed the throttle, and autorotated into the trees.

• The OH-58 was being operated about 300 feet above water. Airspeed had been slowed to allow the copilot to photograph a lighthouse. As the pilot began a right turn, the aircraft began to spin to the right. The pilot used incorrect emergency recovery procedures, and attempts to fly out of the spin were unsuccessful. The aircraft was autorotated into the water. Winds were near calm, and the aircraft was well below authorized maximum gross weight.

The major causes of OH-58 tail rotor spin accidents are:

• Marginal antitorque control of the aircraft.

• Lack of knowledge of the OH-58's flight characteristics.

• Insufficient information in the operator's manual.

• Inadequate unit transition training.

The fix

DARCOM and TRADOC are working with the manufacturer to develop, flight certify, and field a new tail rotor system, 90-degree gearbox, and segmented drive shaft for the OH-58. But this will take time. Until then, loss-of-tail-rotor-effectiveness accidents can be prevented if commanders and OH-58 pilots understand the problem and know what to do about it.

Pilot actions

• Aircraft performance planning is a must and should be done before every flight. You must know how to apply the information from the hover and power available charts in your operator's manual to your specific mission.

• You must be constantly aware of airspeed and relative wind, avoiding conditions which require high power settings.

• Avoid hovering out of ground effect with a direct or quartering tailwind or under turbulent or varying wind conditions.

• Avoid sudden power demands or rapid left pedal applications when you're operating at or near the maximum performance capability of the aircraft.

• Do not operate at or near maximum allowable gross weight, especially under high density altitude conditions.

• Always be aware of your aircraft position in relation to surrounding obstacles such as trees. Don't come to an out-of-ground-effect hover with trees on the right side of the aircraft or behind it, unless there is no alternative. Give yourself space in which to maneuver if you have an emergency.

• If your OH-58 won't come out of a right yaw, and left pedal application has no effect, you **must** respond immediately as outlined in the dash 10.

Command actions

• Commanders and operations officers must know the limitations of their pilots.

• Insure that pilots receive appropriate training and are not required to fly missions where the aircraft must be operated at or beyond pilot and aircraft limitations.

• Require command approval by a designated representative for all OH-58 terrain flight missions.

• Establish local restrictions against low altitude and low airspeed operations except under those conditions specified by the commander. One approach may be to establish locally developed power margin requirements that provide an additional buffer for operating at airspeeds of 30 knots and below.

• Restrict from NOE flight all OH-58 pilots who have not received OH-58 limitations awareness training, including early recognition of tail rotor effectiveness loss and proper recovery procedures, wind velocity and direction sensing techniques, and conditions to avoid. This training is required in DA message, DAMO-RQ, 231622Z Dec 82, subject: OH-58 Accident Prevention.

• Require all OH-58 standardization instructor pilots, instructor pilots, and pilots to view the Army National Guard television tape 46-2, "How Not to Crash by the Book." This tape is available at Training and Audiovisual Support Centers. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Pilot did not apply enough pitch to cushion landing during standard autorotation. Aircraft was in tail-low attitude. Tail skid was bent. □ (H series) FM antenna broke off in flight and hit tail rotor blade. □ (H series) Buzzard hit and broke right windshield as aircraft was flying about 75 feet agl.

UH-1 Class E mishaps □ (H series) Aircraft yawed left and right, and grinding noise was heard from engine. Inspection revealed minor FOD in compressor section, corrosion in intake area, and bleed air leak between combustion and exhaust section. □ (H series) Engine oil pressure dropped during flight. Caused by ruptured oil scavenge line. □ (H series) Engine surged during hover. Caused by defective overspeed governor. □ (H series) Master caution and fuel pump lights came on. Caused by defective fuel pressure switch. □ (H series) Transmission oil temperature light came on during hover. Caused by failure of transmission oil thermostatic switch. □ (H series) As power was applied for HIT check, loud popping noises were heard, egt went to 700 degrees for 3 seconds, and significant power surges occurred. Aircraft yawed left before collective could be lowered. Throttle had to be lowered to stop compressor stall. Caused by ingestion of FOD from an undetermined source.

UH-60 Class E mishap □ Vertical vibration developed during hover. Inspection revealed red blade antiflap cam stuck, causing restrainer to hit against spindle housing assembly.

Attack helicopters

AH-1 Class C mishap □ (S series) Turret slewed full left and down during firing sequence. Grenade detonated 15 to 20 feet from aircraft, damaging pilot's canopy, TOW missile launcher, and both main rotor blades.

AH-1 Class E mishaps □ (G series) Engine oil pressure fluctuated during runup, and smoke was seen coming from exhaust. Caused by failure of No. 2 bearing pack. □ (S series) Rpm audio and light would not go out during runup. Caused by failure of rpm warning box.

Cargo helicopters

CH-47 Class E mishap □ (C series) No. 2 engine chip detector light came on. Caused by failure of engine transmission.

CH-54 Class E mishap □ (A series) Loud noise was heard and aircraft shuddered. No. 2 engine power was lost. Caused by internal damage to engine.

Observation helicopters

OH-58 Class C mishaps □ (A series) As PIC in left seat reached to turn off landing light with his left hand during hover to takeoff, collective control was lowered, causing aircraft to hit the ground. □ (C series) Severe vibrations developed during flight. During landing, vibrations became so severe that pilot feared complete loss of control and rapidly lowered collective. Aircraft landed hard. Tail rotor tip cap weight separated in flight, and three mounting bolts to tail rotor 90-degree gearbox were sheared. The one remaining bolt was loose. Mounting hardware was found under tail boom after shutdown. □ (A series) Pilot overcompensated with too much initial pitch application at termination of straight-in autorotation. Aircraft ballooned and rotor rpm deteriorated. Aircraft landed hard, bounced, and landed hard again.

OH-58 Class E mishaps □ (A series) Engine was at idle for 5 minutes when it hesitated, winding down momentarily and then revving back up. Temperature increased past 1,000° C. Caused by failure of fuel control. □ (A series) Engine oil bypass light came on and aircraft was landed. During preflight, pilot had removed engine oil reservoir cap to check oil level. When he replaced cap, security chain lodged under cap, preventing cap from seating properly. Pilot did not detect this and engine oil leaked out of reservoir during flight. □ (A series) Master caution and hydraulic pressure lights came on. Caused by failure of hydraulic pressure sending unit.

Training helicopters

TH-55 Class C mishap ☐ SIP told pilot to do a standard autorotation. Autorotation was within limits until about 75 feet agl where student started to decelerate. Deceleration was too high and aircraft developed near vertical sink rate. SIP attempted power recovery as aircraft hit the lane. Tail rotor blades separated, and cross tubes, tail skid, stabilizers, tail rotor gearbox, and tail boom were damaged.

Fixed wing

C-12 Class E mishaps ☐ (C series) No. 2 engine would develop only 72 percent torque during takeoff. Caused by malfunction of high pressure bleed valve diaphragm. ☐ (A series) Aircraft shuddered during taxi, as if brakes were grabbing. Pilot tapped both brakes and aircraft started rolling smoothly. About 40 feet later, left brake grabbed, causing left turn. Aircraft could not be stopped in time to prevent left gear from running off side of taxiway and sticking in soft ground.

T-42 Class C mishap ☐ Left wing dropped during takeoff, and left prop and left and right inner gear doors struck runway. Climb was established and gear extracted. Inspection revealed prop struck runway 35 times within a 40-foot distance.

T-42 Class E mishap ☐ Right engine ran rough as power was increased to maintain altitude and airspeed. Caused by fouled spark plugs on left magneto.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	1- 4 May	**1**	**0**
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**13**	**7**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

U-21 Class E mishap ☐ (A series) Fuel was seen siphoning from outboard cell during climb. Fuel cap was not seated correctly.

Maintenance

UH-1 Class E mishaps ☐ (H series) N_1 would not increase above 15 percent during start. Throttle linkage was out of adjustment. ☐ (V series) Aircraft vibrated during flight. Caused by incorrectly installed clamp on No. 2 tail rotor hanger bearing. ☐ (H series) Maintenance personnel saw leaking hydraulic fluid during runup and voltage regulator check. Caused by pinched hydraulic O-ring.

UH-60 Class E mishap ☐ First-stage tail rotor system developed leak in line by servo and lost all hydraulics. Pressure line on first-stage tail rotor servo was chafed.

AH-1 Class E mishap ☐ (S series) Master caution and transmission oil bypass lights came on during hover. Pressure switch boot was full of water, and wire terminal and wire were severely corroded.

OH-58 Class E mishap ☐ (C series) D.C. generator caution light came on. Caused by loose wire.

Messages received

• Aviation life support equipment maintenance advisory message concerning inspection and repair of heat-resistant and fire-retardant aviation and combat vehicle crewmember clothing (ALSE-83-3, 202000Z Apr 83).

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

TM changes

Change 9, dated 15 Feb 83, to TM 55-1520-228-23-2 for OH-58A and C helicopters, has been released. ■

Shortfax

Are you too safe?

How safe are you on the job? The answer to this question could be "not nearly safe enough." At a recent missile maintenance evaluation review board, an airman received an unqualified rating for committing an unsafe act during task performance. When asked why, he replied, "I was being too safe and too cautious and I somehow missed a step in the tech order." My point is that you can never be too safe. If that particular airman had been too safe, he never would have omitted that step. If you consider yourself to be too safe, you should ask yourself the following questions:

Do I sometimes get in a hurry and take shortcuts to complete the task faster? This is often the case when your workload has built up or your mind is preoccupied with something that you feel is more important.

Do I use available agencies when I have a problem? That is, do I continue with my task, using guesswork when I encounter an obstacle or a problem? You should terminate your task and call the proper agency, i.e., your supervisor, job control, quality control, or the safety office.

Do I set the proper example for others to follow? Do I comply with all existing safety regulations and technical data? Do I correct subordinates and superiors when I detect an unsafe act? If not, you are probably setting a bad example for someone who may be using you as an example to follow.

Am I current on all safety materials and new trends in safety? Do I read the safety bulletin boards daily and review safety magazines and other safety materials? If not, you could miss something that may apply directly to you.

Do I act where safety is involved or do I simply give lip service? Do I take the time to report the hazards I discover? Do I promote and sell safety to my fellow workers? Although there are many more questions you can ask yourself, if you answered no to any of the above questions, you are not nearly safe enough.

If all your answers were positive, you have only begun to scratch the surface. Safety should be a vital part of your everyday life both on and off the job. You must be alert for any unsafe condition whatever you are doing. On the job, you should be aware of all parts of your task that require special attention. Preparation before beginning a task is paramount. You should take the time to thoroughly check out your equipment to insure that it is serviceable and safe. Make sure that you understand what your job is and that you are fully trained and qualified prior to attempting to perform a task.

Protective equipment can save your life. Be sure that you have the proper protective equipment before beginning a hazardous task. Insure that your equipment is serviceable and that you have been properly trained to wear or operate your protective equipment.

Remember, you can never be too safe. Safety should be a part of everything in which you are involved. The question should not be "are you too safe" but rather "are you safe enough?" You should thoroughly and closely evaluate the answer to this question every day. ■

—from COMBAT CREW
1LT Roy Gresham
351st SMW, Whiteman AFB

Use the right shaft

Installation of the wrong engine transmission quill shaft caused two recent CH-47C mishaps. In both cases, excessive oil leakage occurred in the engine transmission because the input seal was damaged. In one of the mishaps, the oil leak occurred in flight and the engine transmission had to be replaced because all the oil for the transmission leaked out, resulting in overheating. The crew was lucky the transmission did not catastrophically fail, causing damage to the aircraft and an in-flight fire.

In both cases, a T55-L7C engine quill shaft (P/N 114D6106-6) was installed on a T55-L11 engine. The T55-L7C engine quill shaft is shorter in length than the T55-L11 engine quill shaft (P/N 114D6263-1). Installing it in a T55-L11 engine will allow excessive quill shaft end play. It will also allow the quill shaft to float back and forth, damaging the engine transmission input seal. Also, if you install a T55-L11 engine quill shaft on a T55-L7C engine, the engine transmission will not seat properly.

The installation instructions for engine transmissions in TM 55-1520-227-23-2, chapter 6, contain several notes and cautions to use the proper quill shaft with the engine series (T55-L7C or T55-L11) installed on the aircraft. So, the next time you install an engine quill shaft, make sure it's the right one.

Point of contact at the Safety Center is SFC James Wheeler, AUTOVON 558-4198/4202. ■

(continued on back page)

Shortfax

Eleven receive Broken Wing Award

The Broken Wing Award is given to aircraft crewmembers who demonstrate a high degree of professional aviation 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.

Eleven aviators received the Broken Wing Award from January through March 1983.

Broken Wing Award recipients

CW3 Vincent J. Aberle
U.S. Army Readiness & Mobilization Region VIII Flight Detachment, Aurora, Colorado

Captain Donald A. McEachern
243d Aviation Company, Fort Lewis

Major William McCormick
146th Medical Detachment, West Virginia Army National Guard, Parkersburg, West Virginia

Major William E. Pohlmann
Avionics R&D Activity, Fort Monmouth

Captain Paul A. Pressly
Aviation Division, DPT, Fort Benning

Captain Richard A. Read
Company B, 149th Aviation Battalion, Oklahoma Army National Guard, Lexington, Oklahoma

CW3 Richard L. Risher
Directorate of Evaluation and Standardization, Fort Rucker

Major Steven A. Strawder
Army Aviation Support Facility, Indiana Army National Guard, Shelbyville, Indiana

CW3 Frederick J. Taylor
1st S&F Company, 1st Battalion, Fort Eustis

CW3 Michael O. Victory
243d Aviation Company, Fort Lewis

CW3 Jackie L. Wilson
56th Aviation Company, APO New York 09028

ALSE pamphlet available

The DARCOM Project Officer for ALSE (DRCPO-ALSE) is finalizing and updating the ALSE pamphlet. Please call Sue or Linda at AUTOVON 693-3307 and give them your address and the number of copies you will need or, if you prefer, send a self-addressed official label to Commander, U.S. Army TSARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Boulevard, St. Louis, MO 63120. Identify the number of copies needed in the lower left-hand corner. ■

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 3 □ 13 Oct 1982

Accident sense and the FY 82 record

The FY 82 aircraft accident record is the worst since FY 73: 59 Class A accidents, 58 flight-related and 1 ground; 46 Army fatalities plus another 40 non-Army persons killed as a result of Army aircraft accidents; 48 destroyed aircraft; and total dollar losses for all classes of accidents at $62 million plus.

The fiscal 82 Class A accident rate per 100,000 hours is 3.7, compared to 2.6 for FY 81. Flying hours for both years were about the same, 1.6 million.

The sharp increase in FY 82 Class A accidents was not confined to any particular aircraft system or level of aircrew experience. The accidents spanned the entire fleet of aircraft and were spread across the entire range of aviator experience levels.

Fixed wing aircraft make up 6 percent of the total aircraft inventory and account for 12 percent of the total flying hours. They accounted for 3 percent of the total Class A accidents in FY 82, compared to 5 percent in FY 81. Rotary wing aircraft make up 94 percent of the total Army aircraft inventory and account for 88 percent of the flying hours each year. Breaking out rotary wing aircraft into categories reveals the following:

- Utility helicopters make up half of the rotary wing fleet, fly 51 percent of the total flying hours, and accounted for 47 percent of the FY 82 Class A accidents and 49 percent of the FY 81 Class A accidents.

- Observation helicopters, which make up 31 percent of the rotary wing fleet and fly 26½ percent of the total flying hours, accounted for 27 percent of the FY 82 Class A accidents and 23 percent of the FY 81 Class A accidents.

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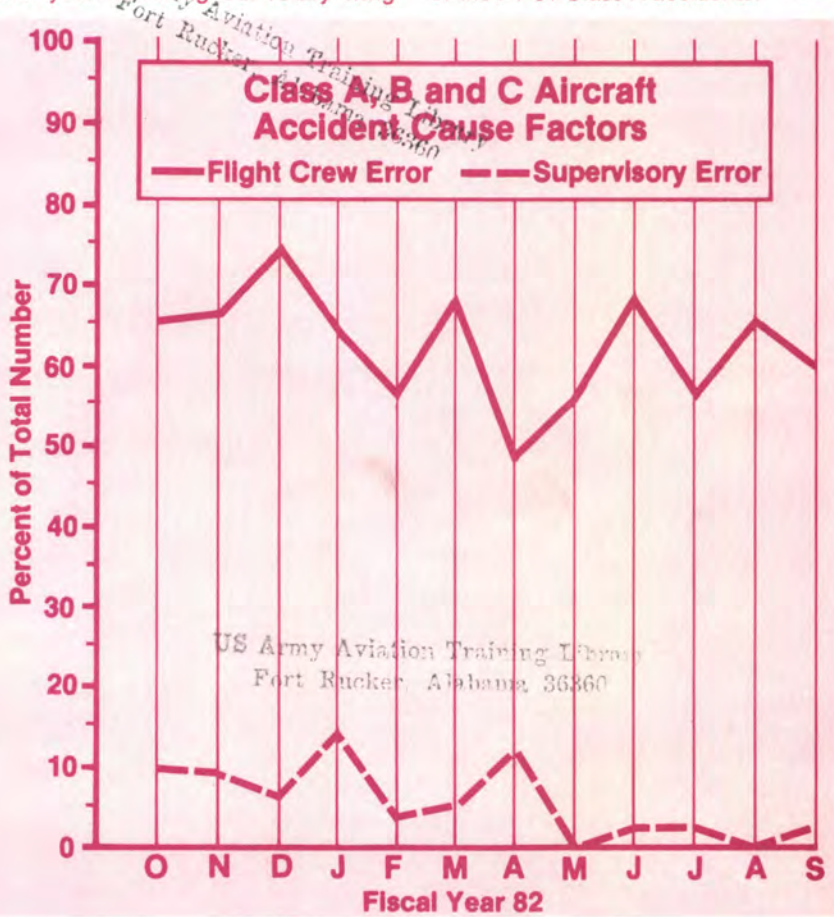

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Accident sense

• Attack helicopters, making up 13 percent of the rotary wing fleet and flying 6½ percent of the total flying hours, accounted for 19 percent of the FY 82 Class A accidents and 16 percent of the FY 81 Class A accidents.

• Cargo helicopters make up 6 percent of the rotary wing fleet, fly 4 percent of the total flying hours, and accounted for 3 percent of the FY 82 Class A accidents and 7 percent of the FY 81 Class A accidents.

The 59 Class A accidents accounted for 90 percent of the total dollar losses in fiscal 82. Forty-two of the 59 Class A accidents involved crew or supervisory error as a definite factor. This number will probably go up when all investigations are completed.

The dominant flight crew errors were:

- **Faulty judgment**
- **Violation of regulations/flight discipline**
- **Failure to follow established procedures**
- **Inattention to tasks**
- **Pilot-induced loss of control**

The dominant supervisory errors were:

- **Failure to provide adequate unit training**
- **Failure to correct actions of subordinates**
- **Failure to provide adequate guidance**
- **Failure to insure instructor pilot qualifications**
- **Failure to take corrective action**

In a series of articles over the next several weeks, we will look at each of the flight crew and supervisory errors separately. In this series, we will review each accident case, focusing on the errors causing each accident. By doing so, we hope to clearly show the lessons learned from all the human error Class A accidents last year and, hopefully, prevent these causes from creeping back into the aviation system, unrecognized by commanders and aircrews, and causing "new" accidents in 83. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (V series) Right fuel boost light came on. Caused by defective flow switch. □ (M series) Transmission oil pressure gauge went to zero during flight. Caused by faulty gauge. □ (H series) Crewmembers heard grinding noise during hover. Caused by failure of 42-degree gearbox. □ (H series) Fire warning light came on during NOE flight. Corrosion was found on connector pins for control assembly fire light. □ (H series) Aircraft yawed sharply left two or three times. Caused by foreign object damage to compressor. □ (H series) Engine chip detector light came on. Caused by malfunction of oil pressure transmitter. □ (H series) Compressor stall occurred during landing to pinnacle. Inlet guide vane and bleed band actuators were actuating 8 to 10 percent too soon. □ (H series) Loud noise was heard from transmission area, and hydraulic and master caution lights came on. Controls became stiff. Loss of hydraulic fluid was caused by failure of hydraulic line.

UH-60 Class C mishaps □ Aircraft was being repositioned for static display. As pilot hovered into position, aircraft drifted right and main rotor blade tip caps hit tree. Ground guide did not give proper hand and arm signals. □ Aircraft was slingloading A-92 container. Load began to oscillate and then fell to ground.

UH-60 Class E mishaps □ Crew smelled strong electrical fumes. Caused by faulty pilot mode select panel. □ Low rotor light came on. Caused by broken wire. □ No. 2 engine fuel filter bypass light came on. Caused by electrical short in wiring harness.

Attack helicopters

AH-1 Class C mishaps □ (S series) Overtorque occurred when pilot initiated cyclic climb to avoid wires. Transmission, main rotor hub, mast, short shaft, and blades were replaced. □ (S series) Aircraft hit tree during low-level flight, damaging stabilizer and right stub wing.

AH-1 Class E mishaps □ (S series) Pilot could get no airspeed indications during takeoff. Caused by broken line from pitot tube. □ (S series) Tgt rose and N_2 dropped during hover. Aircraft had been hovered over several harvested corn fields during 1½ hours of flight. Inlet barrier screens to engine were covered with straw and grass, causing loss of power. □ (S series) Transmission oil pressure dropped to zero. Caused by failure of oil pressure transducer. □ (S series) Fire warning light came on. Caused by shorted connector in air ejector area.

Cargo helicopters

CH-47 Class C mishap □ (C series) Large dent and crack were found on bottom of forward rotor blade.

CH-47 Class E mishap □ (C series) Maintenance test pilots were performing torque differential check. No. 2 engine condition lever was moved to ground position, and PTIT started rapid climb to 1200° C. Engine had catastrophic failure and pieces of power turbine wheels were ejected out tail cone.

Observation helicopters

OH-58 Class E mishaps □ (A series) Low rotor rpm audio activated and low rpm warning light came on. Caused by failure of fuel control governor assembly. □ (A series) IP heard whistling sound and noted slight lateral vibration. Skin on main rotor blade tip cap had separated. □ (A series) Master caution and fuel boost pump lights came on. Caused by failure of boost pump.

Training helicopters

TH-55 Class C mishap □ As student pilot turned aircraft into the wind for a hovering autorotation, aircraft began to drift to the left and aft. Student pilot applied right pedal and right forward cyclic, but drift seemed to accelerate. IP took control as aircraft touched down on left rear skid. Oleo strut and drag brace were damaged.

Fixed wing

C-12 Class E mishaps □ (A series) No. 1 engine would only develop 78 percent torque without exceeding temperature limits during takeoff roll. Caused by failure of rubber diaphragm on high pressure bleed air valve. □ (A series) Crew smelled and saw smoke during landing. Caused by failure of vent blower motor.

OV-1 Class E mishap □ (D series) No. 1 propeller became uncontrollable and oversped allowable limits during flight.

T-42 Class E mishap □ When gear was extended for landing, gear safe light did not illuminate. Visual check in mirror confirmed that nose gear was not fully extended. Gear was extended manually, and aircraft was landed. Landing gear motor brush spring assembly had burned in two.

U-21 Class E mishaps ☐ (A series) Left main landing gear did not indicate down and locked during approach. Gear was manually extended. Caused by failure of down-lock switch. ☐ (RU-21H) Before engine was started, avionics door was opened to replace radar unit. Repairman did not secure door correctly and it popped open during flight.

Maintenance

UH-1 Class E mishaps ☐ (H series) D.C. voltage meter increased to more than 30 volts. Voltage regulator was out of adjustment. ☐ (H series) After aircraft was landed, large puddle of hydraulic fluid was seen under aircraft. Caused by hole in lateral cyclic servo pressure line due to chafing.

AH-1 Class E mishaps ☐ (S series) Aircraft pitched down and then up. Caused by imbalanced SCAS pitch channel. ☐ (S series) Master caution and No. 2 hydraulic lights came on. Caused by loose cannon plug.

OH-58 Class E mishaps ☐ (A series) Low-pitched whining noise was heard during runup, followed by illumination of hydraulic pressure light and master caution light. Caused by incorrectly secured hydraulic line fitting. ☐ (C series) Engine flamed out while at flight idle. Caused by incorrectly torqued jam nut.

TH-55 Class C mishap ☐ As aircraft was being shut down, tail rotor retaining nut separated from aircraft, striking tail rotor hub and main rotor blade. Suspect overtorque of tail rotor retaining nut.

U-8 Class E mishap ☐ (F series) Crew smelled burning wires and saw sparks from behind instrument panel during climbout. Aircraft was wired for two aims altimeters, but only one was installed on pilot's side of instrument panel. Copilot's altimeter was not aims, but cannon plug was in wiring harness. No electrical ties or other means to keep wire and cannon plug in place were present. Cannon plug fell down, striking bus bar and causing arcing as it shorted terminal lug and wire.

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	1-13 Oct	1	0
	November	2	0	November		
	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46	Total to Date	1	0

*Includes 1 ground accident

Messages received

- Safety-of-flight message concerning one-time inspection of CH-47 aircraft (CH-47-82-12, 301415Z Sep 82). Summary: Message provides information on forthcoming inspection to be performed on forward, aft, and combining transmissions of CH-47 aircraft as a result of a recent fatal accident. Contact: Michael West, AUTOVON 693-2470, commercial 314-263-2470.
- Safety-of-flight maintenance mandatory message concerning replacement of safety relief valve with plug on UH-1E/H/V and EH-1X aircraft (UH-1-82-05, 011600Z Oct 82). Summary: Fire recently destroyed one aircraft and damaged another. Cause of fires was attributed to faulty relief valve, which stuck open during pressure refueling of aircraft. Residual fuel from leaking valve caused fire when starter generator brushes were arced during start. Contact: Dick Mooy, AUTOVON 693-3300, commercial 314-263-3300.
- UH-60A maintenance information message concerning T700-GE-700 engine history recorder display protector and cancellation of maintenance mandatory message (MIM-82-T700-MEA-05, 302200Z Sep 82).
- OV-1 maintenance information message concerning extension of completion date for MWO 55-1510-217-50-2, replacement of autofeather/snychrophaser switch (MIM-82-OV-1-01, 242015Z Sep 82).
- Maintenance notice message for records management relative to emergency parachutes installed in aircraft ejection seats (301745Z Sep 82).

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

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 17 Feb 82 issue (8226) ☐ While on NOE training flight, crew felt vibration throughout airframe and heard loud noise. Aircraft spun rapidly to right, descended through trees, and came to rest on right side. Failure of white tail rotor blade pitch change link attachment bolt caused asymmetrically loaded tail rotor disc to flap and tail rotor 90-degree gearbox to separate from aircraft.

UH-1 Class A mishap in 10 Mar 82 issue (8230) ☐ Downgraded to Class B. Aircraft was hovering between two rows of parked helicopters. Main rotor blade hit tied-down main rotor blade of helicopter parked on left side. Transmission and main rotor system were torn from hovering aircraft. Aircraft then landed hard. Pilot did not insure he had adequate clearance on left side. He thought the individual performing PIC/copilot duties would tell him if he was too close to the aircraft on the left. PIC was watching closure rate, but failed to warn pilot in time for corrective action.

UH-1 Class A mishap in 14 Apr 82 issue (8236) ☐ Pilot and IP were on high-altitude training mission in mountainous terrain. On short final, during approach to plateau, pilot had insufficient left antitorque pedal to maintain directional control. Aircraft began to turn to right. Pilot tried to fly out of the turn instead of landing. Aircraft began to spin and crashed. Pilot had not flown in a high-altitude, mountainous environment since completing the training cycle the previous year and had not attended the required ground school. IP, who allowed pilot to attempt go-around, had not received training in high-altitude aviation operations during the preceding 6 years.

UH-1 Class A mishap in 14 Apr 82 issue (8237) ☐ Lead aircraft of a flight of four was at 90 knots and 125 feet agl when it hit a set of high tension wires. Aircraft pitched up, rolled right, hit trees, and came to rest on top left side. Copilot, who was on the controls, was flying at an excessive airspeed for the terrain and altitude selected and had channelized his attention on another set of cables. PIC was concentrating on his map and the terrain features. Current hazards map was not maintained in the operations area nor by the pilots involved. Crew failed to follow the unit SOP, which required a recon of the route. And they were flying lower than the altitude prescribed in the SOP.

8226

UH-1 Class A mishap in 21 Apr 82 issue (8240) ☐ While flying up a canyon toward rising terrain, copilot inadvertently applied aft cyclic, which caused airspeed to dissipate below effective translational lift. He then increased his demand for power and applied forward cyclic to try to regain airspeed. There was insufficient left antitorque pedal to maintain directional control, rotor rpm decayed, and aircraft began to turn to right. Copilot tried to fly out of the turn instead of landing. Aircraft crashed in a level attitude in a canyon. Copilot, who was not adequately trained in mountain flying, was looking for a missing aircraft instead of monitoring the performance of his aircraft. PIC was concentrating on his map and was overconfident in the copilot's ability to handle the aircraft in the flight environment in which they were operating.

UH-1 Class A mishap in 28 Apr 82 issue (8242) ☐ During hydraulics-off running landing, aircraft yawed to right and then to left as it climbed in a nose-high attitude to about 50 feet above the ground. While aircraft was in left yaw, left roll developed, which resulted in inverted attitude. Aircraft crashed on top forward left side of fuselage. IP may have allowed pilot to put the aircraft in an attitude from which it was impossible to recover.

8240

Followups

Attack helicopters

AH-1 Class A mishap in 27 Jan 82 issue (8221) ☐ Main rotor blades hit several trees during attempted takeoff from unlit confined area at night. Aircraft came to rest upright. Pilot did not establish a positive vertical ascent because he did not apply sufficient power to clear the trees and maintain a constant angle of climb. He allowed the aircraft to drift about 100 feet while at a hover. A ground guide was not used. Pilot did not brief copilot before the flight, and copilot did not crosscheck aircraft instruments during takeoff or take corrective action when he realized the aircraft was drifting rearward.

8221

AH-1 Class A mishap in 28 Apr 82 issue (8243) ☐ Fatigue failure of pitch link tube occurred during flight. The resultant loss of main rotor control induced violent airframe vibrations which caused tail boom and transmission case to fracture and separate from aircraft. Aircraft descended out of control and exploded on impact.

AH-1 Class B mishap in 5 May 82 issue (8246) ☐ Aircraft mechanic was performing ground runup check, channelized his attention outside the cockpit, and failed to detect the aircraft was becoming light on the skids. Mechanic induced left pedal. As aircraft began to rotate left, throttle was rolled off, causing aircraft to spin to left three to four times. Another mechanic fell from the ammo bay door and was hit and severely injured by tail rotor blade.

Cargo helicopters

CH-47 Class B mishap in 28 Apr 82 issue (8244) ☐ No. 1 engine mechanical transmission exploded and caught fire during maintenance operational check. Fire spread to No. 1 engine and nacelle. Transmission sprag clutch subassembly overheated because of excessive friction.

Observation helicopters

OH-58 Class A mishap in 4 Nov 81 issue (8205) ☐ Main shaft bearing in fuel control governor overheated and failed during training mission, probably as a result of ineffective lubrication. Malfunction of governor caused reduction in engine, main rotor, and tail rotor rpm and tail rotor effectiveness. Aircraft spun uncontrollably to right, crashed through trees, and was destroyed.

Fixed wing

U-8 Class A mishap in 14 Apr 82 issue (8239) ☐ Downgraded to Class C. Right main landing gear actuator failed in intransit mode, preventing full extension of gear and allowing it to collapse during landing. Aircraft slid off runway. Gear failure was the result of accelerated wear caused by incorrect assembly. ■

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More power to you

It's no secret that performance of both helicopters and gas turbine engines decreases as summer temperatures and density altitudes increase. We've known this fact for a long, long time. Yet, armed with this knowledge, we still find that as temperatures rise, so does the number of engine-related mishaps.

Can this increase be attributed solely to pilot error or complacency? Human nature being what it is, a pilot may, on occasion, fail to consider the effects of heat and density altitude on his aircraft and engine; or he may fail to correctly evaluate the load he is attempting to lift. However, in most instances, this is not the case. The majority of the engines involved in these types of mishaps were simply not up to par, but they went right on working without registering any complaint—until they were asked to put out more than they were capable of doing in their sick condition. The result was surge, high egt, and in some instances, total engine failure—all because the engines hadn't complained and no one had bothered to ask them how they felt.

This gives rise to other questions. Why, if most of these mishaps are not pilot-error type, do they suddenly occur with a change from cool to hot weather? If an engine is sick, isn't it just as sick in the winter as in the summer?

Erosion

Let's consider an engine suffering from compressor erosion—a potentially hazardous condition. Depending on the degree of erosion, the engine may not show any unusual symptoms and may perform normally, especially during cold weather. But should the outside temperature increase, the requirement for engine power will also increase. Since the air is less dense, engine efficiency will decrease. This means the compressor must now rotate faster to maintain proper compression at any given power setting.

Since compressor blades are actually "little wings," each functions aerodynamically in a manner similar to that of an aircraft wing. Erosion of these blades changes their shape and reduces their surface area. Just a few hundredths of an inch wear will significantly alter both their size and shape, rendering them incapable of supporting the load they were originally designed to carry. When this happens, compressor stall becomes almost inevitable.

Because of the high velocities at which they operate, compressor blades are readily subjected to erosion when sand, grit, or even small dust particles flow across them. To protect these blades, we rely on air filters and particle separators. These must be properly maintained and kept clean if they are to effectively do their respective jobs.

Keep in mind that a properly functioning T53 particle separator is, at best, only 70 percent efficient. This means that approximately 30 percent of **all** solid particles—large and small—that get past the filters and enter the separator will continue through the engine. And air coming out the purge line when the engine is operating does not insure the

(continued on next page)

Need for frequent particle separator inspection to insure cleanliness and proper operation is emphasized by buildup of impacted dust along root area of these turbine blades.

More power to you

separator is working properly. Engine compressor bleed air is directed to a venturi effect ejector mounted at the bottom of the lower half of the separator. If the port to the ejector becomes plugged, the separator will not purge, allowing all sand and dust ingested into the intake to enter the engine. The Safety Center has numerous reports on file in which an inoperative self-purging particle separator was a cause factor. In two of these instances, the lower half of each separator was full of compacted dust. Only the purge tube had been cleaned.

Unfortunately, because of high air velocity and pressure, the greatest erosion occurs first in the aft compressor stages where the smallest and thinnest blades are located. Once these blades become worn and lose their efficiency,a deceleration (decel) stall is likely to occur when power is reduced and the bleed band opens, causing a sudden increase in airflow velocity.

While the decel stall serves as a positive indicator that all is not well within the engine, it seldom causes damage. However, another type of stall that can occur when power is demanded poses a serious threat to the safety of both aircraft and occupants and must be avoided. High power settings cannot be maintained and the aircraft may be forced to land, even if a landing site is not available. Obviously, for maximum protection from erosion, the filters, particle separator, and engine must all be properly maintained and kept clean. In addition, that portion of the engine that is visible should be inspected frequently for warning signs that might indicate an eroded compressor. This includes a check of the inlet guide vanes for a sandblasted or polished appearance and the first stage compressor blades for any detectable erosion in the blade root areas. But erosion is only one of the major causes of compressor stalls. Others include incorrect variable inlet guide vane (VIGV) rigging and compressor bleed assembly operation.

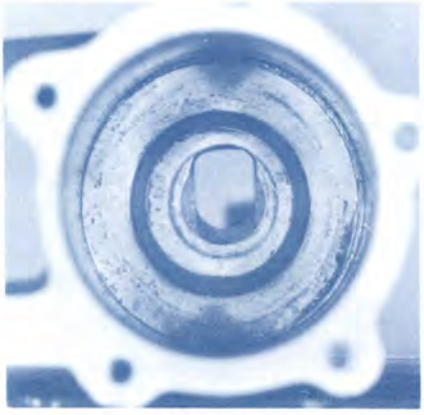
Variable inlet guide vanes

Incorrect VIGV rigging has played a prominent role in compressor stalls associated with T53 series engines. And the most common corrective action has been replacement of the fuel control unit. In most instances, the reason this action cures the stall problem is because it requires rerigging of the VIGVs. Bear in mind that VIGV rigging can change through normal wear. This is especially true if an aircraft is extensively operated in a dusty nap-of-the-earth (NOE) environment. Since the exterior of the engine is not protected from sand and dust, the rapid continuous power changes required during NOE flight cause accelerated wear of all exposed linkages. As a precautionary measure, all aircraft operated in an NOE environment should be given a VIGV rigging check after every maintenance action that could affect VIGV rigging.

Compressor bleed assembly

This assembly which consists primarily of the interstage bleed actuator, bleed band, and attaching parts operates by

Sticky compound collects on top of piston, holds dirt, and causes piston to bind and score cylinder.



Closeup showing compound and dirt collected inside return spring and cylinder.

compressed air in conjunction with the variable inlet guide vanes. Any binding, sluggish, or out-of-phase operation during power changes will result in loss of power, high egt, and often in compressor stalls. For proper operation, cleanliness is an absolute necessity. In fact, most bleed-band-related T53 and T55 compressor stalls have resulted from sticking or dragging of the actuator piston. The piston of the T53 series engines extends vertically out of the actuator housing. During engine cleaning operations, water, dirt, and cleaning fluid will enter the housing from around the piston shaft if no protective measures are taken. The same will happen with the T63 series if the bleed valve is not kept clean.

For safety reasons, TM procedures for cleaning the engine inlet area, inlet guide vanes, and the compressor rotor blades must be accomplished in the sequence specified; and the caution which states that cleaning solution or water must **not** be sprayed into the engine inlet while the engine is running must be observed. A stream of liquid directed against the compressor blades at operating rpm can cause the blades to oscillate at a high frequency, resulting in fatigue damage to the blades and subsequent blade failure.

Stringent care must also be exercised to insure that the water soluble cleaner does not enter the cabin heat system during engine cleaning operations. When heated, this cleaner becomes a powerful irritant, and the fumes emitted, if breathed or allowed to contact the eyes, can incapacitate the pilot during flight.

Closing the T53 series bleed band with a metered air source (not to exceed 60 psi) will prevent cleaning solvent from blowing out the bleed ports and entering the bleed band actuator from around the piston shaft. However, when the engine exterior is cleaned, the Safety Center recommends the entire bleed band actuator be inclosed with some type of waterproof material, such as a plastic bag wrapped with tape. Since the actuator is a "dry" assembly that requires no lubrication, any contaminants that are allowed to collect in the actuator housing can cause erratic operation of the bleed band.

Finally, to insure correct operation of the bleed band, a closure check should be made, using the bleed band closure range charts.

Insuring that no air leaks exist and that the three major engine areas discussed are properly maintained will collectively go a long way toward preventing compressor stalls, particularly those usually associated with hot weather operations. However, reliance on these efforts alone does not guarantee freedom from engine problems. FOD, for example, can result in engine failures. So can improperly adjusted fuel control units. Don't forget that those T53s that could not be topped in the winter months must be topped as soon as temperature and weather permit.

Obviously, for maximum engine efficiency, performance, reliability, and safety, **total** engine care is essential. This means that timely inspections thoroughly performed and by-the-book maintenance of all engine components and assemblies must be the rule. Yet, despite your best efforts, you cannot always identify every potential problem as soon as it begins to develop. However, you can keep a constant check on your engines for early symptoms of some malady that could, if neglected, cause serious in-flight problems. And you can do this safely and easily by use of the health indication test, more commonly referred to as the HIT check.

In brief, this check consists of facing the aircraft into the wind, stabilizing the rpm and egt, then increasing N_1 to the proper value for the existing outside air temperature as indicated by the chart on board the aircraft, and then noting and recording the egt. A variation of 20 degrees or greater from the base line temperature established for that engine requires an entry on DA Form 2408-13. Should the egt vary 30 degrees or more, the aircraft should be considered unsafe for flight. This is also cause for grounding aircraft and entry on the DA Form 2408-13 until troubleshooting determines cause for the egt (tgt) change.

The effectiveness of this check depends first on accurately establishing all base line data after insuring the engine is in good health (regardless of engine operating hours); and second on the care exercised to insure accuracy when performing the HIT check itself. A complete explanation of HIT procedures can be found in the engine technical manual for the aircraft.

Despite the effectiveness of properly performed HIT checks, it is important to keep in mind that this test monitors only those portions of the engine exposed to or affected by the gas flow path. HIT supplements spectrographic oil analysis, engine vibration checks, topping checks, and other established engine maintenance procedures and is not intended to replace them.

If your engine could talk, it would summarize its needs in four short, simple statements:

- Keep me clean.
- Inspect me often.
- Maintain me correctly.
- Test me daily.

That sounds like good advice anytime. But during the hot summer months, it's more than just good advice—it's an ultimatum.

Point of contact at the Safety Center is Jack Carter, AUTOVON 558-4202/4198. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) SIP was giving PIC evaluation checkride. During simulated forced landing, PIC thought he would overshoot the selected landing area. SIP took control and made 360-degree turn. At 400 feet agl, SIP initiated power recovery procedures, noting split needles, 250 rpm rotor tachometer, and engine rpm at 6700. SIP identified sprag clutch failure, reduced collective full down, and rolled throttle to flight idle. Aircraft touched down hard in a plowed field. 8322

UH-1 Class C mishaps □ (H series) Engine quit during flight at 50 feet agl. Aircraft landed in plowed field, slid 45 feet, pitched nose low, and rocked aft. Main rotor blades, tail rotor drive shaft, and tail boom were damaged. Suspect fuel control failure. □ (H series) Partial power loss occurred during contour flight. Rpm warning light and audio activated. Aircraft touched down in muddy, sloping field. Forward cross tube and right skid were damaged. Cause of power loss could not be determined. □ (M series) Main rotor blade struck tree during NOE flight. Blade tip cap was cracked. □ (H series) As aircraft crossed a hill during NOE flight, left chin bubble hit tree. □ (H series) A package of six night vision goggles fell from aircraft. Goggles were recovered. Three pair were not reparable. Goggles were not adequately secured in aircraft.

UH-1 Class E mishaps □ (H series) Master caution and transmission oil pressure lights came on, and oil pressure decreased. Aircraft had lost 6 quarts of transmission oil due to failure of O-ring between clutch assembly and grease retainer. □ (H series) Crew heard loud banging sound during landing. Caused by faulty fuel control. □ (H series) Excessive pressure was required to operate pedals during flight. Caused by defective tail rotor servo. □ (H series) During start, pilot was told that tail rotor tiedown was still hanging from vertical fin. After shutdown, green part of tiedown strap was thrown free of aircraft and red part of strap was wrapped around 90-degree gearbox drive shaft and tail rotor PC links. □ (H series) Low rpm audio and warning light activated after liftoff. Caused by sheared rotor tachometer generator shaft. □ (H series) During approach with hydraulics turned off, hydraulic pressure came on just before landing. Inspection of switch revealed it could be turned on or off with no effect on hydraulic system. Three-way hydraulic valve was stuck in open position.

Attack helicopters

AH-1 Class A mishap □ (S series) IP was flying in rear seat and rated student pilot was in front seat. Both pilots were wearing night vision goggles. IP focused his attention inside aircraft to check radio frequencies, and aircraft hit trees. Aircraft then crashed in nose-low attitude and rolled inverted. 8323

AH-1 Class C mishap □ (S series) Main rotor blades hit tree during NOE flight. Blades were dented and torn.

AH-1 Class E mishaps □ (S series) Airspeed indicator fell to zero during flight. Pilot had set publications packet on pitot line in area behind pilot's seat and cracked the line. □ (S series) Transmission oil bypass light came on. Caused by failure of oil bypass switch. □ (S series) Engine oil pressure light came on during hover. Caused by failure of pressure switch.

Cargo helicopters

CH-47 Class B mishap □ (C series) Aircraft landed on a pad, with aft wheel on pad and front wheels off pad. Forward blades hit hillside at aircraft's 2 o'clock position. 8324

CH-47 Class E mishaps □ (B series) Transmission temperature gauge went to zero. Caused by failure of temperature selector switch. □ (C series) No. 2 engine N_1 fluctuated, torque peaked at 56 percent, and rpm dropped to 240. Caused by failure of fuel control. □ (C series) No. 2 engine chip detector light came on. Crew immediately set external load down. Area was not adequate for a landing, so crew continued flight to a suitable area. No. 2 engine condition lever was brought to ground position. Contrary to performance planning computations, aircraft could not sustain single-engine flight and began to settle. A satisfactory landing area was not available, so engine condition lever was returned to flight. Rotor rpm reached 267 before crew could stop it. Aircraft was landed with no damage. Caused by broken post on engine chip detector plug. □ (C series) No. 1 engine oil pressure dropped and engine oil temperature increased during taxi. Oil filter was clogged by a mixture of water and magnesium.

Observation helicopters

OH-6 Class E mishap □ Crew heard loud noise in transmission area, followed by vibration. Sound controlling blanket had deteriorated and particles were ingested into impeller.

OH-58 Class C mishaps □ (C series) Main rotor blade hit tree during NOE flight. □ (C series) Aircraft began spinning to right while at 50 feet agl. Airspeed was 25 knots. Pilot reduced collective and neutralized pedals. Spin continued and low rpm audio was heard. Pilot reduced collective to flat pitch and pedals to neutral. At 3 feet agl, 75 percent collective was applied and spin stopped. Aircraft landed hard, damaging skids and cross tubes. Crew estimated three complete spins occurred.

OH-58 Class E mishaps □ (A series) Cyclic was uncontrollable momentarily and collective was stiff during hover.

(continued on next page)

Caused by failure of swashplate assembly. ☐ (A series) Grinding noise was heard. Caused by failure of aft freewheeling unit bearing. ☐ (C series) Stiffness in cyclic control during approach was caused by malfunction of force gradient.

Fixed wing

C-12 Class E mishap ☐ (A series) Red lights in gear handle stayed on after takeoff, with gear full up. Gear was lowered and raised three times. On the third try, gear almost stopped two-thirds up before it was lowered. Caused by weak landing gear motor and excessive grease in newly installed main gear actuators.

OV-1 Class C mishap ☐ (D series) Aircraft was being taxied to parking area. Pilot was told to turn right. Wing hit fence obstruction light. Underside of wing and left aileron skin were damaged.

T-28 Class E mishap ☐ Excessive smoke was seen coming from left engine exhaust area during climbout. Engine then began to run rough. Caused by failure of cylinder.

U-3 Class C mishap ☐ (B series) Pilot did not remove left wing tiedown before takeoff. Tiedown ring pulled from attachment, causing bracket and skin damage.

U-8 Class E mishap ☐ (F series) Left engine began running rough and cylinder head temperature decreased. Caused by failure of idle fuel solenoid.

Maintenance

UH-1 Class E mishaps ☐ (H series) Master caution and left fuel boost lights came on. Fuel flow switch would not activate. Caused by finger screen being installed in fuel "T" fitting. Screen was clogged. A message 5 years ago required removal of screen. ☐ (M series) Grinding sound was heard from transmission area, followed by master caution and No. 2 hydraulics lights. Caused by chafed pressure hose to fore and aft cyclic servo. ☐ (H series) Engine failed during runup. Cannon plug was seated incorrectly, causing contact pin to dislodge.

AH-1 Class E mishaps ☐ (S series) Roll SCAS hardover occurred during flight. SCAS card was out of adjustment. ☐ (S series) Pilot noticed engine oil pressure was too high during flight. Caused by incorrectly adjusted oil pressure regulator valve.

CH-47 Class E mishap ☐ (C series) Engine quit during hover. Fuel starvation was caused by chafed fuel line.

OH-58 Class E mishaps ☐ (A series) Transmission pressure light came on during hover. Caused by frayed insulation on wire at pressure switch. ☐ (C series) Low rpm audio and light activated. Caused by loose cannon plug.

OV-1 Class E mishap ☐ (RV-1D) Altimeter and vertical velocity indicator were inoperative after takeoff. Caused by pinched hose.

U-21 Class E mishap ☐ (H series) Pilot noticed significant temperature difference between No. 1 and No. 2 engines. Suspect incorrect assembly of inlet guide vane.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	1-11May	**2**	**0**
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**14**	**7**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Maintenance information message concerning UH-60 expanded aft center of gravity limits (MIM-UH-60A-MEA-83-08, 261530Z Apr 83).

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

Recap of TSARCOM messages

Following is a list of AIG 8881 addressed messages transmitted by TSARCOM from 1 January through 31 March 1983.

UH-60A-83-01 Maintenance mandatory revision to UH-60-82-20 on engine output shaft

UH-1-83-01 Maintenance mandatory revision to TM 55-1520-210-23-1, C35

UH-1-83-02 Safety-of-flight emergency one-time inspection for certain 540 series main rotor blades (UH-1C and M models only)

UH-1-83-03 Safety-of-flight emergency one-time inspection for certain 204 series main rotor blades (all UH-1 except B, C, and M models)

AH-1-83-01 Safety-of-flight emergency one-time inspection of certain 540 series main rotor blades

OH-58-83-01 Safety-of-flight emergency one-time inspection of certain 206 series main rotor blades

UH-60-83-02 Maintenance mandatory message concerning one-time inspection of flight controls - directional control lever assembly

UH-60A-83-03 Maintenance mandatory message concerning one-time inspection of stabilizer assembly (applicable to one unit only)

UH-1-83-04 Safety-of-flight technical message concerning one-time inspection for certain 540 series main rotor blades (C and M models only)

UH-1-83-05 Safety-of-flight technical message concerning one-time inspection for certain 204 series main rotor blades on all UH-1 aircraft except B, C, and M models

UH-1-83-06 Safety-of-flight emergency message concerning one-time inspection for certain 540 series main rotor blades (C and M models only)

UH-1-83-07 Safety-of-flight emergency message concerning one-time inspection for certain 204 series main rotor blades except B, C, and M models

UH-1-83-08 Safety-of-flight emergency message concerning one-time inspection for certain 540 series main rotor blades (C and M models only)

UH-1-83-09 Safety-of-flight emergency message concerning one-time inspection for certain 204 series main rotor blades except B, C, and M models

AH-1-83-02 Safety-of-flight technical message concerning one-time inspection for certain 540 series main rotor blades

AH-1-83-03 Safety-of-flight emergency message concerning one-time inspection for certain 540 series main rotor blades

AH-1-83-04 Safety-of-flight emergency message concerning one-time inspection for certain 540 series main rotor blades

SOU-AH-1-83-01 One-time inspection for LAAT telescopic sight unit

OH-58-83-02 Safety-of-flight technical message concerning one-time inspection for certain 206 series main rotor blades

OH-58-83-03 Safety-of-flight emergency message concerning one-time inspection for certain 206 series main rotor blades

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

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Accident review: blowing dust

Synopsis

The UH-1H pilot was terminating a night formation approach to a sandy road. Blowing dust caused the pilot to lose visual reference with the ground. The right skid hit the ground, and the helicopter rolled onto its right side.

History of flight

The aircraft flew 3.7 hours during the day, landing at 1630. A night training mission was scheduled to begin at 0200. The crew preflighted the aircraft at 2130 and began a rest/sleep period at 2230.

At 0225, the UH-1 crew and the crews of three other helicopters flew to a landing strip 10 minutes away, where they received a mission briefing. The mission called for a false troop insertion at a drop zone (DZ). The danger of possible brownout conditions was stressed repeatedly during the mission briefing.

The aircraft were restarted and the flight departed in a staggered left formation. The formation overflew the DZ and began their approach to the east, with the lead helicopter lined up with a dirt road running through the DZ. As the aircraft descended to about 8 feet above the ground, rotorwash started to pick up sand, causing the copilot to make a comment about brownout. The pilot said he was not concerned about the dust and continued the approach.

The approach was terminated about 1 foot above the ground, and the aircraft started drifting forward and to the right. The pilot tried to correct by pulling up on the collective and applying left lateral cyclic as the right skid hit the ground. The aircraft then yawed left and rolled to the right about the horizontal axis of the right skid, causing the main rotor blades to strike the ground. The Huey came to rest on its right side.

Crewmember experience

The 32-year-old pilot had more than 500 rotary wing flight hours, with more than 400 in the UH-1H. The 22-year-old copilot had almost 600 rotary wing hours, with more than 500 in the UH-1H.

Commentary

Instead of making a go-around or continuing the approach to the ground in accordance with FM 1-51 and TC 1-13, the pilot terminated the approach to a 1-foot hover and allowed the aircraft to drift to the right. The blowing dust caused the pilot to shift his outside visual reference point to an area about 5 to 8 feet out his left door. He did not recognize the aircraft was entering dynamic rollover conditions.

Command supervision of the night flying operation also contributed to the accident. The unit crew rest policy was not followed. The crew of the accident aircraft received only 5½ hours of rest during the previous 24 hours. The crews of all four aircraft in the flight exceeded the 16-hour duty day limit specified by the unit policy and recommended by AR 95-1. ■

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class B mishap in 23 Jun 82 issue (8260) ☐ Downgraded to Class C. Aircraft was being hovered to designated parking spot. There was a ground guide in front of aircraft and one in the rear. As pilot was backing aircraft into parking spot, main rotor blade hit tree branches on left side of aircraft. Pilot set aircraft down, lowering the blades into larger limbs.

UH-1 Class A mishap in 1 Sep 82 issue (8277) ☐ Aircraft landed hard during low-level autorotation at night. Tail boom was severed. Aircraft bounced and came to rest inverted. IP failed to properly supervise and anticipate the actions of the pilot because of inadequate attention and overconfidence in the ability of the pilot. IP placed his hands in his lap and his feet flat on the floor while pilot was performing the maneuver. IP was not in a position to prevent or restrict control inputs of the pilot or regain control of the aircraft when it became airborne after the initial autorotative touchdown.

UH-1 Class A mishap in 15 Sep 82 issue (8281) ☐ During approach to mortar firing point, aircraft crossed a tree line just as a round was fired from the tree line to the right front of the aircraft. IP reacted by abruptly turning the aircraft to the right. The steep angle of bank at low airspeed exceeded the performance limits of the aircraft, causing a loss of control. Aircraft crashed into trees.

UH-1 Class A mishap in 22 Sep 82 issue (8284) ☐ Aircraft was on MAST mission. Pilot made an airspeed over altitude takeoff in a narrow canyon and flew through the canyon at a low altitude and an airspeed excessive for the terrain to be negotiated. Pilot was unable to successfully maneuver the aircraft through a series of turns, and main rotor blades hit a tree. Control was lost and aircraft hit the canyon wall, crashed, and burned.

UH-1 Class A mishap in 22 Sep 82 issue (8285) ☐ Pilot was on an unnecessary low-level flight over a bay. Aircraft hit wires about 100 feet above the water. As pilot tried to land on shore, aircraft landed hard and rolled onto right side.

UH-1 Class A mishap in 22 Sep 82 issue (8286) ☐ Downgraded to Class B. During termination phase of night formation approach to a sandy road, pilot terminated his approach at a 1-foot hover. Pilot lost visual reference in blowing dust, and aircraft drifted forward and right. Pilot applied collective pitch as right skid hit the ground instead of reducing collective pitch to place the aircraft on the ground. Aircraft rolled onto right side.

UH-1 Class A mishap in 22 Sep 82 issue (8287) ☐ Downgraded to Class B. During first supervised solo in UH-1H, student pilot allowed aircraft to touch down hard on left skid and then on right skid. Aircraft bounced into the air and spun to right several times. Nose pitched up, and tail rotor hit the ground. Aircraft rolled right and main rotor blades hit the ground. Aircraft then landed hard. Skids collapsed and main rotor severed tail boom.

8286

8277

8285

8291

8247

UH-1 Class A mishap in 29 Sep 82 issue (8288) ☐ Because of failure to follow specific requirements for calculating weight and balance and aircraft performance data, PIC and pilot were unaware of the critical parameters in which they were operating. Heavily loaded aircraft was hovered in a downwind condition over rough terrain. Aircraft entered uncontrollable right turn. Engine and rotor rpm bled down and antitorque control decayed. Aircraft crashed in nose-low attitude.

UH-1 Class A mishap in 29 Sep 82 issue (8289) ☐ Pilot heard loud banging noise from rear of aircraft during climb. Tail rotor control was lost and aircraft spun to right. Control could not be regained, and aircraft crashed, coming to rest on left side. Caused by separation of No. 2 section of tail rotor drive shaft from drive train. Separation was caused by retainer nut backing off on retainer bolt used to couple forward coupling and spherical coupling. Cotter pin was not installed during repack of tail rotor drive shaft.

UH-1 Class A mishap in 29 Sep 82 issue (8290) ☐ After aircraft was refueled, start was attempted. On ignition, engine was engulfed in flames. Fire could not be extinguished, and aircraft was destroyed. Suspect materiel failure of the safety relief valve provided a fuel source in the area of transmission well.

Attack helicopters

AH-1 Class A mishap in 12 May 82 issue (8247) ☐ On termination of tactical training mission, two AH-1 aircraft passed over the intended landing area at 50 feet above the trees and 120 knots indicated airspeed. Pilot of lead aircraft broke to the left for landing. Pilot of the second aircraft climbed about 100 feet and made a steep right turn. At the apex of the turn, aircraft was about 150 feet above the trees with a 45-degree angle of bank. Pilot tried to correct an out-of-trim condition. Application of right antitorque pedal resulted in the aircraft rolling right and entering a high rate of descent. Aircraft crashed on a small hill. The maneuver over the landing area unnecessarily placed the aircraft in the caution area of the operator's manual height velocity diagram and was in violation of local operating procedures and regulations.

AH-1 Class A mishap in 29 Sep 82 issue (8291) ☐ Pilot made night approach to lighted inverted "Y" at field site. Approach was fast and steep, requiring abrupt deceleration at termination and subsequent demand for excessive power from engine. Demand for excessive power bled down engine and rotor rpm, reducing ability to slow descent of aircraft. Aircraft landed on tail skid and heels of main skids while still moving forward. Left skid dug into soil and aircraft rolled onto left side. Pilot had never made an approach to a tactical field at night from the front seat.

AH-1 Class B mishap in 29 Sep 82 issue (8292) ☐ Aircraft was on NOE flight. During shallow right turn, main rotor blades hit the tops of two trees. Aircraft was landed in confined area. Copilot was looking into the telescopic sight unit and was not helping pilot with obstacle clearance. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) About 15 feet above the ground during approach to pinnacle LZ, aircraft began uncommanded turn to right. Pilot reduced power and turned away from the pinnacle to fly down the mountainside in an attempt to gain airspeed. As aircraft descended, tail boom hit trees. Aircraft crashed and came to rest inverted. Suspect tail rotor malfunction. Investigation in progress. 8325

UH-1 Class E mishaps □ (H series) Cyclic became almost uncontrollable during flight. Caused by malfunction of servo cylinder. □ (H series) Master caution and hydraulic lights came on. Caused by failure of hydraulic pump. □ (H series) Master caution and right fuel boost lights came on. Caused by defective fuel flow switch. □ (H series) Engine tachometer dropped to zero. Caused by failure of dual tachometer indicator. □ (H series) Aircraft yawed rapidly to right. Caused by malfunction of fuel control.

UH-60 Class C mishaps □ Main rotor blade tip cap hit tree branches during takeoff from LZ, damaging tip cap. □ Large bird flew through center windshield as aircraft was flying at 2,000 feet msl. Pilots were not injured. □ Aircraft was hovering with slingload attached. Hook released, and $26,000 vehicle fell to ground and was destroyed.

UH-60 Class E mishaps □ Pilot saw three aircraft coming directly toward him. Steep right turn was made, and main rotor blades hit and cut a wire. Aircraft was landed with no damage. Aircraft was being flown too fast for NOE altitudes. □ Stabilator failed after takeoff. Caused by malfunction of linear servo accelerometer.

Attack helicopters

AH-1 Class E mishaps □ (S series) Master caution and No. 2 hydraulic lights came on. Caused by failure of hydraulic pressure switch. □ (S series) Pilot heard hydraulic pump cavitate, and No. 2 hydraulic light came on. Caused by cracked T fitting from emergency hydraulic valve solenoid to No. 2 hydraulic system pressure line on collective servo. □ (S series) Transmission oil pressure exceeded limits during hover. Caused by failure of transducer. □ (S series) Left pedal stuck when it was about 3 inches forward of center. Antikick panel on right side of gunner compartment was bent and rubbing on pedal tube.

Cargo helicopters

CH-47 Class E mishaps □ (B series) When APU switch was placed in stop position during runup, No. 1 and No. 2 generator and transformer rectifier and No. 2 hydraulic boost lights came on. After shutdown, inspection revealed both shafts had sheared. Suspect malfunction of AGB drive clutch. □ (C series) Transmission oil pressure light came on. Caused by failure of pressure transducer.

Observation helicopters

OH-58 Class A mishap □ (C series) Aircraft was on NOE training flight. IP was on the controls and student pilot was navigating. About 5 minutes into the flight, student told IP to turn left. IP turned and saw a set of wires. As aircraft crested a small ridge, it began an uncommanded turn to the right, which quickly accelerated into a spin. Winds were 10 to 15 knots. IP lowered collec-

tive, reduced left pedal, and added forward cyclic, with no effect on the spin. Aircraft cleared the wires while still spinning. IP rolled off throttle and entered autorotation. Aircraft crashed in nose-low attitude through 50- to 60-foot trees. 8326

OH-58 Class E mishaps □ (A series) Engine oil temperature increased during flight. Caused by failure of temperature gauge. □ (C series) Pilot was hovering, watching AH-1 firing turret. Rotorwash from AH-1 lifted a mortar illumination canister with parachute, which drifted toward OH-58. When parachute was close enough to be affected by OH-58 rotorwash, canister swung underneath rotor system and hit nose panel between pilot's nose bubble and front window, knocking hole in skin.

Fixed wing

C-12 Class E mishaps □ (C series) Aircraft took off from wet runway, with ice vanes extended and brake device off. Flight was conducted in below freezing temperatures. During landing, aircraft veered slightly left. Postflight inspection revealed flat inboard tire on left main gear. Moisture on runway and below freezing temperatures apparently caused ice to form on left inboard brake assembly. □ (C series) As power was applied for takeoff, pilots noticed high tgt and fuel flow on right engine. Caused by failure of compressor turbine.

OV-1 Class E mishap □ (RV-1D) Gear would not extend. Hydraulic failure was confirmed. Pilot used emergency system to extend gear and landed. ►

Mishap briefs

Caused by failure of preformed packing in right brake assembly dual disk.

U-21 Class C mishap □ (G series) Aircraft was struck by lightning. Right wing tip, both engines and propellers, both inverters, left outboard flap, and right aileron were damaged.

U-21 Class E mishaps □ (A series) No. 2 engine power fluctuated during takeoff. Copilot did not secure oil cap during preflight, and 5 to 6 quarts of oil were lost. □ (A series) Banging noise was heard during flight. ADF antenna had broken off at forward attaching point.

Maintenance

UH-1 Class E mishap □ (H series) Aircraft, with internal auxiliary fuel tank mounted on the right side, was being flown on an extended VFR flight plan. After 1.8 hours of flight, with 950 pounds of fuel remaining in main tanks, auxiliary fuel switch was turned on. Fuel gauge increased to 980 pounds, stopped, and then slowly decreased. Pilots determined that auxiliary fuel tank was not being transferred properly and elected to refuel at an airfield about 20 minutes away. At the airfield, fuel was found in the recessed area of the floor which contains the auxiliary fuel tank receptacles. During installation of the auxiliary tank, maintenance personnel had not correctly secured main fuel line to floor receptacle.

UH-60 Class E mishap □ Master caution and tail rotor transmission hot temperature lights came on. Caused by oil on tail rotor gearbox cannon plug. Oil had not been cleaned after gearbox was flushed and drained.

AH-1 Class E mishap □ (S series) Pilot felt some directional instability and heard loud noise. When he landed, he discovered that access panel on belly of aircraft allowing entry to logic relay assembly was hanging by five bolts on aft section of panel. Aircraft had just come from phase inspection and panel had been reinstalled with bolts only finger tight.

CH-47 Class E mishaps □ (B series) No. 2 hydraulic pressure was lost during flight. Caused by incorrectly torqued hydraulic line fitting. □ (C series) Caution light came on, and crew chief saw smoke and fire in avionics closet. Caused by chafed wires.

OH-58 Class E mishap □ (A series) N2 tachometer needle stayed at 10 percent during runup. Caused by loose wire on cannon plug.

C-12 Class E mishap □ (C series) Smoke was seen trailing from vicinity of left engine exhaust stack. Fitting on oil scavenge line was only hand tight and backed off, allowing oil to be pumped into engine compartment.

T-28 Class C mishap □ Postflight inspection revealed broken nose gear door assembly. Caused by incorrect installation of right forward nose gear door control rod link.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	1-18 May	**7**	**1**
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**19**	**8**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Safety-of-flight message concerning one-time inspection of tail rotor gearbox support fitting assembly on all CH-54A/B aircraft (CH-54-83-02, 032000Z May 83). Summary: A recent H-53 accident may have involved a corrosion fatigue failure in a tail gearbox mounting foot. Based on this finding, a one-time inspection for cracks on all CH-54 tail gearbox mounting lugs must be performed within the next 10 flight hours or 30 days. Contact: Michael West, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

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

Shortfax

Prepare for summer exercises

With the summer months fast approaching, many units, Active Army and National Guard, are preparing for field training exercises. Units participating in these exercises should be aware of common "away from home" problems and take appropriate action to prevent them.

Recurring problem areas observed during field training exercises are discussed in detail in a Safety Center pamphlet entitled "Safety Tips for Aviation Operations During Field Training Exercises." To get your pamphlet, write Commander, U.S. Army Safety Center, ATTN: PESC-CA, Fort Rucker, AL 36362, or call AUTOVON 558-4479/5915, commercial 205-255-4479/5915.

The following aviation safety films would also be helpful in preparing for training exercises:

- Helicopter Weight and Balance, TF 46-2339. Calculation of center of gravity limits and weight-balance requirements; problems of balance during flight; use of ballast.
- Wire Strikes, TF 46-6208. Based on actual helicopter accidents. Teaches that serious accidents occur when pilots are careless, when they do not take the time to plan a flight, or do not check the hazard map, and when they fly unauthorized terrain flights.
- Loss of Visual Cues—With Eyes Wide Open, TF 46-6209. Advises helicopter pilots of correct actions to take to avoid loss of visual cues in blowing dust, sunglare, and blackout situations.
- NOE Deceleration, TF 46-6226. Depicts correct method to safely accomplish NOE decelerations.

You can get these films from your local Training and Audiovisual Support Center. ■

Radioactive materials in engines

Army T-53, T-55, and T-63 aircraft engines contain magnesium-thorium alloy components. Although thorium is a radioactive material, these components do not present a significant radiation hazard in normal handling and use. Magnesium-thorium alloy is potentially hazardous if inhaled or ingested. Title 10, Code of Federal Regulation, Part 10, specifically prohibits "any chemical, physical, or metallurgical treatment or processing" of this alloy. Disposal of magnesium-thorium components must be in accordance with AR 385-11. ■

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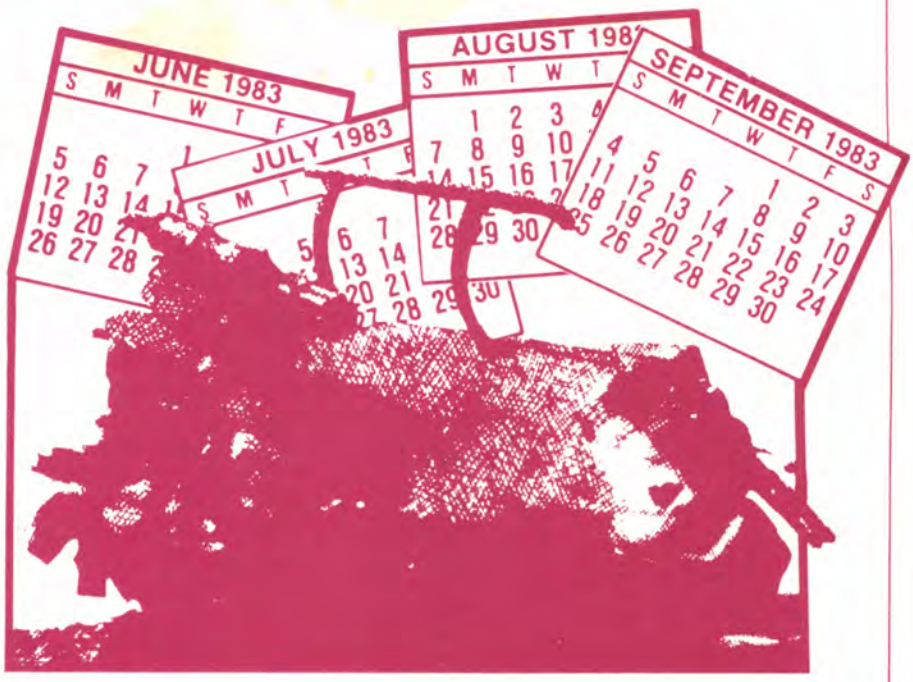
Cutting losses in the months ahead

Through the first 6 months of fiscal year 83, we recorded only 7 Class A aircraft mishaps, compared to 24 for the first half of FY 82. Seven people were killed in two of the seven mishaps. The Class A aircraft mishap rate per 100,000 flying hours was 1.06 for the first half of this year, compared to 3.17 for the same period in fiscal 82. This is a tremendous achievement in terms of resource savings.

The 12 January 1983 issue of FLIGHTFAX contained a synopsis of the four Class A mishaps for the first quarter of FY 83. To refresh your memory, these mishaps involved a UH-1H nonmountain-flying-qualified pilot and copilot who crashed while on a mission in mountainous terrain; an AH-1S which crashed during a training flight when the IP allowed the pilot to land at a high rate of speed and then tried to make a power recovery without first reducing collective pitch; another UH-1H whose pilot lost visual reference in blowing snow while landing; and an OV-1D pilot who used incorrect recovery procedures for the maneuver he was performing.

Following is a synopsis of the three second quarter FY 83 Class A mishaps:

• The crew of a T-42A was conducting ATM refresher flight training. Following the completion of upper air work, the aircraft returned to the airfield for a simulated ILS approach. After completion of the simulated instrument approach, a visual landing was initiated. Approximately 200 feet above the ground, the instructor pilot failed the left engine by closing the fuel mixture control. The pilot raised the nose of the aircraft and added power to the operating engine before touchdown. The aircraft drifted left in a left bank, yawed, and crashed.



Cause—crew error: Pilot allowed airspeed to decrease below the velocity for minimum control (VMC) during a single-engine approach. IP was late with corrective action.

Result: Destroyed aircraft, at a cost of $102,907.

• The pilot of an OH-58 slowed his aircraft at an altitude of 200 feet over the water to allow the passenger to photograph a lighthouse on shore. The aircraft began a spin to the right. The pilot was unable to prevent the aircraft from crashing into the water. The pilot failed to follow established procedures to secure approval for his flight.

Cause—crew error: The pilot placed the aircraft in a flight envelope known to be conducive to loss of tail rotor effectiveness and allowed an uncommanded turn to progress into an uncontrollable spin before initiating emergency procedures. The pilot then failed to fully employ the proper emergency recovery procedures.

Cause—materiel inadequacy: Marginal adequacy of the OH-58A tail rotor within the normal flight envelope.

Result: Destroyed aircraft, at a cost of $143,782.

• During overwater slingload training, a CH-47 nosed up and began a gradual roll to the left. The slingload was released and the aircraft continued a descending left roll, impacting the water nearly inverted and in a nose-low attitude. The aircraft has been recovered, and there were no survivors.

Cause—suspect materiel failure: Mishap is still under investigation.

Result: Destroyed aircraft and five fatalities.

(continued on next page)

Cutting losses

After such a successful 6 months, business picked up in April, with Class A mishaps totaling five for the month. And through 25 May, we have had eight more Class A mishaps, with one fatality. Including these mishaps, the projection for the year—31—is good compared to other years, particularly last year, when we had 59 Class A mishaps.

We've had 20 Class A mishaps this year. We're projecting 12 more—if the current trend continues—with June, July, August, and September coming up. But this is just a projection. It doesn't have to happen and it's not preordained.

Flying activities become much more intense, and flying hour exposure is higher during June, July, and August because of the summer weather flying and annual field training exercises. Flying hours then decrease about 21 percent in September. Let's look at the past record for these months. Active Army and National Guard aircraft were involved in 44 Class A mishaps during June, July, August, and September the past 3 years. That's an average of almost 15 per year for these months—3 above our current projection for the next 4 months. Human error was cited as a cause factor in about 75 percent of the mishaps.

Flying hour exposure is higher during June, July, and August.

The errors identified in these mishaps and their underlying causes are not new. They involved pilots, IPs, flight commanders, mission commanders, and support personnel such as mechanics and technical inspectors. Most of these mishaps would not have happened if more attention had been paid to prior planning, details, and correct performance. Most of the errors were caused by people willfully disregarding rules or just not doing their jobs by the book.

T-42 crashed when pilot allowed airspeed to decrease below the velocity for minimum control during single-engine approach.

Here are some examples of the errors:

"IP directed a maneuver beyond the ability of the rated student pilot."

"Pilot flew aircraft into water during unauthorized high-speed, low-level flight."

"Pilot selected a marginally suitable area with excessive slope when more suitable landing areas were available."

"Pilot deviated from flight plan and crashed on mountain ridge."

"Pilot violated unit SOP, flew low level, and hit a wire."

"Pilot did not compute performance planning card and attempted an out-of-ground-effect hover with a heavily loaded aircraft."

"Copilot lost visual reference in blowing dust."

So what can be done to beat the projection of 12 more Class A mishaps this year? After last year's terrible record, supervisors and commanders took a hard look at their operations and began to take a more active role in the aviation safety program. They began insisting that their subordinates adhere to standard operating procedures. Benefits are immediate when commanders and supervisors keep the communication lines flowing between all levels of command and bring their knowledge and experience to bear on accident prevention.

This active involvement by commanders must continue. By the same token, safety is the responsibility of every person in the unit. Good supervision may make it more likely that an accident will not occur, but if you wear the wings, the buck stops with you.

It's not going to be easy to beat the projection and cut aircraft mishap losses even further, but it can be done through strict adherence to established procedures . . . whether it's piloting, instructing, supervising, maintaining the aircraft, keeping the records, or whatever.■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Pilot had completed emergency governor operation check with aircraft at a hover. Aircraft was landed, throttle was rolled to flight idle position and governor switch to auto position. Throttle increased to full open. Rpm stabilized at 6400 and then accelerated to 7300. Caused by malfunction of fuel control or overspeed governor. □ (H series) Harness failed as soldier exited aircraft for rappeling mission. Aircraft was at 80- to 90-foot hover. Soldier fell to the ground and was injured.

UH-1 Class E mishaps □ (M series) Pilot noticed lack of pedal response and aircraft began to turn to left during hover for takeoff. Caused by crack in elbow fitting on hydraulic pump. Fluid was pumped overboard. □ (H series) Transmission oil pressure light came on and gauge dropped to 23 psi during hover. Transmission oil filter gasket failed, causing loss of transmission oil. □ (H series) Fuel fumes in cockpit were caused by failure of fuel manifold valve. □ (H series) Loud popping sound was heard from engine compartment during flight. Caused by defective bleed band actuator assembly. □ (H series) High frequency vibrations were felt. Caused by failure of transmission mast bearing.

UH-60 Class E mishaps □ Pilot descended too low while hovering to hook up vehicle for slingload. Three small holes were punched in bottom of aircraft when it hit gun mount on vehicle. □ No. 2 engine power control lever was binding during HIT check. Metal strip on engine quadrant had become disbonded and was restricting control lever.

Attack helicopters

AH-1 Class A mishap □ (S series) IP initiated simulated forced landing. Pilot said engine quit. Aircraft crashed. IP was killed and pilot was injured. 8327

AH-1 Class C mishaps □ (S series) Main rotor blade was damaged during rocket firing. □ (S series) Crew chief heard loud noise during runup. Main rotor tiedown had not been removed from blade. Tiedown hit and damaged both tail rotor blades.

AH-1 Class E mishaps □ (S series) Aircraft developed severe vibration during flight. Caused by frozen feather bearing. □ (S series) Transmission oil pressure and bypass lights came on. Caused by failure of oil pressure relief valve. □ (S series) Excessively stiff cyclic was caused by failure of servo cylinder. □ (S series) Engine oil temperature increased during flight. Caused by failure of oil cooler fan. □ (S series) Copilot increased collective to 101 percent during hover fire to recover from 35- to 40-degree nose-high attitude. Overtorque light came on and aircraft was landed. Copilot was firing rockets from the front seat. Copilot adjusted his attitude indicator 20 degrees nose low after being told not to and then forgot the adjustment.

Cargo helicopters

CH-47 Class C mishap □ (C series) Aircraft picked up forklift and dropped it at a field location. Steering wheel of forklift was pulled to the right side sometime during lifting operation.

CH-47 Class E mishaps □ (B series) Master caution and aft transmission oil pressure lights came on. Caused by failure of pressure transducer. □ (B series) Egt climbed rapidly to 860 degrees during HIT check. Caused by failure of fuel control unit and fuel pump.

Observation helicopters

OH-58 Class A mishap □ (A series) Aircraft was flying about 50 feet agl and 30 knots. Pilot said aircraft began uncommanded rapid turn to right. Turn progressed into a spin. Aircraft spun about 2½ revolutions before crashing and rolling on left side. Suspect pilot induced loss of tail rotor effectiveness. 8328

OH-58 Class C mishap □ (C series) Left skid hit a broken or raised place in concrete during ground slide. Skid separated at forward cross tube. Aircraft remained upright.

OH-58 Class E mishaps □ (A series) Pilot noticed during climbout that rotor tachometer had failed. Wires on cannon plug to tachometer generator were broken. □ (A series) When collective was increased, shudder was felt in airframe. Caused by worn drag pin bearing. □ (C series) Aircraft entered fog bank during descent from hilltop to low ground. Pilot saw ground rising, decelerated, and increased collective. Low rpm light flickered. Aircraft landed with suspected overtorque. Fog was in patches and hard to see. □ (C series) IP allowed pilot to maneuver aircraft to a nonaligned position on lane during touchdown from autorotation. Spike knock was heard.

Training helicopters

TH-55 Class C mishap □ Two TH-55 helicopters were on base leg for landing. One aircraft turned into the other. Main rotor blades of one aircraft hit tail boom and horizontal stabilizer of the other aircraft. Student pilots of both aircraft autorotated and landed with no further damage.

TH-55 Class E mishaps □ When collective was lowered during maintenance test flight, engine failed. Caused by failure of fuel servo. □ Smoke was seen coming from underneath aircraft during hover/taxi. Nose seal was leaking oil on exhaust pipe.

Fixed wing

T-42 Class E mishap □ Landing gear would not indicate that it was extended during prelanding check. Gear was

lowered manually. Caused by failure of landing gear actuator.

U-8 Class E mishap □ (F series) When landing gear was lowered, nose gear indicator did not indicate change in gear position. Caused by failure of indicator.

U-21 Class E mishap □ (RU-21H) Crew felt vibration in controls and heard loud grinding noise. Vent blower fan failed when fan got out of alignment, made contact with FOD screen dome, and damaged blades and dome.

Maintenance

UH-1 Class E mishaps □ (H series) Transmission oil pressure decreased to 24 psi when throttle was reduced to engine idle. Pressure relief valve was out of adjustment. □ (H series) Crew felt vibration and feedback in controls during landing. Caused by inadequate torque on right lateral cyclic servo jam nut. Nut backed off. □ (H series) Pedals would not move when hydraulics were turned on. Bolt which usually secures tail rotor sprocket cover was found wedged between tail rotor chain and tail rotor sprocket.

AH-1 Class E mishap □ (S series) Master caution light came on. Caused by loose cannon plug.

OH-58 Class E mishap □ (A series) Fuel boost caution light would not go out during runup. Caused by loose electrical connection on fuel boost pump switch.

U-21 Class E mishap □ (RU-21H) Crew received unsafe right main gear indication when gear handle was placed down. Gear was recycled and then indicated down. Landing gear switch was out of adjustment.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	1-25 May	**8**	**1**
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**20**	**8**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Safety-of-flight technical message concerning one-time inspection to remove 101, 204, and/or 540 series rotor blades by specific serial numbers which have oversized patches on UH-1 (except B models) and AH-1 series aircraft (UH-1-83-10, AH-1-83-05, 022115Z May 83). Summary: Certain series rotor blades were approved for repair with oversized patches. Recent verification testing has revealed that the integrity of a small percentage of these repaired blades is questionable. Contact: Richard Dickman, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning UH-60 external load hookup (UH-60A-83-05, 091400Z May 83). Summary: A previous message stated that the correct way to attach a cargo sling to the Black Hawk hook was to insert the pin of the clevis directly in the cargo hook. Subsequent evaluation revealed that the sling clevis can work under the cargo hook keeper regardless of orientation. This message makes use of the nylon donut mandatory and prescribes conditions for its use. Contact: Robert Lawyer, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

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

TM changes

The following changes to TMs have been released:

• Change 15, dated 14 Mar 83, to TM 55-1520-228-CL for OH-58A aircraft.

• Change 17, dated 20 May 83, to TM 55-1520-235-CL for OH-58C aircraft.

• Change 31, dated 23 May 83, to TM 55-1520-235-10 for OH-58C aircraft.

When you're hot you're hot???

The time of year is here when the thermometer starts to climb and our thoughts shift to sandy beaches and the surf. It's also the time of the year when flight suits rapidly take on the "goat skin" smell and salt rings run from the armpits to the knees. For the next few months, because of the heat, many aspects of flying will become uncomfortable and sticky.

Everyone has felt the extra requirements hot weather imposes on the ol' bod. So, if you start noticing some impairment of efficiency of your thought processes—nausea, weakness, lightheadedness, headaches, or rapid onset of fatigue, the diagnosis could very well be heat stress. Conversely, heat stress may cause a slight increase in irritability and diminish a pilot's insight, creating a tendency to overreact and make more mistakes. Heat also increases susceptibility to motion sickness and hypoxia.

Operation of aircraft in hot climates can impose significant heat strain on aircrewmembers. Briefly, dehydration and mental impairment are the main dangers. Research has shown that effective human performance is impaired above 100° F., a condition which is easily exceeded during the summer months. These same studies also repeatedly demonstrate wide individual differences in maximum heat tolerances even in homogeneous groups of young men under experimental conditions. There are many human variables affecting a person's tolerance to heat, including age, physical condition, alcohol/coffee intake (the less the better), sex (women generally tend to be less heat-tolerant than men), clothing, sweat rate, and degree of hot weather acclimatization. Therefore, there is no all-encompassing index which is universally applicable to determining heat exposure in the work environment.

Here are a few thoughts and recommended actions to help aircrews understand and cope with the heat conditions which could affect them.

• Generally, the majority of heat stress occurs during preflight, engine start, taxiout, and pretakeoff. The heat load experienced by the aircrew in the cockpit is more severe than on the ramp because of reduced air circulation, personnel equipment, and the aircraft's equipment heating.

• Ground exposure heat loads followed by a prolonged low level mission, where no high altitude cooling off period exists, should be closely monitored.

• Sweat evaporation is the major heat dissipation mechanism and rapidly depletes body fluid reserves. Don't be fooled that you are being effectively cooled because a lot of H_2O is dripping off the body. This is useless as a heat loss mechanism; the sweat must evaporate to be effective.

• Try to drink more liquids than thirst dictates. Fluid intake is vital to sweat secretion, and an average person requires 2 to 3 quarts of fluid per day even without hot weather. Middle East countries require their aircrews to drink three plus gallons of water a day to avoid the effects of heat stress, and failure to do so is considered a serious offense. Water-diluted fruit juices and iced tea are recommended over carbonated drinks.

• A person who is acclimatized to the heat, which takes about 90 minutes of hard work in the heat daily for 12 to 14 days, only needs about 3 grams of salt per day. The average American diet has over 2 grams per day. Eating a normal diet is better than taking salt tablets, which should never be taken directly, anyway. The preferred method is mixing 1 quart water with two 10-grain tablets (one-fourth teaspoon). Avoid salt in any form without plenty of water.

• Avoid unnecessary exposure to heat outdoors prior to flights; avoid exercise programs until after the last flight of the day. The body's slow dissipation of stored excess heat could work against you if you go straight to a flight briefing following a strenuous game of handball.

• The only cure for heat stress is to remove the individual from the source and replace the water loss. Significant time will be required to alleviate the problem. If airborne, the recommended procedures are climbing, slowing down, and landing as soon as possible.

Admittedly, heat stress is not one of the more interesting subjects. However, it can become an extremely hazardous problem in all aircraft operations. Awareness is the key to prevention. When the temperatures soar, even a minimum time preflight and climbout can constitute a significant drain on physiological reserves which can compromise performance in the later, more demanding, phases of flight. The consequences of a possible error by an aircrewmember make it essential that personal efficiency and alertness not be compromised. Give the various effects of high temperatures some thought during your mission planning and briefings just to insure no one loses his cool. ■

—adapted from FLYING SAFETY
Major Gary L. Studdard
Directorate of Aerospace Safety

From the field

The following letter and Operational Hazard Report (OHR) were received from an aviation safety officer.

"I share with you an OHR I wrote up concerning a 1-minute flight I had at Camp Roberts, CA, on 23 Apr 83. Upon returning to the AASF at Stockton, I read the 6 Apr 83 issue of FLIGHTFAX, which keyed me to send this to you. As a master Army aviator with 26 years in the business, you would have to look long and hard to find someone more convinced than I am that the sharing of such events is essential to the successful conduct of aviation activities.

"I am equally convinced as I read through each issue of FLIGHTFAX (and our distribution is good—I get a copy of every one) that I have read the accident scenarios before—and I usually have. As the unit safety officer, your publication is all I need to prepare some very meaty safety discussions. This added 'sharing' effort is well worth the cost of ink and paper. And, by the way, I have concluded that I would rather **read** about 'em than **write** about 'em."

OHR

"Preflight check of defog and vent blower consists of moving the switch to the 'defog/vent' position and checking for increase in d.c. amps. Noise is also normally discernible to the pilot. Airflow is **not** checked.

"During engine start at Camp Roberts during visible moisture conditions with temperature/dewpoint within 4 degrees (fog forming in local valleys), the inside of the windscreens began to fog up. Defog/vent blower and heater operation had no beneficial effects. Defog vent controls were open. Pilot and passenger utilized cloth wipes to remove moisture from internal surfaces, until satisfied that visibility was not restricted. Defog and vent blower was left in the 'on' position.

"Upon departure from field site, aircraft was hovered for approximately 15 seconds to position for takeoff and then accelerated into forward flight. Upon reaching 50 to 75 feet altitude, and over trees, the **inside** of the windscreens and door plexiglass was rapidly covered with moisture, reducing outside visibility to near zero. Aircraft was **not** flown into clouds. (Ceiling was estimated at 1,500 feet. Temperature/dewpoint was within 4 degrees with fog visible in adjacent valleys. Visibility at site was approximately 1 mile. Aircraft was to be repositioned from range control to east garrison . . .)

"A right turn was initiated and the aircraft placed in a decelerating attitude, and a circling approach made back into the takeoff site. Downwind was probably 100 to 150 yards over trees. Turn into landing site was by guess. Pilot was too busy controlling aircraft to remove hands from controls to attempt to jettison a door, which might have made matters worse by striking main rotor system.

"The aircraft passed about 50 feet to the right of the windsock and pole at the range control pad. Ground reference was established at about 15 feet altitude through the copilot's lower windscreen only. Rate of descent was slowed and aircraft landed successfully.

"Upon physical inspection, it was observed by pilot and passenger that with defog blower on, **no** appreciable amount of air could be felt coming from defog ducting. **No check of this feature is made on preflight.** And, of course, you don't need it until you really need it!" ■

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The aviation cowboy

The following article was based on a lesson plan prepared by CW2 R.G. Ingram while he was attending the Aviation Safety Officer Course at the Army Safety Center.

A chronic aviation cowboy is an aviator who consistently, for some reason, disregards rules, regulations, and common sense. He's the one who buzzes jeeps, his girl friend's house, and bikini-clad sunbathers, flies under bridges, shows off for anyone who will look, and tries to water ski without a boat.

The results of a personal opinion survey completed by students of an Aviation Safety Officer Course revealed that 92 percent of the students had known an aviation cowboy. Eighteen percent said they had once been an aviation cowboy. Eighty-four percent said the cowboy was between the ages of 18 and 31, with 52 percent picking the age group 23-26. Eighty-five percent said the cowboy had less than 1,500 hours, with 41 percent picking 0 to 500 hours.

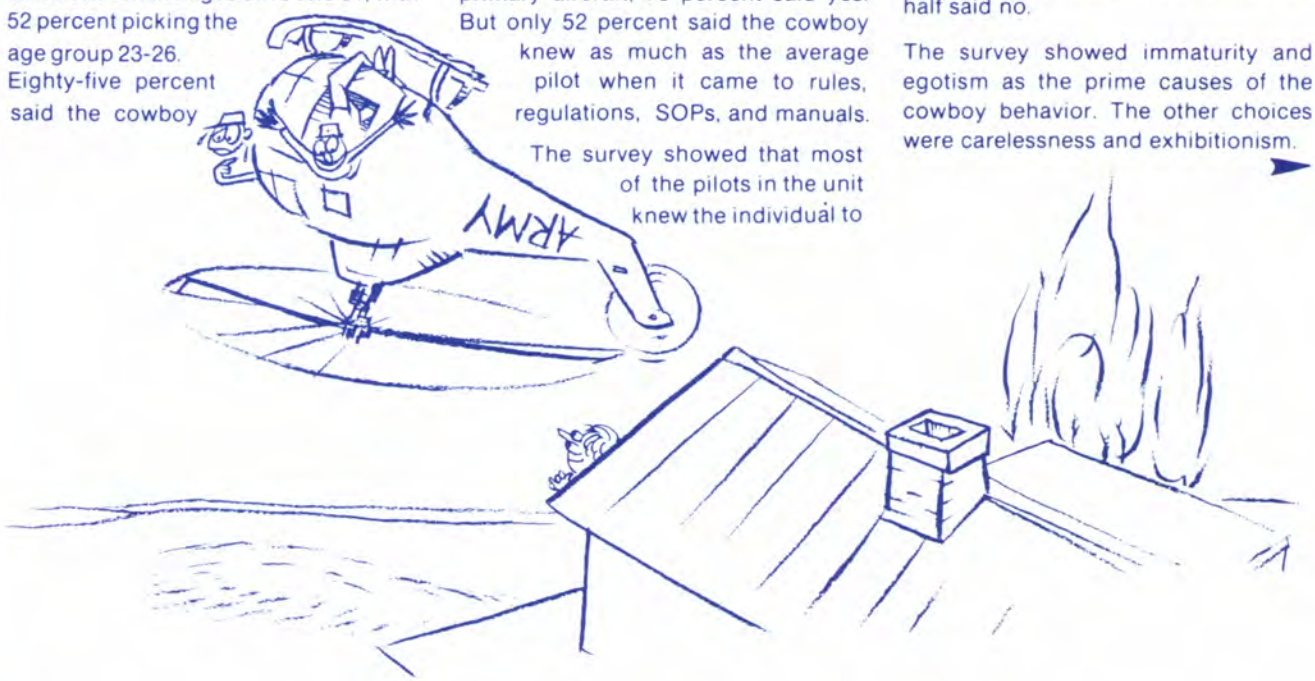
When asked if the cowboy was more likely to be a commissioned officer or warrant officer, 69 percent of the students picked warrant officer. Fifty-seven percent felt the cowboy was more likely to take chances when he was with a less experienced aviator, and 32 percent felt he would be with a nonrated individual. Only 11 percent felt the cowboy was more likely to take chances when he was alone.

All of the people responding to the survey felt the cowboy attitude overflowed into nonflying duties, and 88 percent felt there was a parallel between flying and driving habits. When asked if the cowboy was as knowledgeable as the average pilot in the unit about his primary aircraft, 78 percent said yes. But only 52 percent said the cowboy knew as much as the average pilot when it came to rules, regulations, SOPs, and manuals.

The survey showed that most of the pilots in the unit knew the individual to be a cowboy, but only 22 percent said the platoon commander knew about it. And in only 10 percent of the cases did the aviation safety officer know about the aviator's tendency to be a cowboy.

Seventy percent of the group surveyed said that someone, usually other pilots or IPs, had tried to talk to the cowboy about his problem. Half felt the cowboy benefitted from the talks, but only temporarily. Almost half of the group surveyed said they had seen other pilots become nervous, apprehensive, or upset when they were scheduled to fly with a cowboy. Thirty-one percent said the other pilots found excuses not to fly with the cowboy. Ninety-five percent felt that if their unit had an accident, the cowboy would be involved. When asked if the cowboy had ever been involved in a mishap, half of the group said yes and half said no.

The survey showed immaturity and egotism as the prime causes of the cowboy behavior. The other choices were carelessness and exhibitionism.



The aviation cowboy

Let's look at some quotes from a few accident reports which cited "cowboying" as a cause factor.

Pilot involved in accident
Question: Would your unit commander approve of the maneuver you were doing at the time of the accident?

Answer: Under the circumstances, I'm sure he would be a little bit upset because we crashed an aircraft. Other than that, I don't know whether or not he would be upset.

Another pilot
Question: Is _____ a cowboy?

Answer: Yes. He likes to jockey the aircraft around, but most of the time he uses good judgment.

Platoon leader
Question: What is the pilot's reputation as an aviator?

Answer: He is more of a cowboy than anyone else in the company.

Question: Have you had to counsel him?

Answer: Occasionally, but the sessions were verbal instead of formal written sessions.

Question: Why did you counsel him?

Answer: Usually beause someone had come to me about the unsafe way in which they felt he was operating an aircraft. He would react to the counseling session for a period of time.

Question: Do you normally take situations like this to the safety officer?

Answer: No.

Question: When you heard about the accident, were you surprised at who the crewmembers were?

Answer: No.

Pilot involved in accident
Question: Was the maneuver you were doing a standard maneuver?

Answer: No, it was not.

Question: Do you feel the maneuver was a "cowboy" maneuver?

Answer: Yes.

Question: Did you feel you were going to impress the people at the site?

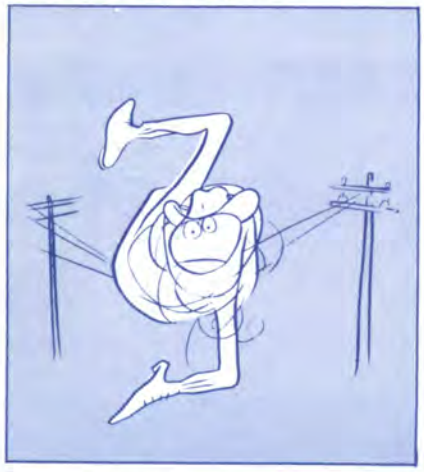
Answer: I did.

Question: Does the chain of command condone this type of maneuver?

Answer: No.

Platoon leader
Question: What is your professional opinion of _____ ?

Answer: He is very intelligent and talented, but some people have told me they don't feel comfortable or safe flying with him. One pilot said he would never fly with him again.



Platoon leader
Question: Were you surprised when you heard who was involved in the accident?

Answer: No, not at all.

Question: Did you ever discuss the pilot's problems with the unit commander, the safety officer, or the unit SIP?

Answer: No. I thought that talking to him would solve the problem. If I had to do it over, I would talk to the commander, the safety officer, the SIP, and everybody who was in a position to control the situation.

Another pilot
Question: When you heard who the pilots were, did it surprise you?

Answer: No.

Question: Why?

Answer: I know how they fly.

What can be done about the aviation cowboy? The group surveyed was asked if they believed he could be broken of his bad habits or attitude, and, if so, how. More than a fourth of those surveyed said they thought he could by guidance and counseling. About 18 percent thought more supervision was the answer, with the same number opting for improved training. Fourteen percent thought his attitude might be changed by a near miss or an accident, and the same number thought the only way was disciplinary action.

Other aviators are usually the first to recognize a cowboy. If there's one in your unit, tell the safety officer and the commander. Then it will be their responsibility to see that something is done before the cowboy kills himself, and, maybe, you. There may come a day when you can no longer avoid flying with him.

When the chain of command learns of an aviator's reputation as a cowboy, action should be taken immediately. Each case will be different. Formal counseling might solve the problem, or the aviator might have to be removed from PIC status until he demonstrates a more mature approach to his duties and responsibilities.

The best way to get the cowboy out of the aircraft is through open channels of communication within a unit. The more people in authority who know about the problem, the faster the corrective action. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps □ (H series) Crew heard loud noise from transmission area, followed by loud bang. Aircraft yawed, rotor rpm decreased, and engine rpm increased. Pilot entered autorotation. Directional control was marginal. Pilot zeroed airspeed and went into the trees. Aircraft came to rest on left side. Suspect failure of sprague clutch. 8329 □ (H series) Aircraft crashed during practice of emergency procedures. 8330

UH-1 Class C mishap □ (H series) Aircraft was crossing a river during low-level tactical training mission. Wires suddenly appeared in flight path. Pilot lowered collective to fly under wires. Aircraft hit three wires, damaging main rotor blades. Aircraft was landed without further incident.

UH-1 Class E mishaps □ (H series) Left fuel boost pump light came on. Caused by failure of fuel flow switch. □ (H series) Pilot felt abnormal resistance in pedal controls. Caused by defective magnetic brake. □ (H series) Fire warning light came on. Caused by defective fire control alarm. □ (H series) Pilot heard hydraulic pump cavitating, and flight controls became stiff. Crack in hydraulic line caused loss of fluid. □ (H series) Three compressor stalls occurred, and aircraft yawed 40 degrees to left several times. N_2 fluctuated between 6600 and 6000 rpm. Collective was lowered and throttle reduced to flight idle to regain control of aircraft. Running landing was made. Inspection revealed foreign object damage to first-stage compressor. □ (H series) Engine-driven fuel pump light came on. Caused by faulty fuel pressure sensor.

UH-60 Class E mishaps □ Aircraft was transporting Howitzer with A22 bag suspended beneath gun. Approach was made to LZ. When bag was on the ground, crew chief told crew that item was down. Copilot, forgetting the load configuration, immediately released load. Howitzer fell about 3 feet on top of A22 bag, which absorbed most of the impact. □ Master caution and No. 2 engine oil pressure lights came on. Oil pressure gauge indicated zero. Caused by malfunction of signal data converter.

Attack helicopters

AH-1 Class E mishaps □ (S series) Roll channel SCAS started motoring during flight. Caused by malfunction of roll channel card. □ (S series) Aircraft had been checked after compressor stall and no irregularities were found. During engine performance check, when power reduced from 80 percent torque to 71 percent, two muffled sounds were heard from engine area. Aircraft was flown to home base and landed. Inspection revealed bleed band actuator was scored beyond limits. First and fifth stage compressor blades and third, fourth, and fifth stage stator vanes were eroded beyond limits. Variable inlet guide vanes were bent, causing actuator to bind. Aircraft was operating in high altitude, sandy desert environment. □ (S series) Training flight was begun with 900 pounds of fuel on board. Range delays resulted in firing mission lasting 1½ hours. After dearming, aircraft had approximately 80 pounds of fuel remaining, according to fuel gauge. As pilot was repositioning from dearming pad to a vacant pad about 200 feet away, engine flamed out. Aircraft was autorotated to ground. Low fuel light did not illuminate until immediately before engine flamed out. Maintenance inspected aircraft for fuel contamination but could get only about 1 quart of fuel from sumps. When refueled, aircraft

FY 83 Class A Accident Countdown

		FY 82			FY 83	
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	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	May	**10**	**1**
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
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*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 91 □ 1 Jun 1983

Army aviation accident prevention awards

The ultimate goal of the military commander or manager is to accomplish the assigned mission. Aviation mishaps resulting in the destruction or damage to a commander's aviation resources detract from the commander's capability to accomplish the mission. The commander's recognition of this fact is important in the formulation and success of an aviation mishap prevention program.

Has your unit program been set up in accordance with AR 385-95 which became effective 15 December 1982? This regulation replaces the much consulted AR 95-5 as one of the functional areas in the Army aviation mishap prevention program. Commanders who are engaged in Army flying operations have a management tool they may use to recognize subordinate elements and individuals who assist in conserving valuable resources.

AR 672-74 became effective 15 June 1982. Has your unit Safety Awards Program been updated to insure deserving organizations meeting the criteria are awarded Department of the Army "Award of Merit," "Award of Honor," or "Award of Excellence"?

Safety officers, support the awards program. Insure that all members of your unit who take part in the safe accomplishment of the unit mission are recognized with an individual award. ■

Safe single engine airspeed

A new term to Army aviators, used in the utility and surveillance airplane ATM, and due to appear in the forthcoming change to AR 95-1, is V_{sse}. It stands for safe single engine airspeed and denotes an airspeed used during fixed wing multiengine training below which an instructor pilot shall not intentionally cut an engine.

The use of this airspeed is an industry concept and most manufacturers of civil aircraft are including this new number in civil aircraft operator's manuals. The number is selected by the manufacturer based on his own data (not an FAA computation) and is published to support the theory that little can happen to the crew in the way of control difficulty if the airplane is always above V_{mc} or V_s during dynamic engine cuts required during training.

Adoption of safe single engine airspeed (V_{sse}) by Army aviation should provide a reasonable margin against the occurrence of unintentional stalls or spins when instructors perform intentional dynamic engine cuts during training. This minimum speed will be published in Army aircraft operator's manuals (dash 10s) as they are revised. In the interim, if V_{sse} is not listed in your dash 10, it will be computed by using the greater of V_s or V_{mc} plus 5 percent. Following is an example of V_{sse} computation:

Aircraft	Gross Weight	Configuration	V_s	V_{mc}	5%	V_{sse}
C-12A	12,500 lbs	Flaps up	99	84	5	104
U-21A	9,000 lbs	Flaps down	75	90	4.5	95
T-42A	5,100 lbs	Flaps up	80	76	4	84
U-8F	7,700 lbs	Flaps up	85	85	4.3	90
U-3B	4,990 lbs	Flaps up	82	88	4.4	93

Master clock

STACOM 56, 14 May 1980, noted the existence of U.S. Naval Observatory Master Clock. If you have been unsuccessful recently at getting the correct time, maybe it's because you do not have the new telephone number. The new number for correct time is AUTOVON 294-1800. ■

Installation and area aviation standardization committees

Your mission—supervise and coordinate your program.

Do you conduct random no-notice flight checks of aviation personnel? Why? The purpose of the no-notice evaluations is to avoid the peak-and-valley syndrome of "getting up for a checkride." This results in improving the level of proficiency in day-to-day operations. No-notice evaluations may be a flight conducted in aircraft or SFTS or an oral or written exam, and need not be terribly time-consuming nor disruptive to the mission.

For other functions of installation and area aviation standardization committees, see paragraph 3-19, AR 95-1. ■

Maintenance operation check (MOC) qualification

Numerous questions have been raised concerning MOC requirements in paragraph 2-22, AR 95-1. In an effort to end the confusion, a revision of that paragraph will appear in Change 1 (expected to be off the press to the field in July 1983). The first part of the paragraph will address training required for all personnel performing MOCs. The second part of the paragraph relates to training requirements for persons who start and run up aircraft and are not qualified and current in the aircraft undergoing MOC. In addition to commander's authorization, this training will include a semiannual evaluation by an IP or SIP. ■

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.

would accept only 192 gallons. Aircraft is being inspected for fuel wall separation.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Transmission chip detector light came on. Caused by failure of aft vertical shaft bearing. □ (C series) Right aft ski shock strut shaft broke during flight in light turbulence.

Observation helicopters

OH-58 Class A mishap □ (A series) Aircraft was en route to field site. Route of flight required transition through control zone of an airfield. While flying through the control zone at an altitude of 400 feet agl and airspeed of 80 knots, pilot inadvertently flew aircraft into an isolated low-hanging cloud or fog bank. Pilot tried to transition to instrument flight and initiated straight-ahead climb. Shortly afterward, he said he was able to see lights on the horizon and initiated descending turn toward the lights. Pilot became disoriented and lost control of aircraft. Aircraft hit tree and most of tail boom was torn off. Aircraft then hit several more trees and crashed in upright position. 8331

OH-58 Class C mishap □ (A series) During takeoff, aircraft started slow turn to right at 30 to 40 feet agl. Pilot tried to stop the turn, and aircraft began to settle with power. Altitude did not permit reduction of power or increase in airspeed. Pilot autorotated and aircraft landed hard and bounced, spreading skids.

OH-58 Class E mishaps □ (A series) Pilot heard loud sound and felt high frequency vibration in antitorque pedals. Inspection revealed parachute and flare canister had been pulled into tail rotor system while aircraft was hovering in confined area. □ (C series) Aircraft developed high frequency vibration when throttle was advanced. Caused by worn oil cooler bearings. □ (A series) Aircraft was picked up to a hover and taxied 50 meters from ramp to takeoff area. N_2 decreased from 103 percent to 100 percent. Aircraft was landed. Throttle had backed off. Aircraft was picked up to a hover and the same thing happened again. Suspect failure of fuel control.

Fixed wing

C-12 Class E mishap □ (C series) When landing gear control handle was placed in up position after takeoff, gear motor ran for about 3 seconds and quit. In-transit light in gear handle remained on. Nose gear indicated down and locked and both main gear lights showed unlocked condition. Gear was manually extended and aircraft was landed. Caused by failure of landing gear motor and relay.

OV-1 Class E mishap □ (D series) During reverse thrust for power approach/precision landing, No. 2 engine egt exceeded 630° C. for about 10 seconds, with a peak temperature of 657° C. Caused by malfunction of fuel control.

T-42 Class E mishaps □ Shortly after release of brakes for takeoff roll, No. 1 engine oil temperature gauge dropped to zero. After power was reduced to idle, engine oil temperature gauge returned to normal reading. Ground wire to oil temperature gauge had broken inside the insulation. □ Landing gear switch would not lower landing gear. Caused by defective relay switch.

U-21 Class E mishaps □ (RU-21H) No. 2 generator failed during flight. Generator brushes were worn below tolerance. □ (RU-21H) Left main gear down light indicated unsafe. Manual gear extension indicated that gear was fully extended. Caused by broken safety switch wire.

Maintenance

UH-1 Class E mishaps □ (H series) Controls became stiff while aircraft was at 3-foot hover. Master caution and hydraulic lights came on. Running landing was made. Hydraulic reservoir was low, allowing air to enter system. Tail rotor servo had been replaced and reservoir was not checked and serviced. □ (H series) When collective pitch was increased, N_2 rpm dropped to 6300. When collective pitch was decreased, N_2 rpm climbed to 6800. Caused by incorrect installation of engine bleed air hose, allowing it to bind on throttle linkage. □ (H series) Hydraulic pressure was lost after takeoff. Incorrect installation of standoff clamp caused hole to wear through hose. □ (M series) Master caution light came on, and cyclic became erratic because of loss of hydraulic fluid. Caused by chafed line.

CH-47 Class E mishap □ (C series) Pilots smelled hydraulic fluid and saw fluid on cockpit floor. Fluid was coming from flight control closet. Caused by loose locknut on forward swiveling actuator. (continued on back page)

Mishap briefs

OH-58 Class E mishaps □ (C series) Copilot heard noise, and hydraulic pressure light came on. Caused by incorrect installation of O-ring. Mechanic did not install retaining packaging behind O-ring at servo inlet elbow. □ (A series) Incorrectly adjusted voltage regulator caused overcharge of battery.

T-42 Class E mishap □ Both engines ran rough and quit when power was reduced. Throttles were advanced, power was restored, and engines ran normal. Aircraft was returned to base and landed. Both engines were checked for magneto timing and fuel pressure, which were found to be out of tolerance.

Messages received

• Safety-of-flight maintenance mandatory message redefining the retirement life of several components on the AH-1 main rotor blade (AH-1-83-06, 161500Z May 83). Summary: The K747 main rotor blade assembly component retirement life schedule established for the AH-1S has been revised due to the latest data supplied by NASA. NASA had a contract with Kaman Aerospace Corporation to obtain and prepare the revised retirement schedules. Two components were added to the retirement schedule—the drag strut fitting bolt and the root fitting assembly. In addition, the drag strut retirement life was increased. This message will also revise the aircraft's historical records to be compatible with the new retirement schedules. Contact: Jimmy Simon and Ed Soteropoulos, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of OV-1 wing attachment bolts for evidence of possible hydrogen embrittlement and bolt clamp-up (OV-1-83-01, 161705Z May 83). Summary: Message requires one-time inspection of wing attachment bolts on OV-1 aircraft to determine if hydrogen embrittled bolts have been installed and to eliminate wing hinge fitting and attachment bolt clamp-up. Contact: John Kapros, TSARCOM, AUTOVON 693-3325, commercial 314-263-3325.

• Maintenance information message concerning OV-1/RV-1 requirement for programed aircraft restoration (MIM-OV/RV-1-83-01, 161710Z May 83).

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

NSN for CH-47 window

Reference FLIGHTFAX, Vol. 11, No. 27, 20 Apr 83, "CH-47 Cabin Windows Lost in Flight." The National Stock Number (NSN) for the new "bubble" type cabin window is 1560-01-124-1084. Thanks to Mr. Fred Koch, CH-47 PMO, AVRADCOM.

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 34 □ 8 Jun 1983

Accident review: UH-1 wire strike

Synopsis

A UH-1H flying over a bay hit a telephone wire bundle and supporting cables strung about 100 feet above the water. As the pilot tried to land on shore, the Huey spun to the right, landed hard, and bounced onto its right side.

History of flight

Five OH-58 and three UH-1 helicopters were flown to an area designated for a field training exercise. One of the OH-58s had engine trouble. The company commander decided to have one of the UH-1s take the bad engine back to home station and pick up a new one.

The crew of the UH-1 consisted of a maintenance technician as pilot, a newly assigned aviator as copilot, and a crew chief. Two OH-58 mechanics were also on board. The OH-58 engine was secured by seatbelts in the cargo compartment.

The first leg of the flight was completed with no problems. The crew landed to refuel the aircraft and eat lunch. They then took off on the second leg, with the pilot on the controls. The pilot told the copilot he intended to show him some beautiful scenery during the flight.

Shortly after the aircraft took off and reached about 500 feet agl, approach control lost radar contact with the aircraft. The flight continued at that altitude until the pilot sighted a bay and flew toward it. The crew and passengers were enjoying the scenery and looking at a yacht moored in the bay when they heard a loud explosion-like noise. The aircraft, while flying about 100 knots and 100 feet above the water, had hit a telephone wire bundle and supporting cables. A section of the wire severed the tail rotor drive shaft, causing loss of antitorque control.

When the aircraft hit the wires, both windshields shattered, along with the copilot's upper window and chin bubble. Debris from the windshields hit and fractured the copilot's nose. The crew felt several severe vibrations and immediately began searching for a landing spot. They selected a field on top of a steep hill to the right of the aircraft.

Controlled flight was continued out of the bay area. During approach to the field, at approximately 150 feet agl, the nose of the aircraft pitched down and began to turn to the right. The right turn accelerated into a rapid spin, and the aircraft spun at least three full turns. It then hit the ground in a level attitude and rolled onto its right side. The pilot, crew chief, and two passengers sustained major injuries during the crash sequence.

Crewmember experience

The 35-year-old pilot had more than 3,000 rotary wing hours, with more than 1,600 in the UH-1H. The 20-year-old copilot had more than 200 rotary wing hours, with more than 150 in the UH-1H.

Commentary

Although the wires that were struck were unmarked and hard to see, there was no requirement that they be marked. The strike would not have occurred had the pilot not unnecessarily diverted from the altitudes at which he was supposed to be flying and made a low pass over a bay area used by vacationers and boat operators. Several individuals in the unit indicated that the pilot liked to fly at low altitudes and did so quite often, although not dictated by the mission. The pilot reputedly flew unauthorized low-level test flights and had been counseled by his unit commander for this violation of flight discipline. Also, he had been grounded for unauthorized low-level flight (buzzing a jeep) during a previous assignment. Regardless, it is apparent that his decision to again conduct an unnecessary low-level flight not only indicates a tendency toward chronic violations of flight discipline but also indicates that he did not have the proper regard for the safety of others.

When the unit commander first became aware of the pilot's low-flying behavior, he only counseled the pilot about it because he was not aware of a previous incident for which the pilot had been grounded. Although this incident had been recorded in the pilot's flight records, the unit operations/safety personnel had apparently not informed the commander about it. In retrospect, had the commander known about the previous incident and taken stronger measures with the pilot, perhaps this accident could have been prevented. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Aircraft was on night training mission, inserting troops into LZ. As aircraft was on short final, TV camera crew turned on two high intensity lamps and directed them toward aircraft. Pilot and copilot were blinded and lost all visual reference. Aircraft landed hard, damaging skids and cross tubes.

UH-1 Class E mishaps □ (H series) During takeoff from field site, copilot felt he would not clear trees. He increased power from 34 pounds of torque to 54 pounds. Copilot misjudged power necessary to clear barriers, and PIC did not react quickly enough to prevent overtorque. □ (H series) Aircraft yawed left and right approximately 15 degrees during landing. Rumbling sound was heard from engine compartment and engine instruments fluctuated. Inspection revealed engine was eroded beyond limits. Aircraft had been in a desert environment. Sand eroded compressor blades. □ (H series) Hydraulics failed during flight. Caused by defective left lateral servo. □ (H series) Chip detector light came on. Caused by failure of 90-degree gearbox. □ (H series) Master caution and hydraulic lights came on. Caused by defective hydraulic pressure switch. □ (V series) Master caution and engine-driven fuel pump lights came on during takeoff. Caused by failure of fuel pump. □ (V series) Aircraft was on emergency procedure training flight. On downwind for landing, hydraulic control switch was placed in off position. Crew chief saw smoke coming from transmission area and alerted pilot. Hydraulics were turned on and aircraft was landed. Hydraulic filter return line had two pin-size holes in it and hot hydraulic fluid had sprayed onto hydraulic servo and transmission case. □ (V series) Airspeed indicator read zero during takeoff. Wasp nest was found in pitot tube.

UH-60 Class E mishaps □ No. 2 engine failed during approach. Caused by failure of P3 assembly. □ IP saw wires and tried to cross them near a pole. Tail wheel struck and severed three strands of a powerline. Aircraft was landed with no damage.

Attack helicopters

AH-1 Class E mishaps □ (S series) Transmission oil pressure fluctuated during flight. Caused by clogged transmission oil filter. □ (S series) Engine chip detector light came on. On short final for landing, pilot saw wires 10 to 20 feet in front of aircraft. Pilot lowered collective and flew under wires. Main rotor blade caught the bottom strand. Aircraft was landed without damage. □ (S series) Master caution and engine oil bypass lights came on. Engine oil reservoir was about 4 quarts low. Reservoir had been full on preflight.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Oil was seen leaking from hydraulic oil cooler fan during landing. Caused by failure of fan. □ (C series) No. 2 engine fire light came on during runup. Crew chief verified engine fire. Fire was extinguished with fire extinguisher bottles. Caused by failure of O-ring.

Observation helicopters

OH-6 Class C mishap □ Pilot heard popping sound during flight. Postflight inspection revealed ADF antenna had separated and hit main rotor blade.

OH-58 Class A mishap □ (A series) As aircraft crested ridge line, pilot saw a reconnaissance target to his immediate front. Pilot, flying from the right pilot's station, brought aircraft to stable 3-foot hover and began to hover to his left rear, over rising terrain. Left skid hit a rock outcropping. Pilot applied power to raise the hover height, but left skid stuck in the rocks. Application of power caused aircraft to pivot to its left around the skid. Main rotor blades hit the ground, and aircraft came to rest on its left side. 8332

OH-58 Class E mishaps □ (C series) Needles did not split during autorotation. Caused by failure of free-wheeling assembly to disengage. □ (C series) Airspeed indicator dropped to zero during takeoff. Plastic fitting on pitot static pressure line beneath chin bubble had come off. □ (C series) D.C. generator light came on. Caused by failure of voltage regulator.

Fixed wing

C-12 Class E mishaps □ (C series) Altitude warning light came on during climb. Caused by failure of outflow valve. □ (C series) Copilot turned No. 2 generator off and then turned it back on. No. 1 generator and inverter went off line. Pilot's audio, transponder, yaw dampner, and No. 1 avionics bus items failed. Caused by failure of generator control box.

OV-1 Class E mishaps □ (D series) When pilot lowered landing gear, No. 2 hydraulic pressure dropped to zero. Gear extended normally. Caused by failure of No. 2 hydraulic pump. □ (RV-1D) During flight, pilot noticed that propeller servicing access port was open. Postflight inspection revealed failure of dzus fastener. □ (D series) Landing gear would not retract after takeoff. Caused by defective dump valve.

T-42 Class E mishaps □ Fumes in cockpit during takeoff were caused by failure of heater blower. □ Left engine surged and lost power during climb after takeoff. Postflight inspection revealed No. 2 cylinder had one plug grounded and the other fouled.

U-3 Class E mishap □ (A series) Smoke was seen coming from No. 2 engine augmentor tube during climbout. Pilot had not secured dipstick correctly during preflight inspection. Loose dipstick allowed one-half quart of oil to siphon into augmentor.

U-21 Class E mishap □ (A series) No. 2 propeller secondary low pitch stop light came on during landing. Propeller rpm and torque fluctuated. Caused by malfunction in proximity switch and alarm control.

Maintenance

UH-1 Class E mishaps □ (H series) Engine-driven fuel pump light came on during hover. Aircraft had recently been modified for AN/APR 39. Pedestal was not covered during modification and metal chips worked into caution panel, causing a short. Inspection of other recently modified aircraft revealed a similar accumulation of metal chips. □ (M series) Engine oil pressure fluctuated during flight. Aircraft had just been modified for installation of crashworthy engine oil lines. Hose assembly coupling half was loose, allowing engine oil to leak out. This fitting, which is on the oil line leading from oil cooler to scavenger pump, was also found loose on three other aircraft. □ (H series) Engine oil temperature rose during hover. Caused by loose line. □ (H series) Engine failed during start. Caused by incorrectly seated cannon plug.

AH-1 Class E mishaps □ (S series) Loud noises were heard from engine. N2 drooped and tgt rose. Caused by bent feeder tube. □ (S series) Engine oil pressure dropped to 75 psi. Oil pump was out of adjustment. □ (S series) Pilot could not reduce collective below 40 percent torque. Aircraft was landed after 5 minutes of maneuvering. Throttle could not be reduced, so pilot decreased linear actuator to full decrease to keep aircraft on the ground. Investigation revealed a screw from the pilot's NVG bag installation had worked loose. Screw fell into a hole for the SCAS amplifier wiring bundle near collective boot. Grommet which protects the hole was missing. The screw worked its way into collective jackshaft and throttle linkage.

CH-47 Class E mishap □ (C series) Master caution and transmission low pressure lights came on. Postflight inspection revealed forward transmission was 3 quarts low and aft transmission was 5 quarts low. Aircraft was not serviced correctly prior to flight.

C-7 Class E mishap □ Left main landing gear did not retract when lever was moved to up position. Caused by corroded gear scissors center bolt.

OV-1 Class E mishap □ (D series) Right main gear did not retract completely. Gear was lowered and aircraft landed. Gear was inadvertently overserviced because of additional weight of flasher pod mounted on right wing.

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	March	2	5
3rd Qtr	April	7	6	April	5	0
	May	6	2	May	8	1
	June	2	3	1-8 Jun	1	0
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	21	8

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Safety-of-flight message concerning one-time inspection of CH-47A/B/C upper flight controls (CH-47-83-04, 042200Z May 83). Summary: Investigation of a recent accident reveals it may have been caused by failure of the flight control bolt connecting the forward swiveling dual actuator to the forward transmission. All CH-47A/B/C helicopters will be inspected for correct installation of bolt and upper flight controls. Contact: Ronald Desplinter, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight message concerning one-time inspection of CH-47D combining transmission support fitting (CH-47-83-05, 191530Z May 83). Summary: There has been one reported incident concerning a cracked CH-47D combining transmission support fitting. This crack is directly attributed to the increased torque of the CH-47D drive system. A complete fatigue analysis investigation is in progress and a fatigue test is being performed to determine crack propagation rates which will then define structural parameters for corrective action. Pending the outcome of the investigation, a one-time inspection, followed by recurring 50-hour inspections thereafter of the four combining transmission support fittings, shall be required. Contact: Dennis Menckowski, AUTOVON 693-1418, commercial 314-263-1418.

• UH-60A maintenance information message concerning removal of rubber boots from the main rotor control rod bearings and main rotor damper bearings and change to the recurring inspection of the bearings (MIM-UH-60A-83-MEA-10, 271945Z May 83).

• OV-1D/RV-1D maintenance information message concerning erroneous tripping of VIDS warning latches (MIM-OV-1-83-MEC-02, 231535Z May 83).

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

Reporting loss of tail rotor effectiveness

The following message dated 172115Z May 83 has been transmitted from the Safety Center:

Subject: Reporting Loss of Tail Rotor Effectiveness During OH-58 Operations

Based on interviews of aviators in the field, we are concerned that there is a greater incidence of loss of tail rotor effectiveness than is being reported. In order to better determine the magnitude of the occurrence of this phenomena, request the following data be furnished on all OH-58 loss of tail rotor effectiveness occurrences following receipt of this message through the remainder of FY 83:

a. Altitude (agl).

b. Gross weight of aircraft.

c. Density altitude.

d. Wind direction and velocity relative to the aircraft, the nose of the aircraft being 0 degrees/360 degrees (i.e., left cross tailwind at 250 degrees 10 knots or right cross tailwind at 130 degrees 15 knots).

e. Maneuver being performed at onset of loss of tail rotor effectiveness.

f. Was full left pedal applied when the spin started?

g. What specific control inputs were performed to recover (i.e., collective, cyclic, pedals)?

h. Pilot experience in OH-58 (flying hours, SIP/IP/P); transition (unit or school trained).

i. How many times has pilot experienced loss of tail rotor effectiveness in the past?

j. Any additional remarks pertaining to loss of tail rotor effectiveness. This additional data will assist in validating the most appropriate avoidance and recovery procedures. The above information is to be provided in paragraph 16g of the Preliminary Report of Aircraft Mishap (PRAM). Aviation commanders should insure that a PRAM is submitted whenever OH-58 loss of tail rotor effectiveness occurs, regardless of whether or not the occurrence results in a preautionary landing or any damage to the aircraft.

Point of contact: Major Garner/ SFC Brown, AUTOVON 558-4198/4202. ■

Summer fallout

Hot weather is here and helicopters will be flying with doors open or removed so that everyone can enjoy the cooling breezes. Unfortunately, the breezes frequently clean out the cabin of everything that isn't firmly anchored down or removed as required—seat cushions, helmet bags, equipment, etc. Falling objects are bad for public relations; and, unfortunately, they sometimes have close encounters of the worst kind with the tail rotor.

Be kind to yourself and the people you fly over—**secure the gear!** ■

Perilous time

The master caution light illuminated and the left engine made a grinding noise. The pilot turned his attention to the caution panel. The left generator light and hydraulic lights were glowing brightly, and the gravelly sounds from the left engine were getting louder. Checking the engine gauges, the pilot pulled back on the left throttle and noticed with a little relief that the noise decreased.

"Gearbox failure," he thought.

He was about to shut down the left engine and declare an emergency when he felt the console stiffen and become erratic. Scanning the instruments and the caution panel, he watched the pressure gauge for the right hydraulic system fluctuate from 1500 psi down to almost zero. Then everything went to pot! In a matter of seconds, the pilot was left with only one choice.

He made it OK, but, needless to say, the aircraft didn't. Now bits and pieces of charred debris, the aircraft became a pile of clues through which the accident investigation board would search for a cause.

Well, they found that the aircraft suffered two serious problems: a drive shaft coupling failure and loss of hydraulic fluid. Why? The reasons can be as numerous as stars in the sky. One plausible explanation, however, is suggested by a recent article in the U.S. Naval Safety Center's **Weekly Summary**. The article deals with time—time with respect to rest and sleep.

At some time in our lives, we have all worked "straight through" to get the job done. During an operational readiness evaluation, for example, we push ourselves to get the fleet up to readiness status and to meet the demanding requirements of the mission. Usually, the stress period is short and we get the results we want, but everyone is aware of the demanding situation. Our managers and supervisors know about the insidious effects of fatigue and schedule the workload so that no one exceeds 18 hours of continuous work without required rest periods or nourishment for both body and mind. But . . . there's another area of work that we may overlook.

Ever hear of moonlighting, working more than one job to "make ends meet"? Sometimes we need that extra cash to pay bills, but we seldom want to let anyone know about that second job. That's where we can fall into the trap of fatigue without knowing it. And the results can be serious.

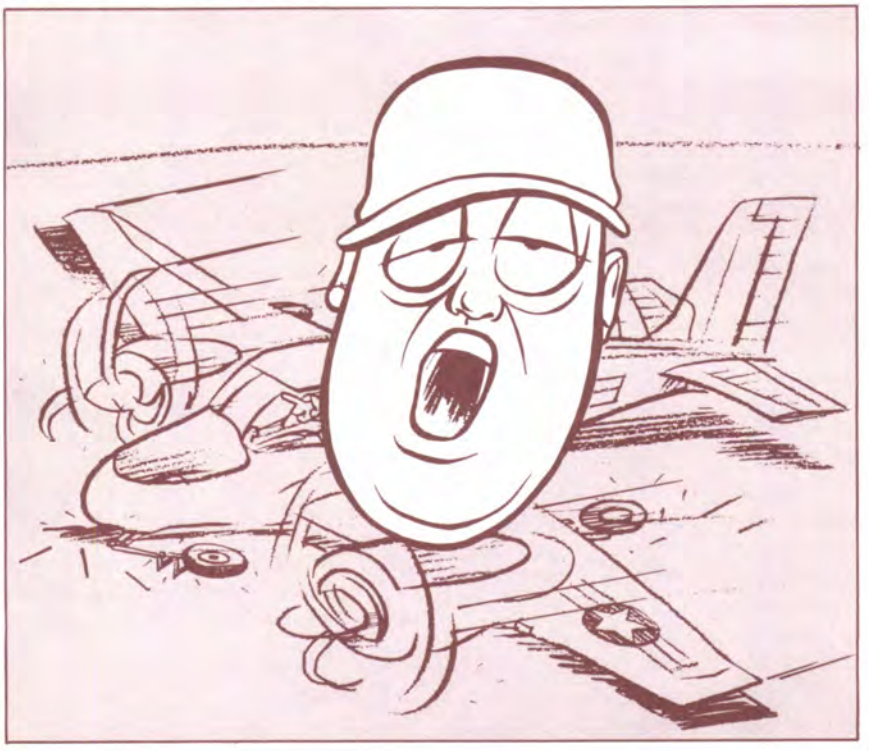
Let's say that someone needs to moonlight for a few months, and he doesn't tell anyone about it. His outfit gets a call for additional aircraft sorties and suddenly the moonlighter gets a week of 10- to 12-hour days in order to bring the aircraft back to flight readiness. If he doesn't quit the moonlight job, he'll end up staying awake and working nearly 19 to 20 hours for the period.

What can happen? The Navy's **Weekly Summary** describes a study involving young, motivated college students that performed jobs requiring **continuous** work on tasks resembling those conducted by flight personnel such as visual memory, auditory vigilance, tracking, and numerical skills.

Here's what the study found:

"Fatigue effects began to appear after 6 hours of continuous performance. The experiment continued to a maximum of 42 hours of continuous duty without sleep. There were serious decrements in performance and disturbing psychological symptoms such as visual illusions, hallucinations, and disorientation reported by this group after 18 hours. Three of the 10 students that started the

(continued on next page)



Perilous time

experiment dropped out and could not complete it.

"Another group of 10 worked 18 hours continuously, then slept 6 hours, and resumed work for another 18 hours. Although they also showed substantial performance deterioration at the end of the first 18 hours, the 6 hours of sleep was effective in attenuating performance decrements during the last 18 hours. This group also reported fewer psychological symptoms.

"A third group of 10 was allowed a 1-hour nap after every 6 hours on the job. Although this was effective in attenuating some of the performance decrements, it was not as effective as allowing the 6 hours of sleep to run continuously, as in the second group.

"The researchers also found that when people are required to work during the time that they normally sleep, they demonstrate impaired performance early. This is known as the circadian rhythm disturbance."

Now, how do these results fit into our accident example? Here is a possible scenario: The mishap aircraft had required a gearbox coupling change during periodic inspection, and because of the push to get it out, the maintenance team with a moonlighting member worked overtime for several days. The job of inspecting and servicing the couplings was given to the moonlighter, but his ability to do the job was becoming impaired. He took a few shortcuts through the tech order procedures to complete the job quickly. Then, because he was distracted by someone requiring his attention during final assembly of the coupling, he made a serious mistake—one small cotter key omitted.

Now, combine a materiel failure of a hydraulic line (depleting the right hydraulic system) with a coupling failure and the fate of the aircraft is sealed.

The point: When people are tired, they make mistakes. And those mistakes can create accidents. Even if people avoid the accident, the mistake must be corrected, and that takes time. So, you end up expending more time than you save. Management of human resources is as important as management of material resources. Fatigue should never be allowed to become a factor that results in a mishap with loss of assets and possibly life. Don't stretch your time limits to that point. Get the rest you need. And if you are over the limit, let your supervisor know. It'll keep you out of a perilous time. ■

—from USAF Maintenance Magazine

Is your accident record the result of careful planning and professional performance, or is it just a matter of luck?

ORVAL RIGHT
Chief Advisor on Matters of Aviation

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Ingredients for success

A team from the Army Safety Center recently surveyed three battalion/squadron-sized organizations to determine the reasons for the organizations' good safety records. An air cavalry squadron, a combat aviation battalion, and an aviation battalion, each with a different organizational structure and mission, were surveyed. Areas of interest surveyed were management, operations, training, mishap prevention programs, and aviation medicine. Following is a summary of what was found. These success factors were common to at least two of the organizations surveyed. Most were found in all three of the organizations.

Management

The commanders of the organizations had extensive aviation backgrounds and experience. They also had strong management and leadership abilities. Performance criteria for all phases of operation were clearly defined, and all personnel were aware of these criteria.

Pilot-in-command was considered a status earned instead of something which was automatically given. During the selection process, aviators had to demonstrate knowledge of general flying, aircraft and aircraft systems, local flying area, unit mission, etc. Input from established pilots-in-command, platoon leaders, instructor pilots, and aviation safety officers was also considered.

Command considered as its primary responsibility the development of knowledge, skills, and overall capabilities of the individual aviator. Establishing individual aviator training as the first priority insured availability of flying time to achieve/maintain flight proficiency standards.

Aviation commanders received strong support from higher headquarters, especially in safety-related command decisions.

Operations

Flight operations were conducted by-the-book, and aviators were proud of that fact. They would not accept anything less. The senior aviators helped to train the inexperienced aviators in by-the-book procedures.

The aviators demonstrated a high degree of professionalism. Senior aviators accepted the responsibility of policing their own. Immediate and effective action was taken against violators of ➤

Ingredients for success

flight discipline. This created an awareness of intolerable behavior and the consequences of deviation from proper flight discipline.

Missions were well planned, with commanders being actively involved in the planning and insuring that unit policies were followed and all safety aspects considered. Commanders required the active involvement of their staffs, including aviation safety officer, instructor pilots, standardization instructor pilots, etc.

Crews were carefully selected for each mission. Total aviator flight time was considered for skills attained. Recent aviator flight time was considered for skills maintained. Experience was paired with inexperience.

There was strong NCO leadership in maintenance operations. The NCOs were competent in technological skills, and they supervised their personnel. They made on-the-spot corrections and emphasized operations by-the-book.

Immediate and effective action was taken against violators of flight discipline.

Excellent quality control in maintenance operations was the strength of the maintenance program and was considered essential for safe flight operations. Technical inspectors never sacrificed quality for quantity, nor would this have been tolerated by the commanders. Maintenance officers and NCOs insured maintenance was performed by-the-book. Required maintenance manuals were available to all personnel. Maintenance personnel peer pressure encouraged by-the-book maintenance.

Training

Command emphasis was placed on training. Training standards were established, and training was conducted according to the standards.

Instructor pilots/instrument flight examiners enforced the safety and standardization programs. They instilled confidence in the aviators and stressed by-the-book flying. No-notice checkrides were given to the greatest advantage. Instructor pilots did not just administer checkrides, they "instructed."

Priority was given to using available flight hours to enhance aviator proficiency. Individual aviator training increased the aviators' capabilities in basic tasks and minimized limitations in accomplishing required ATM tasks.

Emphasis was placed on skilled qualification test training at all chain of command levels. The training was NCO managed and command monitored.

Mishap prevention program

Experienced aviators were selected as aviation safety officers. This was the key to well managed programs. Aviators and commanders listen when skilled and experienced safety officers speak. Aviation safety officers were actively involved in the operations of the unit. Their effectiveness was enhanced by command support.

Safety surveys were done to identify hazards, and command action was taken to eliminate the hazards.

Aviation medicine

Flight surgeons were used primarily for aviation medicine. Other medical duties were minimized. Flight surgeons knew most of the aviators well and were highly attentive to their medical needs. They were also aware of aviator/family relationships.

Flight surgeons were actively involved in unit safety briefings. This enhanced aviator knowledge of the aeromedical aspects of flying.

Timely advice was given to commanders concerning aviation medicine matters. Flight surgeons were highly respected by the commanders and aviators.

Conclusions

Management techniques employed were not unusual or new. The key to the success of these organizations was that management actually practiced these techniques.

Command involvement was one of the most important factors found in successful mishap prevention programs. A variety of leadership techniques were employed, but they were all successful because of command involvement throughout the entire organization.

The following command actions were key elements in the management of the organizations surveyed:

- Established performance criteria.
- Insured all personnel were aware of the performance criteria.
- Insured training was conducted to a standard.
- Insured operations were by-the-book.
- Took immediate and effective action against deviations from established performance criteria. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

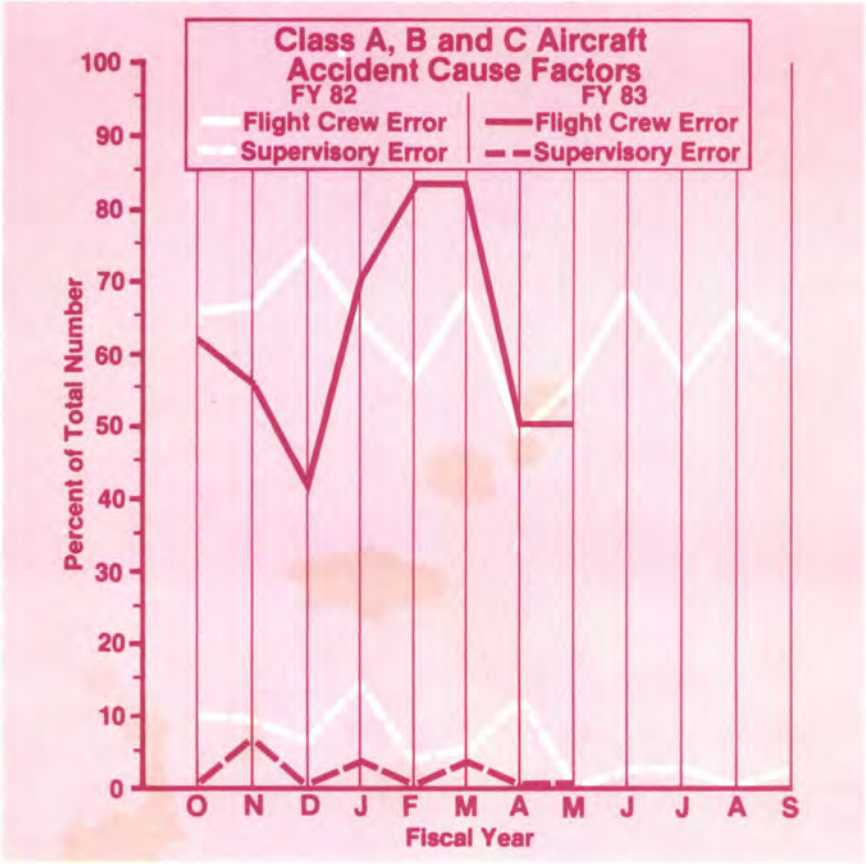
Utility helicopters

UH-1 Class B mishap □ (H series) UH-1 had picked up an OH-58 which had been involved in a Class C mishap. While pilot was hovering with the load about 10 feet off the ground, copilot activated cargo hook arm switch. Hook opened without cargo release button being depressed. OH-58 fell to ground. 8333

UH-1 Class C mishap □ (H series) Bird hit and broke copilot's chin bubble.

UH-1 Class E mishaps □ (H series) Master caution and hydraulic lights came on. Caused by defective hydraulic pressure switch. □ (H series) Loss of tail rotor control during flight was caused by defective tail rotor control tube. □ (H series) Passenger incorrectly latched left cargo door. Even though it appeared to pilot to be locked, it was not secure. Door slid open during flight. □ (H series) Transmission oil pressure increased to 40 psi, then fell below 15 psi. Caused by failure of quick disconnect. □ (H series) High frequency vibration in tail rotor pedals was caused by failure of hydraulic servo cylinder. □ (H series) Master caution and left fuel boost lights came on during landing. Caused by failure of submerged pump. □ (H series) Vertical vibration developed during flight. Main rotor blade inspection revealed hole plug was missing.

UH-60 Class C mishaps □ External load flew up during flight and hit tail boom, damaging VOR antenna and tail boom skin. Pilot was flying too fast for such a light sling load (empty fuel bladder) and crew chief was not watching load. □ Passenger's equipment caught on right forward cargo window jettison handle. Window was jettisoned.



Attack helicopters

AH-1 Class E mishaps □ (S series) Two loud noises were heard from engine area during hover, and aircraft yawed left and right. Aircraft was operating in high altitude desert environment. Inspection revealed bleed band actuator was scored beyond limits. First and fifth stage compressor blades and third, fourth, and fifth stator vanes were eroded beyond limits. Variable inlet guide vanes were bent due to erosion. □ (S series) Roll SCAS started motoring during flight. Caused by malfunction of pylon transducer. □ (S series) Master caution and No. 1 hydraulic system lights came on. Caused by failure of hydraulic pressure switch.

Cargo helicopters

CH-47 Class B mishap □ (C series) Aircraft was landed at airfield. During four-wheel ground taxi, aircraft suddenly pitched forward. Pilot quickly applied aft cyclic, causing extensive buckling of airframe and left aft landing gear to break. 8334

CH-47 Class E mishaps □ (A series) No. 2 engine chip detector light came on during takeoff. Caused by failure of engine transmission. □ (C series) Oil pressure switch failed, causing transmission oil pressure to increase. □ (C series) Crew chief smelled fuel fumes during landing. Check valve in aft auxiliary tank stuck open, allowing fuel to be

pumped into main fuel tank. This caused main fuel tank to overpressurize.

Observation helicopters

OH-58 Class C mishaps ☐ (C series) Main rotor blades hit tree during NOE flight, damaging blade tip caps. ☐ (A series) Engine failed during takeoff. Pilot made sharp left turn to avoid hitting some rocks and autorotated to beach. Main rotor blade hit the ground, but aircraft was landed upright. Main rotor blade, tail boom, engine, and engine cowling were damaged. ☐ (A series) Aircraft hit wires during flight, damaging fuselage, main rotor blade, mast, and push-pull tubes. Suspect unauthorized low-level flight.

OH-58 Class E mishaps ☐ (A series) IP noticed aircraft was making 1- to 2-degree turns without any pilot input. Caused by worn pivot pins in swashplate. ☐ (A series) Engine bypass light came on during approach. Engine oil reservoir cap was off and oil level was low. Pilot did not secure oil cap during preflight.

Fixed wing

U-21 Class B mishap ☐ (A series) After completing obstacle clearance takeoff, IP reduced power on one engine. Crew then attempted to land on remaining runway. IP failed to note that gear had been retracted on takeoff. Aircraft landed gear up, damaging both propellers and engines and three flap panels. 8335

U-21 Class E mishaps ☐ (A series) Pilots heard loud bang from left engine. Aircraft yawed left and fire erupted from exhaust stacks. Engine was secured and aircraft was landed 4½ minutes later. Flames continued to emit from exhaust stacks until touchdown. Caused by internal failure of engine. ☐ (A series) No. 2 engine torque fluctuated. Caused by disintegration of fuel control shaft bearing. ☐ (A series) When left main gear was extended, light did not illuminate. Caused by failure of toggle switch.

Maintenance

UH-1 Class E mishaps ☐ (V series) Aircraft yawed left and rpm decreased rapidly. Fuel control was out of adjustment. ☐ (H series) Transmission oil pressure fluctuated. Master caution and transmission pressure lights came on. Postlanding inspection revealed loss of 6 quarts of transmission oil. Oil was leaking around external oil filter gasket.

AH-1 Class E mishap ☐ (S series) Pitch and roll SCAS motored during takeoff, causing uncommanded cyclic movement. SCAS card was out of adjustment.

OH-58 Class E mishaps ☐ (C series) Master caution and generator lights came on. Voltage regulator was adjusted incorrectly. ☐ (C series) Master caution light came on. Caused by loose master caution relay. ☐ (A series) N_2 dropped and low rotor rpm audio activated. Caused by incorrectly torqued pneumatic line to accumulators.

U-21 Class E mishap ☐ (RU-21H) Fuel check revealed left nacelle fuel level of 200 pounds and right nacelle fuel level of 400 pounds. Left fuel transfer pump circuit breaker was out and would not reset with pump switch on. Left transfer pump electrical wiring had been reversed following pump replacement.

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

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	March	2	5
3rd Qtr	April	7	6	April	5	0
	May	6	2	May	8	1
	June	2	3	1-15 Jun	3	3
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	23	11

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Responsibility of supervisors

"Once again, it's back to basics." Those words are always on the lips of supervisors when something goes wrong. Recent incidents remind us again that when we fail to practice the basics, we invite trouble. Outstanding capabilities and excellent job knowledge are of little help when we do not adhere to the basics and make them a part of our daily work habits. The complexities of our work and the turnover within the work force necessitate adherence to a few fundamentals—always. Let's review some of these fundamentals. Keep in mind that these principles may seem to be the obvious, but remember, what happens on the flight line, in the silo, and in the shop determines how well we do our mission.

Know your job. Each individual has to have a specific and practical understanding of his or her piece of the mission. You may recall earlier days when each person had his job description clearly displayed near the work area. That was useful but perhaps seldom read. What is needed is a clear understanding by each individual of his job and responsibilities if we hope to keep our daily activities on track. Each of us must recognize that we are fully accountable.

Know the people around you. Knowing the strengths and weaknesses of the people around you is a key to being an effective worker. As a supervisor, it is absolutely essential that you know the capabilities of your people. A simple test is to ask the question, "Would you treat your people as you do if you owned the shop and signed the pay checks?" You might also consider how much effort you exert in insuring that each person is as proficient in individual job skills as he is expected to be. Would you do anything different if you were responsible for a profit and loss statement?

Determine the resources required. Know the resources—people and material within the organization. If you know what is required and available, you can prioritize your attention in correcting the shortfalls. It is much easier to work a few problems at a time than it is to try to solve everything at once. The successful worker and supervisor know what is available, what is most important at any particular time, and how to get the system to provide needed additional resources.

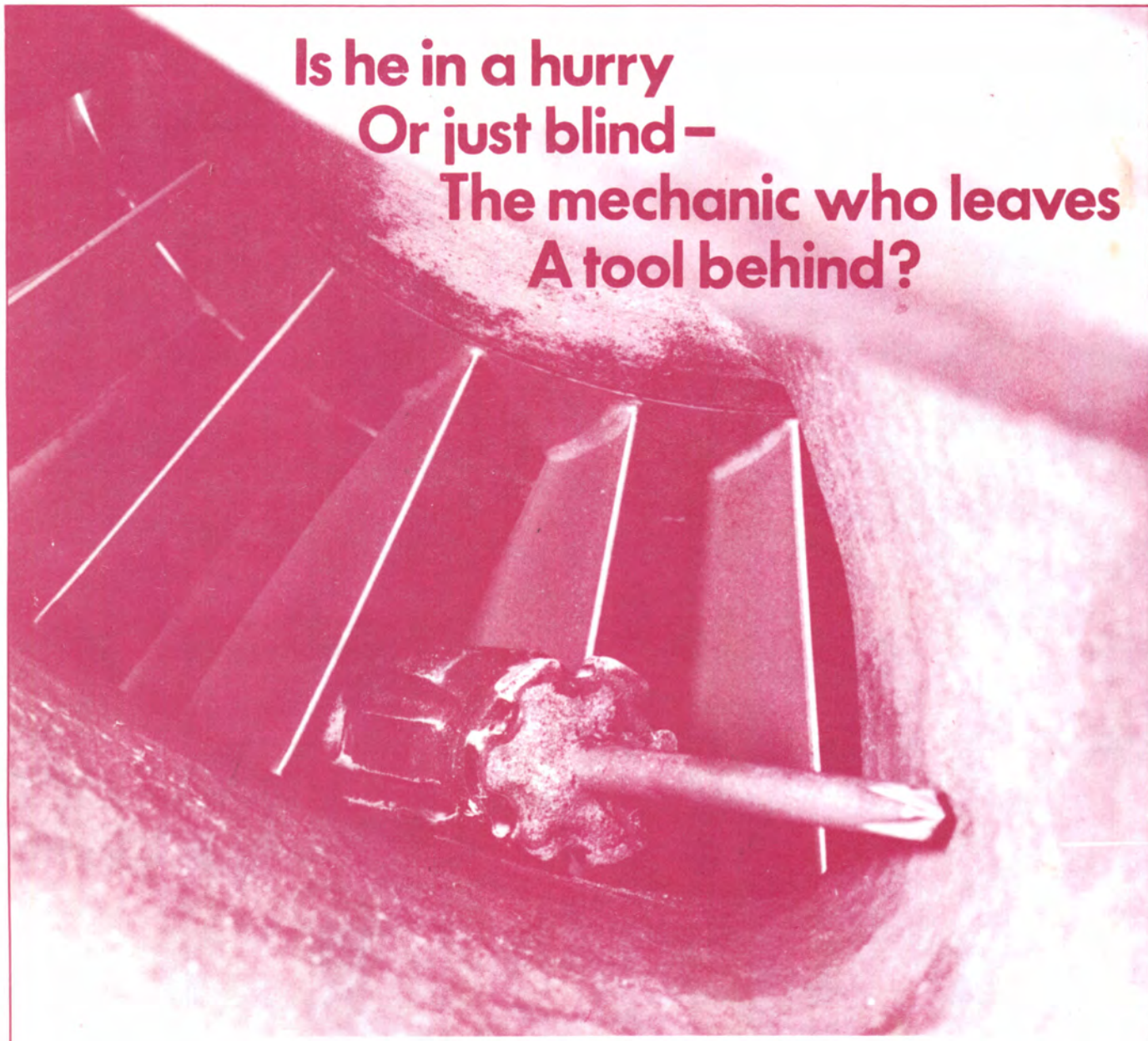
Know where you stand. Each job has certain factors which describe the health and performance of the work center. These factors should be as objective as possible, related directly to the mission of the organization, and should tell it like it is. In assessing how well you are doing, few "we are outstanding" assumptions should be made. A "no nonsense" look at all available indicators should include the results of inspections, accidents, incidents, staff assistance visits, and your personal assessment of how well things are going. The final step is to recognize things as they really are, and if you have problems, do something about them, including asking for help if the solutions are not within your capability. The key to solving a problem is first to recognize and acknowledge that it exists.

Know your soft spots. Sort out your concerns, define your real problems, and prioritize them so you can attack them in some logical manner. What may appear to be a falling sky may actually be one or two soft spots that can be corrected once they are properly defined and when necessary brought to the attention of the right people. Time after time, subsequent to accidents and/or unsatisfactory inspection results, the root causes of problems are resolved. Earlier identification and resolution could have avoided embarrassment and more costly solutions.

Do it better. As you consider basic factors and fundamentals to good job effectiveness and supervisory responsibility, also consider what you can do to improve your effectiveness. Many times a fresh perspective will stimulate excellent ideas toward removal of a problem you have become accustomed to living with. A better idea usually exists in each of us if we can bring it out at the right time and place.

We're okay. We need to approach our work positively by recognizing situations for what they are. We have good people in the Air Force and SAC. They want to do a good job and will if we train them properly, teach them the job skills they need, supervise them as we should, provide them with the quality of work-life and resources they need—and finally, motivate them with an understanding of the importance of their work. The results of our daily work can provide the American people with the most professional and productive Air Force possible with available resources. We will be okay so long as we remember that the basics must be a part of our work habits, every day. ■

—from COMBAT CREW
Lt Gen George D. Miller
Vice Commander in Chief, SAC



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What you see is not always what you get

The following article by Dr. R. A. Alkov, Naval Safety Center, appeared in APPROACH magazine. The information also applies to Army aviators.

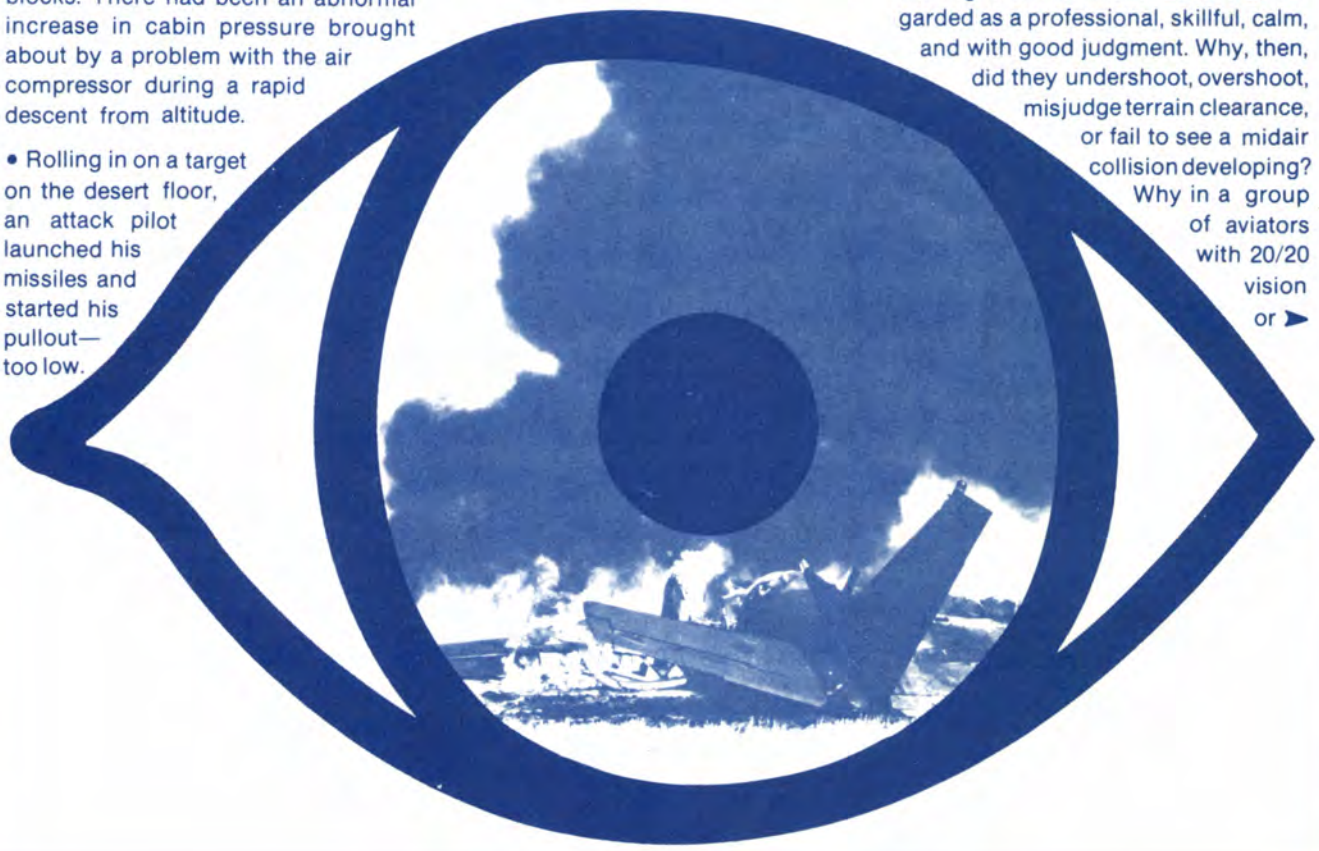
• The pilot eased back on the yoke to flare his cargo aircraft a few feet above the short runway. Seeing that he'd overshoot his aimpoint, he attempted to go around. The aircraft went through a fence and across a ditch and broke up in a fireball as it hit a stand of trees. The ensuing fire killed the entire crew. The cockpit voice recorder revealed that just before landing, the pilot and his crew were in extreme pain from ear-blocks. There had been an abnormal increase in cabin pressure brought about by a problem with the air compressor during a rapid descent from altitude.

• Rolling in on a target on the desert floor, an attack pilot launched his missiles and started his pullout—too low. Realizing he'd misjudged his terrain clearance, he started a hard pullup but hit the ground before the aircraft could fully respond. There was no ejection attempt. The weather was clear with no significant impairment to visibility.

• On an overwater approach on a clear night toward a brightly lighted coastal runway with a city rising in the background, a patrol pilot reduced power, dropped too low too soon, suddenly saw he was undershooting, added power, but still touched down in the bay short of the runway threshold. He had excellent vision. In fact, his resting focus was at a greater distance than normal.

• During a sunny day over the Gulf of Mexico, two training aircraft collided. Neither the instructors nor the students involved saw the other aircraft in time to avoid the midair collision. One crew had time to eject successfully and was pulled out of the sea by a search and rescue helicopter. The other crew was killed on impact.

What happened in these tragic mishaps? Each of the responsible aviators was an experienced pilot, familiar with the flight environment. Each was regarded as a professional, skillful, calm, and with good judgment. Why, then, did they undershoot, overshoot, misjudge terrain clearance, or fail to see a midair collision developing? Why in a group of aviators with 20/20 vision or ➤



What you see is not always what you get

better do some spot "bogies" much sooner than others? Can such visual skill be acquired through training, or is it just something we're born with?

Research conducted by Dr. Stanley Roscoe of New Mexico State University and others, notably Dr. Robert Randle of the NASA-Ames Research Center and Dr. Herschel Leibowitz and his students at Penn State, has provided some answers to these questions. To understand the mechanisms involved, let's quickly review the physiology of visual accommodation—the focusing of the eye.

The lens of the eye is elastic and changes its curvature to focus at different distances under the control of the ciliary muscle (see figure 1). This is known as the accommodation of the lens. It was once believed that relaxation of the ciliary muscle caused the eye to focus at optical infinity. We now know it focuses at a relatively short distance when at rest, although this resting distance varies greatly from person to person and moves outward as we get older.

The typical result for pilots in flight is space myopia (or nearsightedness) while flying under conditions where there's little or no texture to focus on outside of the aircraft's surfaces. Relatively "empty" visual fields occur when you're flying at night, at high altitudes, over water or snow, or during a hazy day. Also, clouds have surprisingly little effect as stimuli for distant focusing. Under such conditions, the eye relaxes and allows the lens to seek an intermediate curvature that requires no particular focusing effort. This relaxed state is known as the **dark focus**.

The eyes are constantly involved in a tug-of-war between focusing on some stimulus and returning to the dark focus, with the stimulus normally pulling just hard enough to be seen and recognized. Most of the time in flight, however, there's no stimulus out there to pull the eyes' focus away from the dark focus.

As previously stated, the dark focus varies considerably with the individual, even among those with normal vision. To find your own dark focus, try an experiment first described by Dr. J. Mandelbaum in 1960 (in a groundbreaking article for the "American Medical Association Archives of Ophthalmology") and since called the Mandelbaum effect. From the screened-in porch of his summer cottage, he found he couldn't read a sign on the beach when he stood a certain distance from the screen. All he could focus on was the mesh of the screen. When he moved closer or farther away or moved his head from side to side, he could again read the sign. The distance from his eye to the screen when he couldn't read the sign turned out to be his dark focus, a fact later confirmed experimentally by Dr. Fred Owens at Penn State.

Even if you do have "normal" vision your dark focus can vary with the time of day, your emotional state, your workload, and your fatigue and stress levels. Furthermore, it has long been apparent that many aviators have much better than 20/20 vision, and there is a wide range of individual differences in perceptual abilities among those considered normal.

Empty-field myopia is reinforced by window posts and frames, some of which are quite close to the eyes. **Traffic appearing along a line of sight close to a window post may be virtually invisible to the aviator.** There are two main reasons for this. First, the nearby structure can serve as a focus trap. Probably even more important is the normal scan habit of looking to one side of a post with both eyes and then to the other with both eyes.

The two fixations are typically about 30 degrees apart. As a consequence, traffic appearing near one edge of the post will be as much as 15 degrees off the line of sight. Only if targets move, flash, or glisten will they be picked up soon enough in peripheral vision. Even targets that present an extended distinctive shape, such as a long, thin contrail, can be missed when they appear close to a window post. Remember, an aircraft on a collision course stays on the same relative bearing and doesn't appear to move—it only seems to grow.

Research reported by Dr. Stanley Roscoe has revealed a high correlation between the size an object is judged to be and the distance at which the eyes are focused. When the eye is focused close-up, we judge the apparent size of a more distant object to be smaller than it really is, and the converse is true when the eye is focused farther away. Since the apparent size of an object serves as a cue to distance, it follows that the perception of depth and distance depends upon where the eyes are focused.

The apparent size of an object is therefore influenced by other objects near the line of sight that also affect focus. Dr. Roscoe believes that this accounts for the popular illusion that the moon seems larger and closer when it is near the horizon than it does when viewed overhead in an empty sky. He's shown experimentally that changes in the apparent size of the moon (or other objects) correlate almost perfectly with the distance at which the eye is focused. When we look at the moon above a horizon, our eyes focus at a great distance; when we look up at the moon in the sky overhead, our eyes relax to a near point close to the dark focus, and the moon appears to shrink accordingly.

If you want to see for yourself, try sticking your thumb out at arm's length and closing one eye. Look at a relatively distant object with your thumb held near the line of view of the open eye and then alternately open and close your

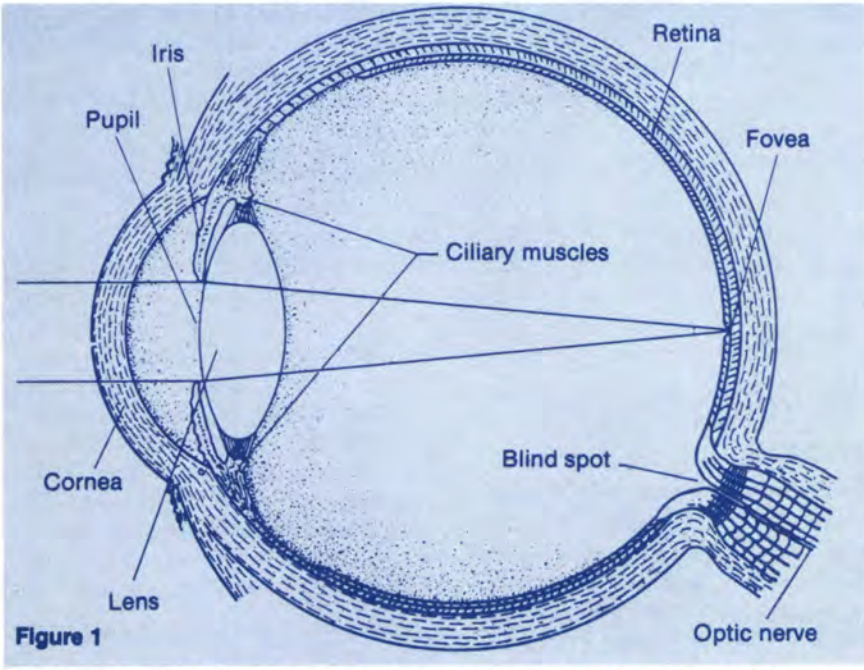


Figure 1

other eye while still looking at your thumb and the object. Notice the apparent change in size of the object, shrinking when one eye is closed and expanding when it's opened. The reason for this is that the closed eye tends to return to its dark focus and to pull the open eye with it. The compromise between the two eyes is about halfway between the dark focus and the distance of the object being viewed.

What about the guy landing short at night? When flying over water toward a lighted runway on a dark night, pilots with distant dark focuses, looking at the lights of a runway on the shore with the lights of a city beyond, suffer from the illusion that the runway is larger and therefore closer than it really is, and the runway threshold consequently appears lower in the visual field. An aviator in this situation may take off power too soon and land short. Dr. Roscoe recommends that lead-in light buoys be used where this problem exists.

As to the overshooting accident, researchers at NASA-Ames have shown that intense stimulation of the inner ears, such as that caused by a sudden increase in cabin pressurization, results in an overaccommodation of the eyes' focusing mechanism. This causes the runway to appear smaller and farther away than it really is.

Outward accommodation is at least partially controlled by the sympathetic branch of the autonomic nervous system. That's the one that allows us to run faster and fight harder when we're "psyched up." It increases our visual acuity by magnifying what we see to allow us to detect enemies or sight elusive prey when our adrenaline is pumping. This mechanism has helped us since the days of the caveman. Can it be that today this same process causes the attack pilot's visual world to expand, making the ground appear lower and causing him to pull up too late?

It has been demonstrated that some people can be trained more easily than others to control the focal distance of their eyes. This ability is related to a person's dark focus and should be given consideration in the selection and training of aviators. A distant dark focus could be one basis for assigning a flier to fighter or attack aircraft. Individuals with a distant resting focus are not troubled as much by empty-field or space myopia.

Of course, as pilots gain more experience, they learn to compensate for biased distance judgments. As an individual ages, resting focus moves farther away so that target detection tends to improve. In extreme cases, however, a pilot who has "eagle eyes" may have serious problems in making a "black hole" approach at night and may be more likely to land in the water.

The key is detection. Now that we know that certain circumstances can alter our vision, we can take steps to voluntarily control our eyes' accommodation. There you have it. What you see is not always what you get, but you **can** learn ways to see more than you've ever seen before!

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Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps □ (H series) On base leg for landing, pilots thought they noticed decrease in engine noise. Engine instruments revealed engine rpm was decreasing and rotor rpm was below normal. Pilot entered autorotation and turned toward a small clearing near the airfield. On short final approach, pilot saw several large storage tanks in his intended landing area and rapidly decelerated to avoid landing on them. During the deceleration, tail boom hit ground and failed. Aircraft then hit the ground hard. 8336 □ (H series) Five UH-1H helicopters were to be dispatched at first light. Weather was reported as sky obscured from ground fog and low clouds, with visibility at ½ to 1 mile. Air mission commander placed the mission on a weather hold, but directed that the five helicopters be repositioned from their tactically dispersed parking areas to a large cleared area. One of the aircraft, which was parked in a small clearing surrounded by 50- to 60-foot trees, began a straight-up hover to an altitude of about 80 feet where it entered the fog and clouds. It appeared that the pilot tried to transition to instrument flight. Aircraft accelerated forward and climbed to 100 to 150 feet agl and began what appeared to be a semicontrolled slow turn to the left. Aircraft continued in the left turn and hit the ground at the top of a ridgeline. Aircraft then bounced back into the air and continued to fly for about 100 meters through the tops of 25- to 30-foot trees. After clearing the trees, aircraft crashed at a high rate of speed in a valley. Three fatalities. 8337

UH-1 Class B mishap □ (V series) Aircraft was at 3-foot hover over pad when engine surged. Aircraft climbed to 15 to 20 feet and landed hard. 8338

UH-1 Class C mishap □ (H series) Loud banging noise was heard from engine compartment while aircraft was on short final for landing. Aircraft yawed left and low rpm light activated. Aircraft began to settle and power could not be maintained. Pilot landed on sloping, plowed field, damaging skids and breaking chin bubble. Suspect compressor stall.

UH-1 Class E mishaps □ (H series) Loud noise was heard from transmission area, and master caution and hydraulic lights came on. Caused by failure of right lateral servo seal. □ (H series) Transmission oil pressure fluctuated during flight. Caused by defective pressure relief valve. □ (H series) During final approach, rpm bled off to 6000. Caused by failure of overspeed governor.

Attack helicopters

AH-1 Class C mishap □ (S series) Engine was being run up for main rotor blade track. Workstand was blown into parked OH-58. Unforecast winds, which gusted to 26 knots, and aircraft rotorwash moved stand. Pilot assumed that placing the stand on its side would secure it.

AH-1 Class E mishaps □ (S series) Transmission oil hot light came on during hover. Oil cooler screen was covered with weeds, grass, and brush. □ (S series) Crew heard loud bang and saw tgt rise to 840 degrees for approximately 2 seconds. Caused by leaking engine nose seal and dirty compressor.

Cargo helicopters

CH-47 Class E mishaps □ (B series) No. 2 engine chip detector light came on. Caused by failure of engine transmission. □ (C series) Master caution and No. 2 hydraulic pressure lights came on. Loss of hydraulic fluid was

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	1-22 Jun	**4**	**4**
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**24**	**12**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

The buck stops here

"The buck stops here"—every time you hear it, it's like a breath of fresh air. But there's a catch, particularly today. "Here" means **you** and "stops" means **now**.

If **you** want to make decisions, the climate's right—but be ready. Events have almost overtaken us. We're younger, less experienced, and training harder and better than ever before—but something's missing. Maybe it's **you**.

When **you** pinned on your wings, **you** pinned on a lot more than an aero rating. **You** pinned on a certain loyalty, dedication, and responsibility. Now it's time to deliver. The buck **stops** here, remember? And if you're going to **stop** it, you've got to be prepared; you've got to be responsible. That's what those wings represent. That's what you're paid for—being ready. No one can do that for **you**. Only **you** know if you're prepared. Only **you** know what's missing. Don't bluff it.

If you're not ready—don't go. If **you** go and find yourself in over your head—**stop**. If **you** see someone over his head—**stop** him. Being the meanest mother in the valley is great when you're back at the bar, but it's not worth much when you're out in the valley. What **is** worth something in the valley are the brains, sophistication, and self-control that make **you** lethal and keep **you** alive. It's preparation, discipline, and awareness that give **you** the judgment and maturity to balance the real and potential risks of aggressiveness against its payoffs.

The stakes are high—it could be "**you** bet your life." So then, the buck has to **stop** here with you. Know your job; know your machine; know your limits. **You** owe yourself that much. If **you** are the "World's Greatest Pilot," then "I didn't know" or "I didn't think" make sorry epitaphs.

It's really a matter of being professional. Like the refrain goes, "Between the

amateur and the professional is a difference not only in degree, but in kind." **You** signed on as the latter—we can't afford the former. We can't afford the price of amateurs masquerading as pilots who don't know the tools of our trade and we can't afford the tools. We can't even begin to afford the price of those other amateurs who don't know the rules, can't learn the rules, or won't follow them. We can't afford the price because that "buck" eventually is extracted from all of us in the form of more restrictions, less training, and less readiness.

We've come a long way. We train twice as hard as we ever did, but we still may only be half as good as we need to be. We can't afford another "Dark Age" because of amateurs. Pros owe each other something; pros demand something of each other.

Some cold, gray dawn my life may be the buck spent or saved depending on your discipline and performance—or vice versa. We're not playing kid's games—amateur's games. When **you** see your buddy crash an aircraft, hear that first panic call cut short with "Oh, my God," or listen to that futile cry of "Beeper, beeper, come up voice," you'll understand it's no place for amateurs uncertain of their skill.

But it's too late then—the buck's already been passed.

So, we've got to stop it **now**. We've got to prepare ourselves. We've got to take responsibility for the bottom line, for doing it right, for speaking the unspeakable in the debrief, for calling the shots or calling it off. It's nothing personal. Mistakes aren't crimes—unless **you** let them flourish. So no hard feelings. It's strictly business—performance does count.

So the buck has to **stop**, right now, right here, right above the left breast. Don't be an amateur. Don't let someone else be an amateur. If he can't make it as a pro, get him a bus ticket to the bush leagues. We can afford the ticket; we can't afford the amateur.

That's it—everytime **you** man up and strap in, **you** have to have the responsibility—that certain loyalty, discipline, and dedication that says, "I'm prepared, I'm ready, I'm responsible—the buck stops here." ■

—adapted from AIR SCOOP
Lt. Col. Ronald E. Keys
Hq USAF AF/CC

Mishap briefs

confirmed by crew chief. Caused by failure of hydraulic pressure line.

Observation helicopters

OH-58 Class E mishaps □ (A series) Aircraft was hovering NOE in a direct downwind condition. Pilot started a 180-degree turn to the left, placing aircraft in a left quartering tailwind condition. After turning about 15 degrees, aircraft began an uncommanded spin to the right in nose-low, tail-high attitude. Pilot pushed forward cyclic to gain airspeed and lost 5 to 10 feet of altitude. Tail rotor effectiveness was then regained. Pilot said that the constant review of loss of tail rotor effectiveness by his unit safety officer was a factor in his ability to recognize and correct loss of tail rotor effectiveness in this instance. □ (C series) IP noted excessive amount of grease building on windscreen. Caused by faulty grease fitting on main rotor assembly.

Fixed wing

C-12 Class E mishaps □ (C series) When gear handle was placed down, nose gear indicator did not illuminate. Gear was manually pumped down, and aircraft was landed. Caused by failure of down-lock microswitch. □ (C series) Aircraft began to turn to right during taxi for takeoff. Full left pedal and brake had no effect. Power levers were moved to full reverse, slowing the turn to the right. Caused by warped brake disc.

OV-1 Class E mishap □ (D series) After liftoff, No. 1 engine propeller noise decreased and aircraft dropped about 3 feet to runway. Aircraft was stopped on the runway. Failure of propeller control box caused No. 1 prop rpm to drop excessively.

Maintenance

UH-1 Class E mishaps □ (H series) Crew smelled smoke, and then cabin filled with smoke. Postlanding inspection revealed corrosion inside cannon plug caused electrical short. □ (H series) Pilot felt right lateral cyclic feedback, followed by stiffness in collective and illumination of hydraulic warning light. Hydraulic fluid was leaking from incorrectly manufactured hydraulic line.

OH-58 Class E mishaps □ (A series) Master caution and generator warning lights came on. Voltage regulator was out of adjustment. □ (A series) N_2 rpm rose rapidly during flight. Elbow fitting inside jam nut on regulated air pressure line at power turbine fuel governor was loose, letting regulated air pressure leak between fuel control and fuel governor.

U-3 Class C mishap □ (B series) Aircraft continued down runway for approximately 400 feet after touchdown, then began to gradually turn to right. Loud squealing sound was heard from tire. Aircraft came to a stop in the sod on right side of runway. Torque link on right main landing gear had separated at midpoint. Incorrect washer had been installed on inboard side of attaching bolt, allowing bushing on torque link to pull through. This allowed right main gear wheel to free-float during landing and pull aircraft off runway to right even though full left brake was applied.

Messages received

- OH-58 information message concerning interim changes to OH-58 operator's manuals (101800Z Jun 83). These changes, concerning loss of tail rotor effectiveness, should be posted immediately.

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

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Accident review: medevac mission

Synopsis

A UH-1V was on a rescue mission in the mountains. After picking up the patient, the aircraft took off and followed a creek through a canyon at a low altitude and high airspeed. While recovering from a steep right bank, the aircraft hit a 50-foot tree and crashed.

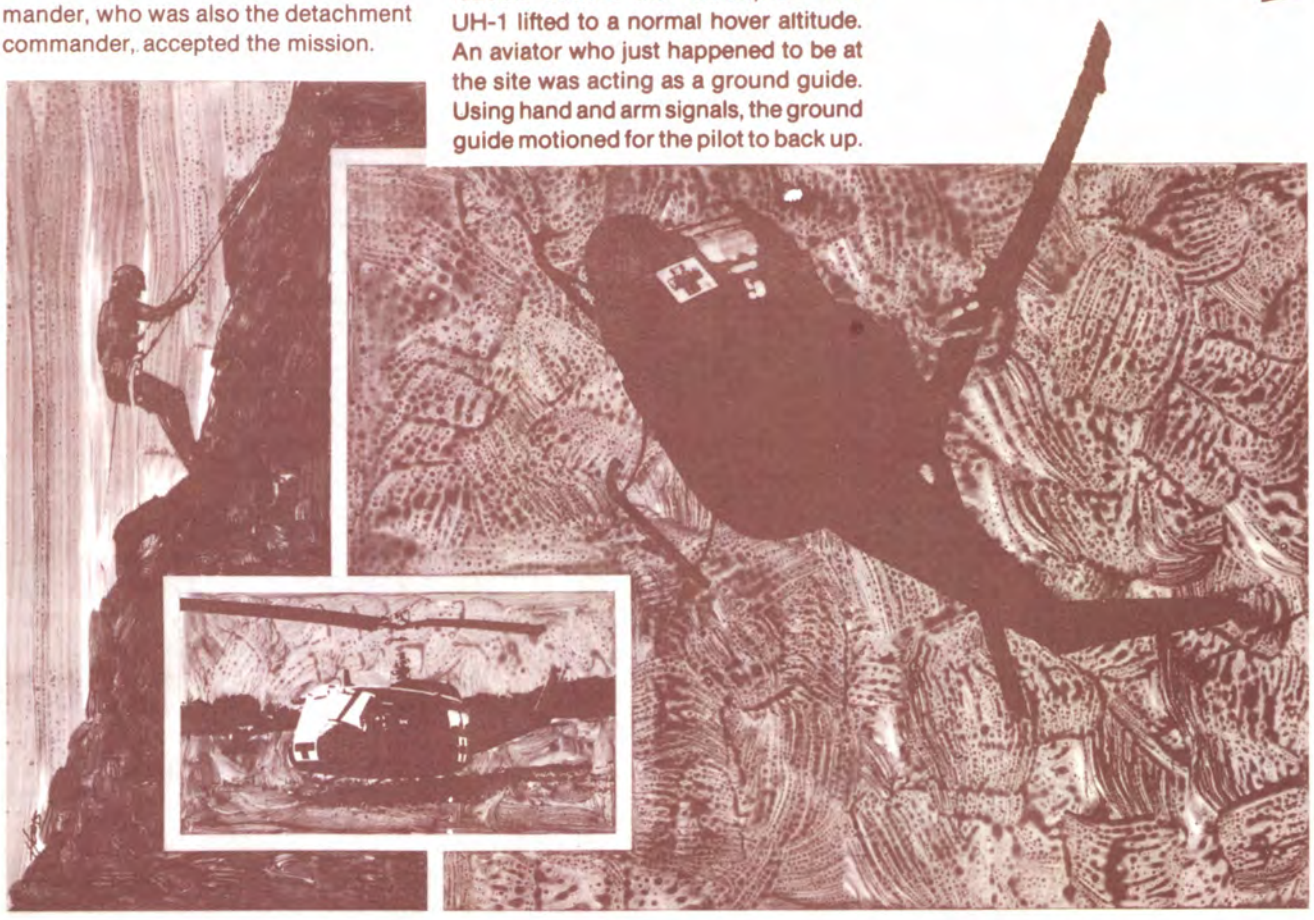
History of flight

The unit was asked to send a helicopter to evacuate a mountain climber with severe injuries. The mission commander, who was also the detachment commander, accepted the mission.

The UH-1V, with a pilot, copilot, crew chief, and medic aboard, left the airfield and flew to the accident site. After reaching the site, the crew completed an overhead reconnaissance and landed in a parking lot adjacent to a creek inside a narrow canyon, 350 feet below its rim.

The medic and several civilian paramedics proceeded to the accident victim, who was located about 150 feet up the side of a steep rock cliff. About 40 minutes later, the accident victim was loaded aboard the helicopter. The UH-1 lifted to a normal hover altitude. An aviator who just happened to be at the site was acting as a ground guide. Using hand and arm signals, the ground guide motioned for the pilot to back up. Before backing up far enough to reach the prearranged takeoff point, the pilot moved the aircraft forward in a takeoff attitude and climbed directly over the ground guide, causing him to drop to the ground.

Leaving the parking lot, the pilot climbed to about 40 feet and veered slightly to the right to clear a huge outcrop of rock. The pilot then banked to the left about 20 to 30 degrees, still maintaining his low altitude, and accelerated to an estimated 60 knots.



Medevac mission

After the helicopter had moved 350 to 400 meters from the departure point, it was seen in an extremely steep right bank along the left side of the canyon wall, negotiating an S-turn. Witnesses said the aircraft leveled and appeared to be banking back to the left when the main rotor blades hit a tree. The aircraft then hit a rock wall on the right side of the creek and crashed on a gravel road below the impact point. There were no survivors.

Witness accounts

Civilian rescue team members said the helicopter crew appeared to be professional and unrushed. Two civilians volunteered to go with the crew to the hospital, but the flight medic declined, saying he thought they were heavily loaded already. The witnesses said they were surprised when the pilot made no attempt to climb out of the canyon on takeoff, but began to fly at a low altitude through the canyon.

None of the witnesses could see both the departure point and the crash site. The witnesses agreed that the aircraft appeared to be in controlled flight, although the lack of aviation background of many of the witnesses contributed to perceptions on their part that there may have been something wrong with the aircraft.

When questioned about the pilot's flight habits, several members of the unit said it would be very possible for the pilot to use an airspeed over altitude departure.

Crewmember experience

The 35-year-old pilot had more than 2,000 rotary wing hours, with more than 1,900 in UH-1 aircraft. The 28-year-old copilot had more than 300 rotary wing hours, most of them in UH-1 aircraft. The crew's experience in mountain flying was limited.

Commentary

The pilot made an airspeed over altitude takeoff from a confined area and remained at a low altitude while following a straight section of the creek. The creek then turned and the width of the canyon narrowed. Although the pilot successfully maneuvered through the first turn, excessive airspeed prohibited him from successfully negotiating the second turn. The crew took off into the wind, but during the steep right bank, they encountered a quartering left tailwind, possibly of strong velocity. This aggravated the situation.

The optimum takeoff technique, particularly considering the power available versus power required, would have been to execute a coordinated climb (increasing altitude and airspeed simultaneously) out of the canyon. Remaining at low level is contrary to guidance contained in the unit SOP, TC 1-10, and TC 1-135.

The presence of a crowd of onlookers, plus the nature of the mission and the favorable reputation of the unit, may have had a psychological influence on the pilot to execute a takeoff with a flair, such as an airspeed over altitude takeoff. But the opportunity to climb out of the canyon still remained after takeoff.

Another factor which may have influenced the low-level flight was the nature of the injuries to the patient. Medical evacuation pilots are taught to avoid pressure changes, such as those associated with altitude, whenever a patient has closed head injuries, as did the patient aboard this aircraft. However, the pilot was familiar with the area and his flightpath, and he knew the route to the hospital required him to climb an additional 1,500 feet to clear the en route terrain. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (V series) During low-level autorotation at night, pilot pulled initial pitch at 25 to 30 feet and followed with cushioning pitch at 10 to 15 feet Aircraft fell through, hit the ground, bounced, and came to rest about 100 feet from initial point of contact. Rear skid cross tube and saddle straps were damaged. Landing light was not used during autorotation. Sufficient lighting was not available for IP and pilot to judge altitude of aircraft. □ (H series) As engine was being flushed with hand-operated fire extinguisher, nozzle of sprayer hose broke loose and was ingested into engine. First-stage compressor blades and VIGV were damaged.

UH-1 Class E mishaps □ (H series) Governor would not return from emergency to auto position following emergency governor operation. Caused by defective electrical solenoid. □ (H series) Rpm warning light flickered on and off during flight. Caused by defective tachometer generator. □ (H series) Excessive feedback in cyclic was caused by failure of servo. □ (M series) Master caution and No. 1 hydraulic lights came on. Caused by failure of hydraulic pressure switch. □ (H series) Inverter caution light came on and loud squealing noise was heard. Caused by failure of main inverter. □ (H series) During simulated gas attack with an M5 disburser, hose from talc container leading to outside of aircraft ruptured. Cockpit and cargo area were immediately covered with talc. The only person who could see was the pilot, who was wearing a gas mask. Cleaning the outside lens of his mask, pilot flew the aircraft while looking out the open side window. Crew released the pressure from the air tank and visibility was restored. Talc was wiped from inside of windscreen and aircraft was landed. □ (H series) Banging noises were heard during hover. N_2 drooped to 6200 and egt fluctuated. Postflight inspection revealed variable inlet guide vane actuator rod was stiff and feedback rod and bearing from fuel control to actuator was frozen □ (V series) Pilot felt control stiffness and feedback during flight. Master caution and hydraulic lights came on. Caused by failure of hydraulic servo. □ (H series) Engine oil pressure fluctuated and then dropped to 45 psi. Caused by failure of transducer sending unit.

UH-60 Class C mishap □ Aircraft was No. 5 in a flight of 6 landing to a field site. As aircraft set down, main rotor blades hit small tree to left rear of aircraft. Rotor tip caps were damaged.

UH-60 Class E mishap □ Torque needles split on pilot's and copilot's PDU. No. 1 needle had maximum indication and No. 2 needle had minimum indication. Caused by malfunction of signal data converter.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	March	2	5
3rd Qtr	April	7	6	April	5	0
	May	6	2	May	8	1
	June	2	3	June	4	4
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	24	12

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Attack helicopters

AH-1 Class C mishap □ (S series) As AH-1 was shutting down, another aircraft hovered too close, causing slow-turning main rotor blades to flex and hit tail rotor drive shaft cover. Inspection revealed deep dent in drive shaft cover and scoring of No. 4 drive shaft.

AH-1 Class E mishaps □ (S series) During left pedal turn, tgt exceeded yellow into the transient range. Inspection revealed copilot in front seat had inadvertently turned on engine deice switch. □ (S series) Master caution and engine fuel pump lights came on. Caused by shorted wire to fuel pump pressure switch. □ (S

series) As aircraft rolled out of right turn, collective was not lowered in time to prevent transient overtorque to 105 percent. □ (G series) Master caution and engine chip detector lights came on. Excessive metal chips and slivers were found on engine chip detector and on oil filter wafers. □ (S series) Master caution light came on. During descent for landing, No. 2 hydraulic caution light came on. Hose had burst, allowing hydraulic fluid to escape. □ (S series) Pilot initiated descending deceleration to land in a field. Pilot added power to stop descent and simultaneously initiated rapid left turn at low airspeed. The necessary application of power to stop the descent and maintain altitude in the steep turn and transient torque developed by the rapid turn caused overtorque. Four trunnion bolts were replaced. □ (S series) Engine oil pressure light came on. Caused by failure of oil pressure switch.

Observation helicopters

OH-6 Class C mishaps □ As aircraft was sliding over sod touchdown area at termination of low-level autorotation, it hit a section of sod that was soft and uneven. Aircraft was rocking and main rotor rpm was low. One main rotor blade flexed down and hit tail boom as aircraft stopped. □ Loud noise was heard and shudder was felt through airframe. ADF antenna had broken in half and hit main rotor blade.

OH-6 Class E mishap □ Aircraft was started with a GPU. Flightcrew then signaled operator to turn GPU power off, which he did. Crew continued engine start and runup checklist at engine idle speed. GPU operator drove tug away without disconnecting GPU cable from aircraft. Aircraft was dragged about 6 feet across the ramp until cable broke free.

OH-58 Class C mishap □ (A series) Copilot hovered aircraft to parking ramp. As copilot approached his parking pad, aircraft was at 2-foot hover. An AH-1 was running at flat pitch 120 feet south of the parking pad. As copilot arrived over his pad, he began a right pedal turn to park the aircraft heading south. Aircraft suddenly spun to the right, and copilot reacted with left pedal pressure. Pilot then got on the controls with the copilot. Full left pedal was applied with no results. Pilot initiated hovering autorotation, and aircraft landed, spinning to the right. Rear cross tube was bent during landing.

OH-58 Class E mishaps □ (A series) Aircraft was at 1,500 feet heading 150 degrees during out-of-ground-effect hover when it started to spin to the right. Emergency procedure was performed and aircraft was recovered at 1,100 feet, 90 degrees from initial heading. □ (C series) Copilot pulled excessive collective during takeoff, causing overtorque.

Cargo helicopters

CH-47 Class B mishap □ (C series) Copilot had placed aircraft in a two-wheel hover down the taxiway. Copilot had just picked up the front wheels when tail moved to left and vibrations were felt in controls. Aircraft started to shake. Copilot lifted

(continued on next page)

FY 83 Fixed Wing Mishap Review*

Type aircraft	Number of Class A-E mishaps	Number of Class A mishaps	Total mishap costs	Fatalities	Nonfatal injuries
B-E8	1	0	$ 0	0	0
C-7	89	0	857	0	0
C-12	68	0	105,722	0	0
OV-1	66	1	2,557,979	2	2
RV-1	24	0	685	0	0
T-28	3	0	885	0	0
T-42	44	1	127,156	0	1
U-3	9	0	1,120	0	0
U-8	26	0	34,074	0	1
U-21/RU-21	121	0	88,424	0	1
UV-18	1	0	0	0	0
Total	452	2	$2,916,902	2	5

*Data as of 14 Jun 83

Mishap briefs

aircraft off the ground but was unable to control yaw and left drift. Pilot took controls and lowered thrust to place aircraft back on the ground. Aircraft began to vibrate violently. Engines were quickly shut down. Investigation indicates red aft rotor blade struck airframe at least two times. Left rear landing gear attachment mechanism was loose, there was excessive air in hydraulic accumulators, and swashplate bearings were excessively worn. 8339

CH-47 Class C mishap □ (A series) Main rotor blades hit tree branches during NOE training flight. Leading edges of blades were damaged.

CH-47 Class E mishaps □ (A series) Crew smelled electrical odor and saw smoke coming from radio compartment. Caused by malfunction of gyro compass resistor. □ (C series) No. 1 engine torque dropped and PTIT rose to 800 degrees. Caused by failure of engine transmission clutch. □ (B series) Master caution and transmission oil pressure lights came on, and oil pressure gauge fluctuated. Caused by malfunction of transmission oil pressure gauge. □ (B series) During simulated single-engine failure, No. 1 engine trim would not respond to normal or emergency inputs when No. 2 engine condition lever was placed to ground. After landing, No. 2 engine was returned to flight and aircraft was repositioned. During hover, No. 1 engine came off line and was recovered using emergency engine trim. Caused by failure of No. 1 engine N_1 fuel control actuator.

CH-54 Class C mishap □ (A series) As slingload (T-42) was lifted from the ground, drogue chute tangled in left wing elevator. Aircraft was then set on the ground, allowing rigging equipment to rest on cabin top, damaging cabin. Drogue chute was untangled and T-42 was again lifted to 6-foot height for hover check. Chain assembly disconnected from tail section, allowing ground contact. Tail cone, horizontal stabilizer, and rudder were damaged.

Training helicopters

TH-55 Class C mishaps □ Aircraft fell through from 20 feet during landing. Student pilot applied pitch, with no effect. Aircraft landed hard on right skid, damaging skid, aft cross beam, and oleo struts. □ IP rolled off throttle for simulated forced landing. Student pilot entered autorotation and turned aircraft toward an open field. Once aircraft was aligned with the field, IP began to increase throttle. Aircraft did not respond. Engine rpm was zero. IP took control and continued autorotation. Aircraft touched down with left skid upslope and began to yaw left. IP pulled all remaining pitch and applied full right pedal. Right skid dug into sod and aircraft rolled over onto right side. Main rotor blades struck tail boom and tail rotor gearbox.

Fixed wing

C-7 Class E mishap □ Left engine ran rough during flight. Caused by cracked No. 6 cylinder.

C-12 Class E mishap □ (A series) Right engine tgt started rising above

(continued on back page)

NVG alert

We have recently learned of a problem with certain AN/PVS-5 night vision goggles. These goggles with image intensifier tubes are used primarily by ground personnel, but they are also approved for night flying activities. When the UHF radios in aircraft are keyed for transmission between 200 and 400 MHz, the level of light intensity increases above normal resolution in one or both tubes. When the mike switch is released, the light intensity dims to below normal resolution and may shut down for several seconds and then resume normal operations.

The goggles are manufactured by VARO Corporation, under contract number DAAB07-81-C-1066. The manufacturer is aware of this problem and is working on a solution. Should any of these night vision goggles encounter UHF interference, we recommend their use be discontinued pending corrective action.

Point of contact at CECOM is Dave Werner, AUTOVON 992-1381/1382. ■

Mishap briefs

red line during liftoff. Caused by failure of high pressure bleed valve.

OV-1 Class E mishaps □ (D series) Left engine quit during approach for landing. Caused by failure of fuel control. □ (RV-1D) Nose gear indicated unsafe when pilot lowered landing gear. Tower personnel indicated gear appeared to be down. Aircraft was landed without incident. Caused by failure of landing/flap indicator.

U-21 Class E mishaps □ (A series) No. 2 engine chip detector light came on. Single-engine landing was made. Large metal particles were found on chip detector and internal oil filter screen. □ (A series) Right engine surged during flight and ITT began to rise. Unable to stop the rising ITT with power reduced below 500 pounds of torque, pilot shut down engine, flew to airport, and landed. Caused by failure of engine. □ (A series) Flaps failed to go down during before-landing check. Switch was recycled with no flap response in approach or full-down position. No-flap landing was made. Flap gearbox gears had chipped and jammed internally.

Maintenance

UH-1 Class E mishap □ (H series) Ten minutes after takeoff, crew noticed abnormally high engine and transmission oil temperatures. After 1 hour of flight, engine oil temperature reached 93° C. and transmission temperature was 90° C. Cabin heater line in secondary hell hole was cross-threaded, allowing loss of bleed air at aft firewall.

AH-1 Class E mishaps □ (S series) Master caution and engine oil bypass lights came on. Postlanding inspection revealed aircraft was 3 quarts low on engine oil. Oil return line from oil tank to engine had a loose fitting at oil tank. □ (S series) Loud noises were heard and aircraft shuddered. Inlet guide vanes were out of adjustment.

OH-58 Class E mishaps □ (C series) Crew smelled electrical fumes during flight. Caused by hole in outgoing battery vent line. □ (A series) Engine quit as aircraft was on the ground at flight idle. Fuel control was out of rig.

C-7 Class E mishap □ Elevator was hard to move past neutral during takeoff. Rag left on cover over elevator control cables worked its way down into cable and pulley area where it wrapped around pulley and caused resistance. Rag was hidden from view by panel and pulley.

OV-1 Class E mishap □ (RV-1D) Aircraft vibrated severely during turn. Propeller was out of balance.

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

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 38 □ 6 Jul 1983

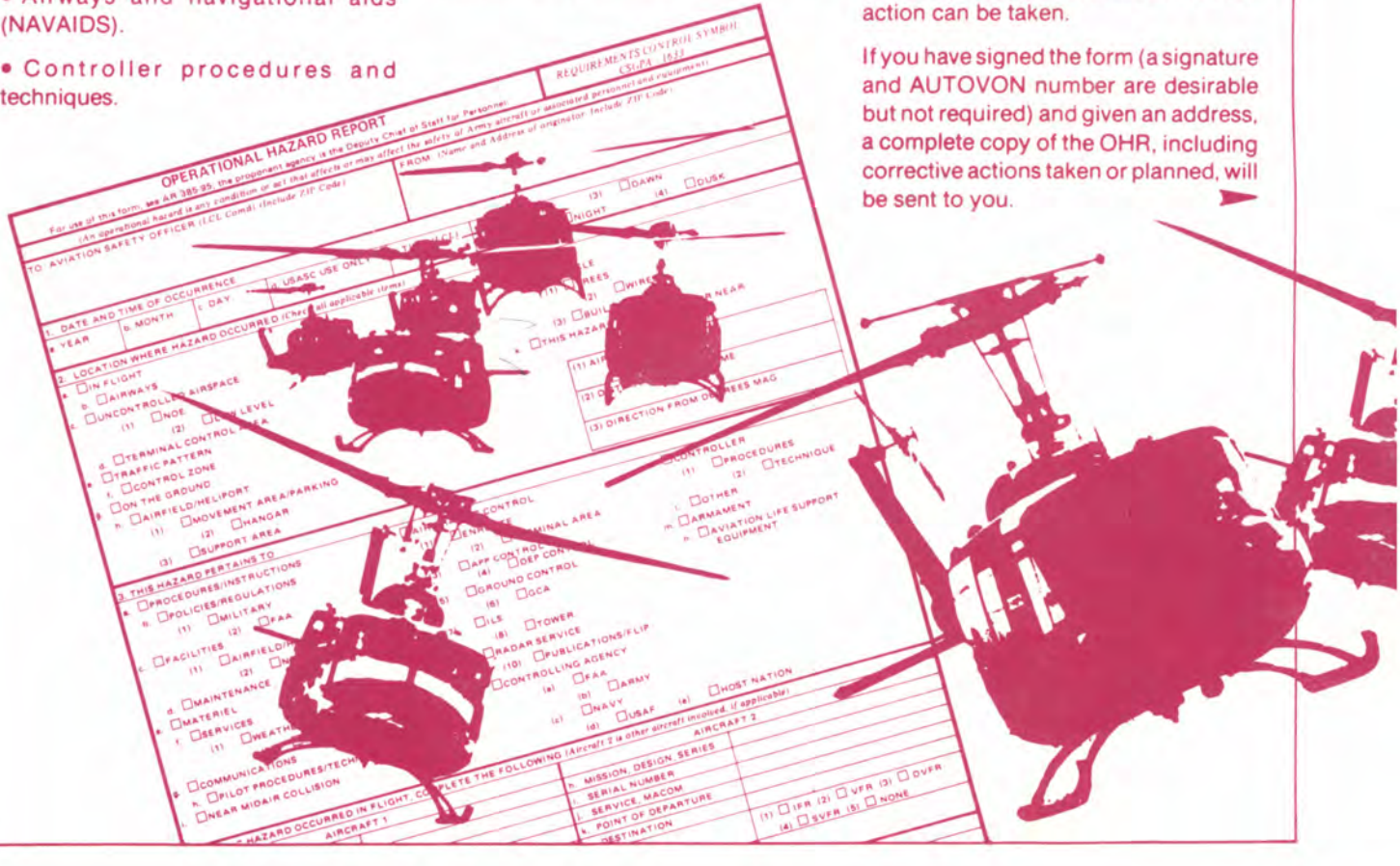
The hazard eliminator

If you know of a safety problem in your unit or at your airfield, or if you land at some other Army airfield and notice something wrong, what can you do about it? Fill out an Operational Hazard Report (OHR), DA Form 2696-R. According to Change 1 to AR 385-95, an operational hazard is any condition, action, or set of circumstances that compromises the safety of Army aircraft, associated personnel, or equipment. Operational hazards include inadequacies, deficiencies, or unsafe practices pertaining to:

- Air traffic control.
- Airways and navigational aids (NAVAIDS).
- Controller procedures and techniques.
- Near midair collisions between aircraft or near collisions between aircraft and other objects in the air or on the ground.
- Aircraft operations.
- Aircraft maintenance or inspection.
- Weather services.
- Airfields and heliports, facilities, or services.
- Flight or maintenance training and education.
- Regulations, directives, and publications issued by Department of Defense agencies, the Federal Aviation Administration (FAA), the International Civil Aviation Organization, and host nations.

What happens after you fill out the form? You send it to the unit aviation safety officer or flight operations officer. Reports sent to an operations office will be forwarded to the organization aviation safety officer. The aviation safety officer will investigate the circumstances reported and submit the report, the findings of his investigation, and recommendations to the unit commander. If the corrective action can't be accomplished at unit level, it will be moved up the chain of command where action can be taken.

If you have signed the form (a signature and AUTOVON number are desirable but not required) and given an address, a complete copy of the OHR, including corrective actions taken or planned, will be sent to you.



The hazard eliminator

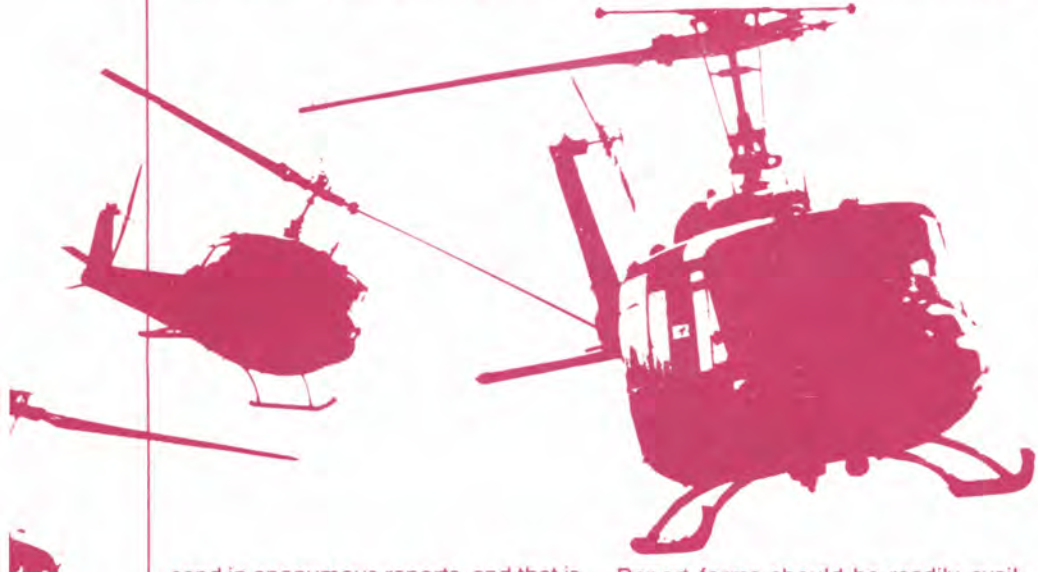
The OHR was introduced into the Army safety program almost 20 years ago, to be used as a mishap prevention tool from post to unit level. The purpose of the OHR program is to obtain information pertaining to mishap-producing conditions before mishaps occur and to take timely corrective action to change or eliminate the conditions. The OHR program has brought about many changes in aviation operations, maintenance, and systems during its lifetime, increasing the margin of safety for the aviation user.

OHRs are used for mishap prevention purposes only. They cannot be used as evidence before any court or board for disciplinary action or to establish pecuniary liability. Some people prefer to send in anonymous reports, and that is perfectly acceptable. The most important thing is to take the time to report safety hazards so they can be eliminated before they cause a mishap.

Any person (military or civilian) assigned to or employed by the U.S. Army and other armed services of the United States or host nations may submit an OHR. Hazards observed in flight should be reported to the nearest radio contact point. An OHR should be completed after landing. The OHR should be used only to report hazards which affect aviation safety. An OHR is not required when an aircraft accident report will be prepared in accordance with AR 385-40 or when a quality deficiency report will be submitted.

Operational Hazard Reports are filled out in triplicate. The person filling out the OHR should be specific in describing the conditions and circumstances of the hazard. He should be aware that the hazard he identifies may well receive worldwide attention, not only saving lives and equipment locally, but throughout the Army.

Aviation safety officers should promote the OHR program at safety meetings.



Report forms should be readily available. A copy of the OHR form is included in Change 1 to AR 385-95 for reproduction purposes. The form is to be reproduced locally. It is the responsibility of the aviation safety officer to see that this is done.

It is also the responsibility of the aviation safety officer to immediately investigate the hazards reported and recommend corrective actions to the commander. OHRs must be handled expeditiously if the program is to remain viable and reduce the potential for mishaps.

When a commander receives an OHR, he should insure that the hazard is promptly corrected. If the hazard cannot be corrected locally, the commander will send the report to the next higher command. The commander is responsible for returning the completed OHR to the aviation safety officer within 10 working days of the date the report was received.

When the aviation safety officer receives the completed report from the commander, he sends the original to the Army Safety Center if the hazard pertains to air traffic control, airways and NAVAIDS, controller procedures or techniques, near collisions, or any other subject he thinks the Safety Center should know about. The second copy of the report is returned to the originator if the report contained a name and address. The third copy is filed. The Safety Center analyzes the data it receives and keeps commanders and aviation safety officers advised of the types of hazards being reported and the actions taken to control them.

The Air Force and Navy have similar hazard reporting systems. Army personnel operating from Air Force or Navy installations should submit hazard reports directly to the base or station operations office.

Who is the key person in making the OHR program a success? It is the aviation user. You must effect the changes, just as you will be affected by the changes. There are many aviation hazards out there yet to be identified. Old ones abound and new ones crop up every day. You see them, but do you report them so they can be corrected? Submit your OHR today. It could save a life.

Point of contact at the Safety Center on the OHR program is Mr. Laurel Sand, AUTOVON 558-5916/6595. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Aircraft landed in marshy tundra. Crew chief noticed that landing gear was sinking. Copilot pulled in power and left ski came free. Right ski was still stuck. As copilot tried to free it, right ski broke in half. □ (H series) Main rotor blade hit tree branches during takeoff from field site. Underside of blade was damaged. □ (H series) Bird hit and broke left chin bubble as aircraft was on downwind turn. □ (H series) Bump and yaw were felt during autorotation, followed by vibration. After landing and shutdown, crew found that both tail rotor blades were damaged. Aircraft had been flown with doors open, and pilot's helmet bag went out the right door. Bag contained headsets and some personal equipment, which contributed to the tail rotor damage. IP was the only individual using a tiedown ring to secure his helmet bag to the floor.

UH-1 Class E mishaps □ (H series) Oil pressure fluctuated between 0 and 60 psi during landing. Caused by defective oil pressure indicator. □ (H series) Low rpm audio and light activated. Engine N_2 needle on dual tachometer dropped to zero. Caused by failure of tachometer generator shaft. □ (H series) Master caution and engine fuel pump lights came on. Caused by failure of differential pressure switch. □ (H series) Explosion was heard from rear of aircraft, followed by whine and total loss of engine power. Aircraft was landed to small confined area. Caused by failure of power turbine wheel blade. □ (H series) Master caution and engine fuel pump lights came on. Caused by failure of fuel pressure switch. □ (V series) Engine oil temperature climbed past 100° C. during climb. Caused by failure of oil cooler fan bearing. □ (V series) Master caution and transmission oil pressure lights came on. Torquemeter increased to 52 pounds. Caused by failure of oil filter gasket, which allowed oil to be ingested into engine. □ (V series) SIP started engine with throttle in open position. At 40 percent, engine increased to 5200. □ (H series) Windshield wiper motor began to smoke during takeoff. Inspection revealed wiper motor switch was in low position and wiper select in pilot position. Aircraft had previously been flown in the rain by another crew, who left windshield wiper in low position. The second crew also failed to follow dash 10 procedures and did not turn switch off before starting engines. When battery switch was placed in "on" position, wiper blade did not start because windshield was dry. Wiper motor and three resistors had to be replaced.

UH-1 aviation-related mishap □ Service member, driving a tug, was taking some equipment to a UH-1. As he neared the aircraft, some of the equipment shifted and lodged against the accelerator and brake pedal. Service member could not stop tug before it hit aircraft.

Attack helicopters

AH-1 Class A mishap □ (S series) Copilot, who was at the controls, noticed engine speed was fluctuating. Pilot took control and initiated power-on landing. Aircraft landed hard in open area with approximately 30 knots forward airspeed. Aircraft then slid forward about 50 feet and went through a wire fence. Flexing main rotor blades hit the fence, and transmission, torn from its rear mounts, shifted forward. One main rotor blade hit the forward cockpit, killing the pilot. Suspect engine failure during power-on descent and failure to initiate appropriate emergency procedures. 8340

AH-1 Class C mishap □ (S series) Aircraft hit tree while flying at 20 to 25 knots and 17 feet agl. There was green foliage 12 feet up the tree, with 10 feet of dead wood above the foliage. Pilot did not see the dead part. He thought he was clear of the tree and was looking out the left side of the aft cockpit. Copilot was looking inside the cockpit.

AH-1 Class E mishaps □ (S series) Master caution and d.c. generator lights came on. Ammeter dropped to zero. Caused by broken wire on reverse current relay. □ (S series) Pilot heard loud grinding noise behind his seat. Master caution and No. 2 hydraulics lights came on. Caused by cracked T fitting in area beneath transmission. □ (S series) Aircraft yawed to the left and then to the right during hover. Yaw card in SCAS box was replaced.

Cargo helicopters

CH-47 Class E mishaps □ (A series) No. 1 engine torque needle increased to 760 pounds and then failed in static position. About a minute later, No. 1 engine chip detector light came on. Caused by failure of engine torquemeter drive. □ (C series) Flight engineer saw smoke and hydraulic fluid coming from hydraulic cooler area. Caused by failure of hydraulic cooler and fan assembly. □ (C series) Loud popping noises were heard during takeoff. Two rotor tip cap retaining screws had sheared off and tip cap was bent.

CH-54 aviation-related mishap □ Mechanic was removing tail rotor blades. As he removed the last bolt, he allowed tail rotor blade to fall to the floor.

Observation helicopters

OH-6 Class E mishap □ Pilot was told by someone from another aircraft that something had fallen from his aircraft. Pilot noticed that transmission soundproofing was missing. Pilot landed to pick up soundproofing and tape it down.

OH-58 Class A mishap □ (A series) Pilot brought aircraft to a hover in preparation for takeoff. As pilot hovered

rearward, his main rotor blades hit the main rotor blade of a parked OH-58. Large sections of the main rotor blades were torn from both aircraft. Control was lost and aircraft spun and rolled left, coming to rest inverted. Pilot and one passenger sustained major injuries, and one passenger sustained minor injuries. Aircraft was not parked in its normal parking position; normally it required rearward hover to the taxiway. Proper access to the taxiway for the accident aircraft would have been straight forward or to the right. The second OH-58, heavily damaged by the rotor strike, was parked where the accident aircraft is usually parked. Suspect the pilot hovered rearward because of habit and inattention. 8341

OH-58 Class C mishaps ☐ (A series) Main rotor blade hit tree on left side of aircraft during takeoff from confined area. Pilot was looking to the right. Observer did not clear left side of aircraft. ☐ (A series) Pilot overshot touchdown zone during low-level autorotation, and aircraft landed hard. Fuselage skin was wrinkled and engine deck support mounts were cracked.

OH-58 Class E mishaps☐ (A series) Transmission oil hot light came on during hover. Dry desert grass was blocking transmission oil cooling unit. ☐ (A series) Master caution and fuel boost lights came on. Caused by electrical short in wiring. ☐ (A series) Suspect pilot inadvertently rolled off throttle during turn, causing N_2 rpm to decrease to 94 percent. ☐ (C series) N_2 tachometer needle went to zero during hover. Caused by broken plug wire. ☐ (A series) Aircraft spun to the right during OGE hover. Pilot reduced power and applied forward cyclic. Aircraft made two complete 360-degree turns. Pilot then added full left pedal and increased power. Spin stopped just before aircraft reached the trees. Pilot had viewed the video tape "How Not to Crash By the Book" and had received a tail rotor effectiveness briefing by an SIP 3 days before the mishap. ☐ (C series) Unforecast weather was encountered and crew, wearing night vision goggles, became disoriented. Goggles were removed. Still disoriented, pilot initiated a climb, called approach control, and told them his attitude indicator was inoperative. Approach control told pilot to climb to 3,000 feet and maintain present heading. Approach control further advised him to continue to climb until VFR on top. As aircraft was breaking out on top, copilot took control and continued to fly assigned headings. Copilot performed GCA and aircraft broke out at 1,500 feet msl.

OH-58 aviation-related mishap ☐ Main rotor blades were being installed on a main rotor hub. Hub was on maintenance workstand. One blade had been installed on the hub, with the other end of the blade resting on a padded trash can lid. One person was holding onto the hub to keep it from moving, one person was supporting the outboard end of the blade, and one person was supporting the inboard end of the blade and trying to install the retaining pin. The hub moved, causing the installed blade to slip off the trash can and fall to the floor. Tip of blade was damaged beyond repair.

Fixed wing

OV-1 Class E mishaps ☐ (D series) Pilot saw sparks between ring cowl and engine cowl of No. 1 engine. Caused by failure of engine anti-ice generator. ☐ (RV-1D) As aircraft was landed, controllers in tower told pilot that right

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	March	2	5
3rd Qtr	April	7	6	April	5	0
	May	6	2	May	8	1
	June	2	3	June	4	4
4th Qtr	July	2	2	1- 6 Jul	1	0
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	25	12

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 92 □ 6 Jul 1983

Night hooded flight

Based on recent recommendations from MACOMs, the symbol "NH" will be deleted from AR 95-1 in Change 1. This should eliminate the present problem of recording NH on DA Forms 759. ■

Airman's Information Manual (AIM)

There are 18 major changes in the 14 April 1983 edition of AIM which are of interest to the professional pilot. There are changes in traffic advisory practices at uncontrolled airports, designated unicom/multicom frequencies, standard terminal arrival (STAR), instrument approach procedures, and others. Don't be caught short! ■

Ejection seat training

TC 1-134 and FM 55-43 outline who needs ejection seat training and reasons for the training. The U.S. Army Aviation School, Fort Rucker, is responsible for initial ejection seat instruction for aviators attending the OV-1 (Mohawk) Aviator Transition Course and for OV-1 aviators, observers, crew chiefs, passengers, and maintenance and medical personnel assigned to Fort Rucker.

The U.S. Army Intelligence School/Training Center, Fort Huachuca, is responsible for initial ejection seat instruction for OV-1 airborne sensor specialists and passengers assigned to Fort Huachuca.

FM 55-43 states that upon successful completion of ejection seat training, appropriate records will be completed for each individual as specified in AR 95-1. For crewmembers—DA Form 759, Individual Flight Record and Flight Certificate-Army, is used. For others listed, DA Form 3015, Flight Equipment Training Record, will be used to record training. As the 15 November 1982 AR 95-1 rescinded DA Form 3015, how do you record training?

Answer: For crewmembers, an entry in the remarks section of DA Form 759. To meet the requirement of maintaining appropriate records, recommend that a DF be prepared to record formal training and qualification of persons who receive ejection seat training but do not have flight records. ■

Aircrew information/reading files

Aviation units will establish and maintain aircrew information/reading files in accordance with AR 95-1 and TC 1-134.

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. Current information will be posted and read by each aircrewmember on a periodic basis, but not less than quarterly.

To clarify any misunderstandings of general and specific functional areas:

Specific functional areas are defined as information on specific projects; i.e., letters from the commander and information temporary in nature.

General area information is of a much broader scope. As no list is published that covers needed information, it is recommended that, as a minimum, the following publications be contained in the general functional area:

a. FAR Part 91 (U.S. only) or applicable ICAO/foreign government regulations (overseas)

b. AR 95-1

c. Applicable supplements to AR 95-1

d. AR 95-16

e. AR 95-21

f. AR 95-26

g. AR 385-40

h. AR 385-95

i. Appropriate SOPs

j. TC 1-134

k. Current FLIGHTFAX

l. Appropriate local command safety/standardization memorandums

m. Chain of command policy letters affecting aviation operations ■

Procurement of pink filters for NVG users

Inquiries from field units indicate pink light filters for night vision goggle (NVG) training are very difficult, if not impossible, to obtain. Change 1 to MWO 55-1520-210-30-57 changes procurement procedures for the pink filter, making it a locally procured item. To obtain the pink filter, units should order the required number of filters from:

METAVAC Inc.
ATTN: Mr. Clifford Sisler
45-57 162d Street
Flushing, NY 11358

Correct pink filter nomenclature is filter, pink, diameter 5.740 inches ±.015 X .125 ±.015 inches thick pyrex substrate.

By using local procurement procedures, units should be able to obtain the necessary number of pink filters to supplement Night Hawk/NVG training.

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.

Mishap briefs

brake was smoking. Caused by hydraulic leak in brake.

U-21 Class E mishap □ (A series) When gear was lowered, left gear light did not illuminate. Gear was manually extended and light indicated down and locked. Gear light went out on short final for landing. Caused by broken wire from down-lock switch.

C-12 Class E mishap □ (A series) No. 2 engine oil pressure fluctuated, and stream of oil was seen coming from cowling at oil cap cover. Oil cap, which may not have been fully secured after oil sample, came unlatched in flight and 3 quarts of oil were lost.

Maintenance

UH-1 Class E mishaps □ (H series) Crew chief found fuel leaking from fuel line above starter generator. Caused by fuel line from fuel control to bleed band actuator chafing against starter generator. □ (H series) Engine oil pressure fluctuated during flight. Caused by loose oil pressure gauge cannon plug.

AH-1 Class E mishap □ (S series) Transmission oil pressure gauge registered zero during takeoff. Caused by loose cannon plug.

OH-58 Class E mishaps □ (A series) Grinding noise was heard and high frequency vibration was felt in airframe and tail rotor pedals. Grinding noise was caused from water accumulated in oil cooler fan due to clogged drain beneath it. Vibration was caused by incorrectly torqued balance bolt on balance washer. □ (A series) Stiffness was felt in collective during landing. Wiring plug for APR 39 was found unsecured under console. Plug was caught between cyclic torque tube and sheetmetal bulkhead. Collective jackshaft friction was also set too tight.

Messages received

• Safety-of-flight technical message concerning finite life schedule for parts incorporated in servo cylinder assembly installed on AH-1 (all models) and UH-1 (C and M models only) and other components of the hydraulic actuator assembly on all AH-1 aircraft (AH-1-83-07, UH-1-83-11, 232200Z Jun 83). Summary: Message requires certain revisions to finite life schedules. Contact: Jimmy Simon and Ed Soteropoulos, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning the finite life schedule for parts incorporated in the hydraulic servo cylinder assembly installed on AH-1 (all models) and UH-1 (C and M models only) (AH-1-83-08, UH-1-83-12, 240100Z Jun 83). Summary: Message serves as authorization to revise the finite life schedule in certain maintenance manuals until manual revisions have been published. Contact: Jimmy Simon and Ed Soteropoulos, AUTOVON 693-3300, commercial 314-263-3300.

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

TM changes

The following changes to TMs have been released:

• Change 28, dated 1 Jul 83, to TM 55-1520-228-10 for OH-58A aircraft.

• Change 32, dated 6 Jun 83, to TM 55-1520-235-10 for OH-58C aircraft.

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Stress, fatigue, and the squadron commander

The following article by Colonel P. DeTracey, Canadian Forces, was published in FLIGHT COMMENT. Although it is addressed to squadron commanders, the thoughts and principles apply to all supervisors of aviation personnel.

Studies by noted doctors and civilian industry have identified that emotional stress created in the day-to-day lives of people lead to ulcers, heart disease, family problems, loss of productivity, and possible early death. It follows that stress as a health factor should also be of concern to squadron commanders if they are to provide quality supervision of their aircrew. Associated with the general problem of stress is the more familiar problem of aircrew fatigue. To the best of my experience, squadron commanders do not focus sufficiently on these two problem areas and consequently run the risk of not providing the most productive, highest motivated, or safest flying units. However, as squadron commanders we should work toward managing the stress and fatigue levels within our organizations, since to neglect these areas could result in low morale, a loss of productivity, and ultimately the loss of an aircraft and its crew.

Stress

Squadron commanders do not have to be medical experts to recognize and minimize stress factors on their units. However, they should begin by reading several articles and books. It is important that they be aware of the local resources and use them to best advantage in building a stress recognition, treatment, and awareness program. Some of the more obvious stress-inducing events (stressors) have already been alluded to and a life event scale has been produced showing the relative score values of each stressor. This scale (see table 1) was used by Dr. Thomas H. Holmes at the University of Washington and Dr. Richard H. Rake to perform a study for the U.S. Navy. As supervisors we should be aware of the relative impact of these events and guard against loading people up who are already stressed by a "life event." Implicit here is the requirement to know your people and their families well

Stress, fatigue, and the squadron commander

TABLE 1—Social Readjustment Rating Scale (Incomplete)

Life event	Value
Death of spouse	100
Divorce	73
Marital separation	65
Jail term	63
Personal injury or illness	53
Marriage	50
Retirement	45
Change to different line of work	36
Trouble with in-laws	29
Trouble with boss	23
Change in work conditions	20
Change in sleeping habits	16
Change in eating habits	15

enough to be aware of these events. Similarly, it is important to have links with professional help on the base to provide assistance or to insure that you are advised if there is a problem.

What are the symptoms of stress and how would you as a supervisor recognize them? Some of the more obvious danger signs are listed below:

- General irritability or depression
- Low morale—loss of enthusiasm
- Poor work habits associated with a decline in the quality of work
- Trembling, nervous twitches or tics
- Insomnia, sweating, headaches
- Compulsive eating or drinking
- Drug and alcohol abuse
- Illness such as ulcers, high blood pressure

In the military, heavy use of alcohol is often a sign of maladaptive coping; hence, it is important to treat this problem appropriately by identifying the cause of the behavioral change rather than always taking punitive action—treating the cause is preferable to punishing the symptoms.

Local base resources such as the chaplain, welfare officer, drug and alcohol education officer, and flight surgeon can all be of valuable assistance in running stress awareness programs. These professionals should be brought out to squadron meetings during professional activity days and flight safety meetings. Chaplains in the Canadian Forces have directed their attention more towards dependents and consequently have become detached from the "operational" family. Also, the flight surgeon staff is usually undermanned and often has difficulty just keeping up with the daily deluge of annual medicals and administrative routine. It behooves the squadron commander to work harder at drawing these professionals into the squadron circle through social, educational, and operational activities. Only through closer interaction and cooperation will they understand our work environment and benefit the quality of squadron life.

Many squadron members are worried about relating problems to professional help if they believe their career will be jeopardized. By exposing "support" professionals more often to the aircrew and establishing a rapport, stress is less likely to reach unmanageable proportions. In the Canadian Forces today the onus is on the squadron commander to help develop that rapport and insure that well-earned stress is not considered to have career implications.

Have you ever heard the expression "I give ulcers, I don't get them?" Well, the manager who cited that line is part of the stress problem. Dr. Alan Mclean has stated that there is considerable evidence from physicians and clinical psychologists that psychologically unhealthy relationships between subordinates and their authority figures lead to emotional disability. One of the best ways to alleviate stress in the working environment is, therefore, to adopt a management style that engenders an open, trusting, and participative climate.

Any squadron commander should convey his personal management philosophy to his squadron so they know where he is coming from. All levels of the squadron should also understand and work towards mutually established goals with a common purpose. Good communication and an open, honest approach will do a lot to alleviate stress through common clear understanding of tasks, purpose, and goals. The way supervisors handle evaluations, internal job changes, tasking, committee meetings, and counseling can either be devastating or morale building. Admittedly, there are times when tight deadlines and operational requirements induce stress, but such stress is to be expected and can be managed by careful assignment of tasks according to ability and equitability of the work load.

Other studies have shown that participation in decisionmaking help alleviate stress whereas nonparticipation has been found to be related to overall poor physical health, drinking, depression, low self-esteem, and low job satisfaction. A management style that includes participation, rather than an autocratic or dictatorial approach, is beneficial.

There is a variety of additional activities we can incorporate into squadron life to reduce stress or fatigue. There should be the traditional recreation, fitness, and social programs to name a few. It is too easy to neglect these during times of heavy tasking, but effective planning and foresight will allow you to choose less busy periods to run stress-reducing and morale-building programs. Hans

Selye addresses the management of stress succinctly in the following quotation: "The secret of success is not to avoid stress and thereby endure an uneventful boring life, for then our wealth would do us no good, but to learn to use our capital wisely, to get maximal satisfaction at the lowest price."

It is our task to help maximize that satisfaction in the work environment at the lowest cost to the individual and the organization.

Fatigue

The incidence of breakdown due to distress is generally low since aircrews are happy flying and performing an operational role. High productivity and esprit de corps normally derive from a cohesive squadron operating effectively under good leadership. The more traditional enemy of the air transport crew is aircrew fatigue. Flying tasks require a high degree of skill, alertness, and coordination under sometimes adverse conditions. Curiously enough, we do not expect civilian workers to put in a 16- to 18-hour day and then perform the most important and demanding part of their mission; yet, this is what we expect the military transport pilot to do. This fatigue factor, simply put, results in an inability to perform effectively. Also, it is insidious in that you may not be aware your judgment is impaired. The symptoms, however, are visible to the rested observer and include the following:

- A low frustration level
- Lack of coordination
- Slowness in response
- Failure to recognize errors
- Carelessness
- Acceptance of low standards of accuracy

How many of us have heard of errors such as wrongly set altimeters, missed altitude calls, wrong headings, and poor approaches followed by dicey landings after a long and stressful day? Luckily most crews survived because a fellow crewmember noticed the error or because of our ability to draw on reserve energy to "psyche up" and handle stressful situations.

It is necessary to be aware of circadian rhythms, which means the human body functions on a 24-hour biological clock and any disruption of this cycle will cause fatigue and stress. Such primary body functions as temperature, blood pressure, blood sugar level, and hemoglobin level can be adversely affected. Performance studies show that our poorest performance occurs at the low point in our circadian rhythm or the time we would normally be sleeping. Hence, our worst period for mission conduct is about 0300-0600 local time. If you are trying to land after a 16- to 18-hour day during the 0300-0600 period, then don't expect your judgment and skills to be at their best. Crossing time zones and previously poor crew rest due to poor quarters, etc., will lower performance even more.

Another important concept for squadron commanders to understand is that of "sleep deficit." The amount of sleep required by an individual varies, but in flying operations, sleep disturbance occurs frequently to the point that insufficient sleep or "sleep deficit" occurs. If less than 8 hours of quality sleep are obtained in any 24-hour period, then an accumulation of sleep loss begins. During operations, sleep appears to be fragmented and often scheduled for unusual hours. In these cases, it is likely that a crew's sleep deficit will accumulate to a point where mission risk increases. Once into a sleep deficit situation, considerable time off is required to restore the body to its normal state. Studies have shown that following duty times of 12 to 20 hours, fatigue may exist for more than 1 or 2 days.

There is a multitude of other factors that cause aircrew fatigue in addition to those mentioned. Some of these are age, experience levels, cockpit temperature, humidity, cabin altitude, and physical fitness, including the effects of caffeine, self-medication, alcohol, and smoking. There are a few irrefutable facts worth keeping in mind when considering pushing the fitness and hygiene factors and bending such rules as "bottle to throttle," for example:

- Mental alertness and stamina are increased when an individual is physically fit. Fit aircrews are also more cheerful and have a better outlook on life.
- If your crews do not eat properly before and during missions, then a low blood sugar may result in anxiety, disorientation, amnesia, and headaches.
- Studies and reports show a definite reduction in altitude tolerance . . . smokers are more susceptible to fatigue.
- Alcohol produces significant changes in the body system that seriously impair the performance of flying skills. These changes appear to remain longer after drinking stops than we previously realized. Alcohol itself and its residual effects can remain for up to 18 hours after drinking.
- The overuse (4 to 5 cups per day) of coffee after missions might impair adequate rest and contribute to unnecessary fatigue on the next day's flight.

Of course, many of these fatigue and stress factors can be present at once. The tired inexperienced chap who is flying a demanding rescue mission with a hangover in adverse weather may end up being rescued himself. It is the individual and his commander's responsibility to insure he is aware of his

predicament and that such events should not be allowed to accumulate. But how does the squadron commander insure awareness and prevention? He must insure he has an active flight safety program that includes lectures, films, and guest speakers on the human factors side of accident prevention. With help from an enthusiastic flight safety officer and flight surgeon, the objective should be easily attainable if they understand that you wish to emphasize these factors along with the traditional operational factors. The squadron commander should also make it known that he will rigidly enforce alcohol and smoking regulations so there is no doubt that these are important safety and health issues.

Some fatigue factors are beyond the squadron commander's control and we must admit that on some operations you get too tired to have an appreciation of what the limit is under "all out" conditions. The trick is to use wise judgment as to when the mission tasking is unsafe or unnecessarily difficult. To this end, a squadron commander must fight to have an input into mission planning before exercises become "fait accompli." The squadron commander is in the best position to judge the crew's readiness, morale, and experience levels—not higher headquarters. Often there are tradeoffs that can be made on behalf of the crews that result in safer, less tiring route schedules. My experience is that tasking agencies try to utilize the aircraft to the maximum, sometimes at the expense of the crews. Planners should consider the effects of circadian rhythm and sleep deficit. If you must accept a demanding mission, then use the more experienced and better rested crews. It also helps morale if reasons for the mission can be explained with some degree of openness and enthusiasm; and morale is a big factor in countering stress and fatigue. Quite often factors like mission difficulty, number of landings, weather, crew experience, crew complement, quality of rest facilities, and time of departure are not considered in mission tasking, and squadron commanders must develop a management system that insures his squadron supervisors realize when these stress- and fatigue-inducing factors are beginning to accumulate. The key in some squadron organizations lies in the dual responsibilities in scheduling and operations.

First, these sections must have these responsibilities written into their terms of reference so that they realize their responsibilities for monitoring the stress and fatigue element of flying and other duties. All taskings should be reviewed to analyze their degree of difficulty, importance, and itinerary to insure the crew duty day is realistic. If not, the squadron commander must be told soon enough to request a change. If it is impossible to change a tasking, then a hand-picked crew is required. Schedulers and supervisors should try to get to know their respective crewmembers well enough to know when they are overworked. Similarly, the squadron commander must become close to his supervisors since they are likely to be more exposed to a combination of flying fatigue and office stress. The time will come when you have to say "no" to a tasking and you had better know your people and the squadron aircrew disposition well when it happens.

Summary

The subject of aircrew stress and fatigue is complex and often it is a struggle to maintain control over events that threaten to cause loss of men and equipment. Nevertheless, a squadron commander must continue to focus from time to time on these human factors if he expects to run a healthy, happy, and effective unit. The idea is not to eliminate stress and be overly lenient, but more to alleviate **unnecessary** stress and fatigue. By developing a participative open style of management, creating suitable awareness programs, and devising a monitoring system for potentially dangerous missions, the squadron commander can increase his flight safety record and improve morale. To begin, however, the squadron commander must educate himself and his supervisors on the many aspects of stress and fatigue that have heretofore not been sufficiently emphasized. Stress- and fatigue-inducing symptoms must be recognized early and monitored closely before distress becomes a problem. There are also valuable support resources at any base that should be rejuvenated and included in the operational family.

Courage is often required to reject an overtasking or disagree with a poor plan from higher headquarters. The price of neglecting the stress fatigue factor or a failure in courage may be too high in lives and equipment. Remember, people are the most important resource we have, not the equipment. The best equipment in the world is worthless if it is not operated by a competent, healthy, and well-motivated crewmember. ■

Change in Class C reporting

The property damage dollar value for a Class C mishap has been increased from $300 to $700. Effective immediately, a mishap is reported as a Class C if the total cost of property damage is $700 or more but less than $50,000. HQDA concurs with this change in reporting and advises that it will be reflected in a future change to AR 385-40. ■

Selected mishap briefs

Utility helicopters

UH-1 Class C mishap □ (H series) Loud bang was heard from rear of aircraft and jolt was felt in flight controls during shutdown. Exhaust diffuser cover had exited rear of engine and hit tail rotor blade, cutting 3-inch gash in blade. Suspect failure of lockwire tab-lock washer or bolt.

UH-1 Class E mishaps □ (H series) Engine failed during hover. Excessive wear on fuel control drive shaft splines and in accessory drive gear splines caused loss of drive to fuel control. □ (V series) Vibration was felt through pedals during descent. Caused by hanger bearing failure. □ (V series) Master caution and hydraulic pressure lights came on. Hydraulics were lost, and running landing was made. Caused by ruptured hydraulic line. □ (H series) Rpm fluctuated during flight. Caused by defective overspeed governor. □ (H series) Master caution and hydraulic pressure lights came on. Caused by defective pressure switch.

UH-60 Class C mishap □ Pilot hovered too close to tree line in parking area. Main rotor and tail rotor blades hit tree.

UH-60 Class E mishap □ Transmission oil pressure light came on, followed by loss of transmission oil pressure. Caused by failure of oil scavenge pump.

Attack helicopters

AH-1 Class E mishaps □ (S series) Master caution and engine oil pressure lights came on. Caused by failure of oil pressure switch. □ (S series) Aircraft was landed to clear weapons systems smoke, and battery acid was seen coming from vents in tail boom. Battery had overheated. Temperatures were in excess of 100 degrees.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Engine transmission hot light came on. Caused by failure of temperature sensing unit. □ (B series) Heater was turned on. Copilot opened cabin vent and debris blew into cockpit and into pilot's eye. Crew returned to airfield and landed. □ (C series) Copilot saw heavy white smoke coming from aft transmission area during rapid refueling operation. Investigation revealed oil cooler fan had failed and utility hydraulic system was extremely hot.

Observation helicopters

OH-58 Class C mishap □ (A series) When IP closed throttle for hovering autorotation, student pilot increased collective to cushion landing but allowed aircraft to touch down on toe of skids. As aircraft settled aft, student pilot applied forward cyclic abruptly, resulting in spike knock. Mechanic inspected aircraft for damage, did not see any, and released aircraft for flight. Crew then flew 1.4 hours without incident and landed. Student pilot did post-flight inspection and did not find damage. The next crew assigned to the aircraft found three wrinkles on underside of tail boom.

OH-58 Class E mishaps □ (A series) Piece of plastic was drawn into rotor system during NOE flight. Aircraft was landed and plastic removed. □ (A series) IP initiated simulated engine failure and reduced throttle from copilot position. Engine audio activated and N_1 decreased, followed by illumination of engine-out light. IP continued autorotation and landed. Flight idle detent box switch button elongated through wear, causing copilot throttle to bypass detent when turned to flight idle. □ (A series)

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2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**4**
4th Qtr	July	2	2	1-13 Jul	**2**	**6**
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**26**	**18**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

Aircraft was hovered to a grassy area which appeared level. Pilot placed skids on the ground without placing the full weight of the aircraft on the skids. Nose pitched up and aircraft began to roll right. Pilot abruptly added power, bringing aircraft airborne and resulting in spike knock. Severe roughness of landing zone was hidden by tall grass. □ (A series) Linear actuator went to full increase during flight and would not respond to increase/decrease switch. Electrical wire had detached from collective increase/decrease switch box. □ (A series) As aircraft accelerated through translational lift, severe vertical vibration was encountered. Investigation revealed aircraft had not been through test flight or rotor tracking after phase inspection.

Fixed wing

C-12 Class E mishap □ (C series) As takeoff power was being set on No. 1 engine, torque lagged and then came up to normal. Diaphragm in low pressure bleed air valve had deteriorated on side wall, allowing air leakage.

OV-1 Class E mishap □ (D series) No. 1 engine fire light came on. Caused by

corrosion on fire detection control relay cannon plug.

U-8 Class E mishap □ (F series) Aircraft shuddered and oil pressure dropped to zero during approach. Push rod had broken and gone through engine casing.

Maintenance

UH-1 Class E mishaps □ (H series) When power was increased about 20 feet above the ground, rpm warning light came on and low rpm audio sounded. Fuel control was rigged incorrectly. □ (V series) Engine chip detector light came on. Small particle of steel wool was found on magnetic plug. Crew chief had cleaned the plug with steel wool, an unauthorized procedure. □ (H series) Left fuel boost pump circuit breaker tripped and caution panel segment light remained on when main fuel was turned on for engine start. Circuit breaker could not be reset. Cover assembly of left fuel boost pump was installed incorrectly, crimping a wire, which grounded out.

OH-58 Class E mishap □ (A series) D.C. ammeter reading dropped to zero, and fumes were seen coming from battery vent. Voltage regulator was out of adjustment.

OV-1 Class E mishap □ (D series) Oil was seen seeping from No. 2 engine during start. Preformed packing was not installed on engine oil filter.

U-21 Class E mishap □ (A series) Pilots heard unusual banging noise during flight. Weather stripping had come loose and was hitting side of aircraft.

Messages received

• Maintenance information message concerning compressor cleaning for T63-A-700/720 gas turbine engines to remove salt water contamination after operating in salt-laden air (MIM-T63-83-MEA-02, 281830Z Jun 83).

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

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Accident sense and the FY 82 record

I. Flight crew error: Faulty judgment

This is the first in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. Faulty judgment is the first of five flight crew problem areas involved in 67 percent of the 58 flight-related Class A accidents in fiscal 82. Accidents attributed to faulty judgment last year resulted in 11 fatalities and cost the Army almost $10 million.

In the analysis of aircraft accident causes, the term faulty judgment is used when individuals who are properly trained and prepared decide on a course of action known to be improper. By using this definition as a yardstick in the review of these recent accidents, we hope that each reader will see the lessons to be learned and develop his own accident sense—the learned capacity to foresee the consequences of his actions—or inactions—and avoid the development of situations that set the stage for flight crew error accidents.

• A UH-1V crew was participating in a search for a missing civilian aircraft in a mountainous area. While flying up a canyon toward rising terrain, the copilot inadvertently allowed the aircraft to slow below effective translational lift. There was not enough left antitorque pedal to maintain directional control, rotor rpm decayed, and the aircraft began a right spin. The copilot tried to fly out of the spin instead of landing, and the aircraft crashed in the canyon. The copilot, who was not trained in mountain flying, was looking for the missing aircraft instead of monitoring the performance of his aircraft. The PIC was concentrating on his map. Result: destroyed aircraft, two major injuries, three minor injuries, and $620,000 in losses. The PIC had 3,373 rotary wing hours, with 1,705 in the UH-1V. The copilot had 2,032 rotary wing hours, all in the UH-1V.

• A UH-1H pilot tried a second approach to a pinnacle after the copilot had aborted the first approach because of insufficient engine power. The second approach was tried without recomputing aircraft performance data despite indications that adequate power was not available. The aircraft crashed into trees when rotor rpm was lost and the antitorque system became ineffective. Result: destroyed aircraft, one fatality, five major injuries, and $1,182,000 in losses. The pilot had 709 rotary wing hours, with 640 in the UH-1H. The copilot had 1,634 rotary wing hours, with 728 in the UH-1H.

Faulty judgment

• As a UH-1H pilot crossed a treeline where mortar positions were located, a mortar began firing almost directly below the aircraft. The pilot banked steeply to the right while at 10 to 15 knots, resulting in a loss of control. He tried to level the aircraft and applied additional collective pitch which resulted in rotor and engine rpm bleed-down and loss of tail rotor authority. The aircraft settled 20 feet into the trees while still in a right turn. The pilot was not in contact with the ground unit and thought he would be landing to the rear of the mortar pits. Result: damaged aircraft, three major injuries, two minor injuries, and $953,000 in losses. The pilot had 3,046 rotary wing hours, with 2,079 in the UH-1H. The copilot had 237 rotary wing hours, with 187 in the UH-1H.

• A UH-1H IP initiated a simulated engine failure at a hover. The pilot overreacted and placed the aircraft in a left bank and drift. The IP did not take corrective action in time to prevent the aircraft from landing hard and rolling over. The IP was not adequately guarding the flight controls. He had his right hand on the radio console or near his right leg rather than adjacent to the cyclic control. Result: extensive damage and $220,000 in losses. The IP had 2,927 rotary wing hours, with 1,120 in the UH-1H. The pilot had 60 rotary wing hours, all in the UH-1H.

• A UH-1H crew was approaching an observation post when the IP directed that the approach be terminated in an adjoining valley because of excessive airspeed and altitude for a safe approach to the observation post. The pilot intended to terminate at a high hover, not realizing he had a 15-knot tailwind. When he realized he could not stop the descent, he told the IP, who was monitoring the radios, and the IP tried to cushion the landing. The aircraft hit hard and rolled onto its side. Result: destroyed aircraft, four major injuries, and $940,000 in losses. The IP had 6,900 rotary wing hours, with 5,800 in the UH-1H. The pilot had 350 rotary wing hours, with 80 in the UH-1H.

• A UH-1H IP gave his student pilot a hydraulics-off landing. At an altitude of 15 to 20 feet and a very slow airspeed, the aircraft pitched nose up and climbed to 50 to 60 feet. It then rolled inverted and crashed. While trying to turn on the hydraulic system, the student pilot may have placed the engine governor in the emergency mode. Investigation revealed that the most probable cause was the IP allowing the pilot to put the aircraft in an attitude from which it was impossible to recover. Result: destroyed aircraft, four fatalities, and $1,883,000 in losses. The IP had 466 rotary wing hours, with 283 in the UH-1H. He had graduated from the IP course 5 days before the accident. The student pilot had 54 rotary wing hours, with 4 in the UH-1H.

• A UH-1H pilot allowed his aircraft to touch down hard during a night autorotation. He tried to maintain control while the aircraft was sliding down the runway, but the aircraft became airborne again. The IP got on the controls too late. The helicopter flipped over, landed on its top, rolled, and came to rest upright. Result: extensive damage, one fatality, two major injuries, and $545,000 in losses. The IP had 3,000 rotary wing hours, with 2,300 in the UH-1H. The pilot had 1,000 rotary wing hours, with 920 in the UH-1H.

• A UH-1V pilot had picked up an injured civilian and departed for the hospital. The pilot was flying low level over a river with high cliffs on each side. The aircraft completed a steep right turn and then rolled into a steep left turn. The combination of high airspeed and steep banks resulted in the aircraft losing altitude. The main rotor blades hit the top of a tree, control was lost, and the aircraft hit a rock cliff. Result: destroyed aircraft, five fatalities, and $1,428,000 in losses. The pilot had 1,954 rotary wing hours, all in the UH-1V. The copilot had 260 rotary wing hours, all in the UH-1V.

• An AH-1S pilot was making a night approach to a lighted "Y." Excessive speed and a steep approach angle caused the aircraft to fall through, hit the ground tail low, and roll onto its side. Result: extensive damage and $250,000 in losses. The pilot had 568 rotary wing hours, with 169 in the AH-1S. The copilot had 809 rotary wing hours, with 315 in the AH-1S.

Next week's article will focus on violation of regulations/flight discipline. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft was on support mission, carrying hay to stranded sheep in mountainous terrain. As pilot slowed to about 20 knots to drop the hay, engine and rotor rpm began to bleed off. Aircraft turned about 240 degrees to right before impacting in an open area covered with 3 to 5 feet of snow. Aircraft was destroyed. Demand for power exceeded that available for the conditions. 8301

UH-1 Class C mishaps □ (H series) Pilot noticed high rotor rpm and increased collective. Engine rpm went to zero. Pilot entered autorotation, placed governor in emergency mode, and increased throttle. N_2 did not respond. Autorotation was continued and aircraft landed hard. Suspect high side governor and N_2 tachometer generator failure. □ (H series) Main rotor blades hit trees during NOE flight, damaging blades.

UH-1 Class E mishaps □ (H series) Antitorque pedals became stiff during hover. Caused by defective tail rotor servo cylinder. □ (H series) Transmission oil pressure gauge fluctuated and then went to zero. Caused by broken wire to oil pressure sending unit. □ (H series) Master caution and transmission oil pressure lights came on. Caused by failure of oil filter gasket. □ (H series) With force trim off and hydraulic control switch on, cyclic control would creep rearward in all phases of flight. Caused by defective left lateral irreversible valve.

UH-60 Class E mishaps □ Loud whine was heard during HIT check. Caused by failure of coupling on high speed output shaft. □ During hot refueling operation, crew chief saw hydraulic fluid draining down side of aircraft and seeping through overhead soundproofing. Caused by failure of hydraulic seal assembly.

Attack helicopters

AH-1 Class E mishaps □ (S series) After touching down and stopping, IP and pilot felt sudden drop of aircraft on left rear side. Cross tube had broken off at attachment point on left rear side. Corrosion and cracks caused attachment bracket to break. □ (S series) D.C. generator light came on. Caused by failure of starter generator. □ (S series) Visibility was restricted during hover over dusty field. To avoid ground contact, pilot increased pitch in excess of limits.

Observation helicopters

OH-6 Class E mishap □ Pilot had inadvertently entered IMC and was being vectored by approach control. As pilot was adjusting his position in seat, his pants leg containing a map unhooked fire extinguisher bracket latch. As aircraft was in turn, extinguisher fell out over water.

OH-58 Class B mishap □ (A series) Engine exploded as pilot was hovering from parking area. Engine was destroyed and engine compartment and fuselage damaged. 8302

OH-58 Class C mishap □ (A series) Pilot was flying about 50 feet agl through a valley en route to field site. Pilot tried to clear a group of trees in the flight path by making cyclic climb. As airspeed was reduced to 30 knots, aircraft was in tail-low attitude. Underside of aircraft hit top of tree, denting vertical fin and tail boom. Pilot was performing unauthorized, unsupervised terrain flight.

OH-58 Class E mishaps □ (A series) N_2 dropped during takeoff. Caused by cracked accumulator. □ (C series) Pilot was approaching a firing point. Wind was about 12 knots from the south. Because of the room available at the landing area, pilot made his approach to the northeast. About 12 feet agl and 15 to 20 knots, pilot began left turn to bring aircraft around to the landing pad. Aircraft turned into a very dusty area. Pilot decided to change his touchdown point by pedal turning aircraft back to right and moving slightly to right. Wind caught horizontal stabilizer and created nose-low attitude about 6 feet agl. Pilot tried to recover by adding collective and cyclic input. Low rpm audio activated and pilot stopped collective movement, applied aft cyclic,

and noticed overtorque. ☐ (C series) Engine-out warning light came on. Caused by failure of engine rpm sensor.

Fixed wing

U-3 Class E mishap ☐ (A series) When landing gears were retracted, two loud pops were heard. Left main and nose wheel came about halfway up and right main was still down. Gear lever was placed in down position. Left main and nose gear extended and gear-safe light came on. Landing was made without incident. Right landing gear torque tube bracket broke where torque tube connects, causing rivets in bracket to shear. This let the torque tube move inboard and up, breaking push-pull tube for up lock hooks.

OV-1 Class E mishap ☐ (D series) Brakes would not hold during engine runup. Right brake lost pressure. Caused by failure of O-ring in master cylinder.

T-42 Class C mishap ☐ On short final for landing, aircraft encountered possible wake turbulence from C-130. Right wing dropped and right main gear hit runway, causing tire to blow and damaging both propellers on No. 2 engine. Go-around was made and aircraft landed.

T-42 Class E mishap ☐ Left auxiliary fuel tank started siphoning fuel immediately after takeoff. Fuel cap was correctly seated but allowed fuel to siphon because of insufficient tension on cap seal.

U-8 Class E mishap ☐ (F series) Engine ran rough and cylinder head temperature gradually decreased. Engine then quit. Caused by failure of injector pump.

U-21 Class C mishap ☐ (A series) Rock was picked up by No. 2 propeller during ground run and thrown into nose section of fuselage, puncturing hole in skin. Propeller was damaged beyond repair.

U-21 Class D mishap ☐ (RU-21H) Pilot complained of being tired and having a headache. Fumes were smelled in cockpit. Crew was not aware that heater was on. After aircraft was landed, medical tests revealed pilot's and IP's blood had carbon monoxide level of 30 to 35 percent. Suspect problem was caused by crack in heater muff assembly.

U-21 Class E mishap ☐ (RU-21H) IP shut down No. 2 engine during training flight. Engine could not be restarted. Caused by failure of engine igniters.

C-12 Class C mishap ☐ (D series) When gear handle was cycled up on takeoff, red lights in handle remained on. Gear was cycled down, motor circuit breaker was pulled, and manual pump-down completed. Both main landing gear collapsed during landing.

C-12 Class E mishaps ☐ (A series) Copilot's windshield cracked during flight in clouds. ☐ (A series) During takeoff roll, No. 1 engine reached tgt limit before reaching minimum takeoff power. Caused by failure of No. 1 flow control unit.

Maintenance

UH-1 Class E mishaps ☐ (H series) Master caution light came on during landing. Incorrectly attached cannon plug came loose. ☐ (H series) Pilot felt high frequency vibration from pedals. Tail rotor assembly was not properly balanced. ☐ (H series) Transmission pressure dropped to 35 psi during flight. Transmission drain valve was not correctly closed.

UH-60 Class E mishap ☐ Pilot felt binding in longitudinal movement of cyclic during taxi. When bolt attaching bearing to longitudinal control rod was reinstalled, it did not pass through mixer link assembly rod end bearing. Bolt was secured in place with nut and cotter

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	1-20 Oct	1	0
	November	2	0	November		
	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46	Total to Date	1	0

*Includes 1 ground accident

Accident review: blade strike at night

Synopsis

An AH-1S crew was preparing to take off from an unlighted confined area at night. The aircraft drifted aft and right at hover altitude, and the main rotor blades hit several trees, destroying the main rotor system. The AH-1 came to rest upright.

History of flight

The unit was engaged in a field training exercise, and an AH-1 pilot was assigned an administrative support mission. The unit commander assigned himself as copilot. The initial preflight inspection had been done earlier in the day. The pilot did not get a weather briefing, did not compute a performance planning card, and did not determine the correct weight and balance of the helicopter. He completed a thruflight inspection without the aid of a checklist, got in the aircraft, and continued with the before-start engine check. The copilot arrived at the aircraft and strapped in without receiving a flight briefing on crew duties from the pilot.

A few minutes later, the pilot began his hover power check while the copilot was coordinating the night mission over the radio. The copilot was not monitoring the aircraft instruments as he was supposed to be doing. The pilot was concentrating his attention outside the aircraft without crosschecking the instruments and was unaware the aircraft was drifting. When the copilot told him they were drifting, the pilot hesitated a second and then tried to accelerate. The main rotor blades hit some trees, and then the aircraft hit the ground in a nose-down attitude and rolled right before coming to rest upright.

Crewmember experience

The 26-year-old pilot had more than 450 rotary wing hours, with more than 250 in the AH-1S. The 29-year-old copilot had more than 700 rotary wing hours, with almost 150 in the AH-1S. He was not current in the AH-1 at the time of the accident.

Commentary

Performance errors on the part of the pilot and the unit commander (copilot) contributed to the cause of this accident. Before beginning aviation operations in support of a field training exercise, the unit commander did not insure that procedures were established to support aircraft accident prevention. Although an SOP existed for night tactical operations, the unit had no specific procedures for night operations or airfield operations as required by AR 95-5. As a result, a pre-exercise maneuver briefing was not conducted for the aviation personnel, and the aircraft was operating from a confined area at night without sufficient visual aids to insure safe operations.

While preparing for the administrative mission, the pilot did not comply with regulations, as mentioned earlier. His noncompliance with the regulations was the result of lack of standardized unit procedures and a self-generated sense of urgency.

The copilot did not crosscheck the aircraft instruments as required by TC 1-136 because he was not aware of the requirement. The pilot did not brief the copilot before takeoff because they had flown together several times in the past.

The pilot did not apply enough power during takeoff to clear the trees and maintain a constant angle of climb. He allowed the helicopter to drift about 100 feet while at a hover. Impairment of the pilot's visual cues and references resulted from a combination of darkness, moisture on the canopy window, scratches on the canopy side panels, inadequate ground reference lighting, absence of a ground guide, glow from wing tip lights, and not knowing what the aircraft instruments were reading. ■

Mishap briefs

pin. Aircraft flew more than 17 hours without mixer link assembly connected to longitudinal control rod.

OH-58 Class E mishap □ (A series) Aircraft was at full rpm and flat pitch during runup when another aircraft landed beside it, causing pilot's door to be ripped from hinges. Door was not adjusted correctly.

OV-1 Class C mishap □ (D series) Drop tank safety pin vibrated loose and was sucked into propeller during ground run. Propeller blade was damaged and drop tank safety pin destroyed. Caused by failure to check for positive lock on drop tank safety pin or secure with flag.

Messages received

• Safety-of-flight emergency technical message concerning one-time inspection of connecting link, rigid, left cyclic, and connecting link, rigid, right cyclic, for all UH-1H/V, EH-1H, and EH-1X aircraft (UH-1-82-06, 072230Z Oct 82). Summary: A 3-month production run of cyclic connecting links is suspected of not meeting heat treat specifications. Links are subject to cracking in the area of the high shear rivets. Links have never been inserted in depot supply stock and could not have been issued to the field by requisition. However, links were installed on 66 aircraft during the last 3 months at CCAD, and these aircraft were released to the field worldwide. Some of these links could have been transferred from one aircraft to another. Prior to next flight, connecting links will be inspected on all UH-1H/V, EH-1H, and EH-1X aircraft. Contact: Dick Mooy, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning maintenance procedures relative to an inoperative 10KVA alternator (AH-1-82-10, 051925Z Oct 82). Summary: Several AH-1S ECAS and MC type aircraft have had alternator failures, with resultant precautionary landings and/or mission aborts. This message emphasizes several items noted in AH-1-79-22 message and includes additional data. Contact: Ed Soteropoulos, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance advisory message concerning the flatplate canopy removal detonation transfer system (AH-1-82-11, 051930Z Oct 82).

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

Loose engine cowlings

In the past 6 months, four OV-1 engine cowlings have come loose in flight and separated from the aircraft. These mishaps could have been prevented if the preflight inspections had been done right.

Cowling fasteners should be checked for wear on daily inspections. But inspecting engine cowlings for security is a preflight checklist item. Play it safe and do all your inspections by the book. ■

PRAM info needed

Preliminary Reports of Aircraft Mishaps (PRAM) concerning part or component failures are of no value unless the parts or components are completely identified. This means serial number, part number, NSN, etc. AR 385-40 requires that historical data for all major components that contributed to a mishap be reported in paragraph 14 of the PRAM.

The next time you submit a PRAM and a major component is a suspected or known cause factor, be sure to complete paragraphs 14a through q. ■

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The woods are full of them

Trees, that is. And Army helicopter pilots are still hitting them at an average of almost two times a week. During a 32-month period ending 31 May 1983, 250 tree strikes were reported. Nine people were killed and 36 injured in these mishaps, which cost the Army more than $13 million.

Why are pilots hitting so many trees? Poor judgment and failure to follow procedures are the most often cited reasons. An in-depth study of tree strike mishaps was done about 3 years ago. Based on this analysis, a typical tree strike flight profile was apparent.

Most likely, the tree strike will occur during a single-ship mission in a simulated tactical environment at terrain flight altitudes, usually in an NOE hover mode. There probably will not be an IP on board and the pilot(s) will usually be preoccupied with checking the map, tuning a radio, firing weapons systems, or observing another aircraft or ground position. The pilot will either not see the tree, misjudge clearance, or not consider the effect of main rotor downwash on the tree.

Let's review some Class A and B tree strike mishaps.

• An AH-1S crew was on a tactical training mission. After sighting suspected aggressor tanks, the pilot hovered the AH-1 about 45 feet agl among several trees, with the tallest tree to the rear of the aircraft. While the crew was trying to determine the identification of the sighted tanks, they heard a loud bang. The aircraft had hit a 50-foot tree. Antitorque control was lost, and the aircraft crashed.

The pilot was concentrating on the suspected enemy tanks, and the copilot was looking at his map, at the expense of maintaining aircraft control. The crew had relaxed their adherence to standard tactical procedures because the field exercise was about to end. They had flown 6 hours that day, the last 5 hours in a high stress environment over snow-covered terrain in a tactical NOE flight mode. The pilot added to his stress condition by not eating properly, resulting in a low blood sugar level. Damage cost was $95,393.

• During terrain flight at an airspeed of about 60 knots and an altitude of 35 to 50 feet agl, a UH-1H pilot attempted a deceleration maneuver during a left turn by rotating the aircraft about the center of gravity rather than the tail rotor horizontal plane. This decreased the altitude of the aft tail boom, causing it to strike the treetops. The tail rotor system and 90-degree gearbox separated, and the aircraft spun twice before the pilot closed the throttle and autorotated into the trees.

The pilot's actions probably resulted from his inaccurate estimate of his height above the trees. The combined deceleration and left turn maneuver compounded the degree of difficulty in estimating obstacle clearance. This mishap resulted in six major injuries and one fatality. Damage cost was $673,532.

• Two UH-60 helicopters were approaching a landing zone. As the lead aircraft approached the ground, rotorwash induced blowing dust and sand. The separation between the two aircraft was 1½ to 2 rotor diameters. The No. 2 aircraft flew into the dust cloud generated by the lead aircraft. Trying to maintain proper spacing, the pilot of the No. 2 aircraft channelized his attention on the lead aircraft because he was so close to it and allowed his aircraft to

(continued on next page)

Pilot attempted deceleration maneuver by rotating the aircraft about the center of gravity rather than the tail rotor horizontal plane. Tail boom hit trees and control was lost.

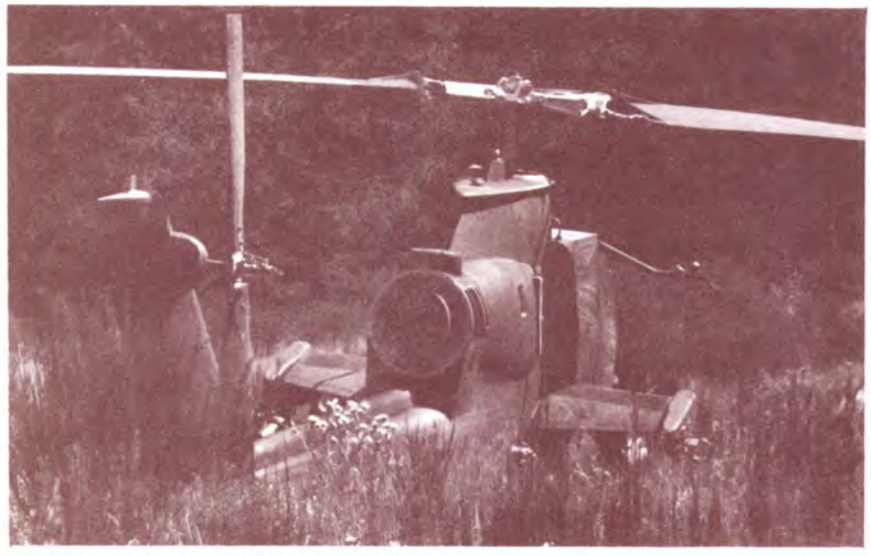
The woods are full of them

drift to the left 15 to 20 feet. The drift was not detected by the copilot. The crew chief noticed it and tried to tell the pilots, but they did not hear him because they were talking to each other about the approach. As the aircraft drifted left, the main rotor blades hit a tree. The pilot moved the aircraft to the right and landed.

A three- to five-rotor disk horizontal separation should have been maintained between the two aircraft on final approach. Damage cost was $107,617.

• An AH-1S was on a night aerial gunnery qualification training flight. While in an out-of-ground-effect hover, the IP fired the remaining 8 to 12 rockets and was reaching forward to safety the armament system when the copilot in the front seat told him the aircraft was descending into the trees. The IP applied collective pitch but was uncertain about whether the aircraft could be flown out of the treetops. He bled off the main rotor rpm and allowed the aircraft to descend through the trees.

The crew's night vision was affected by the rapid firing of the rockets on an extremely dark night and the fact that only the aircraft's position lights were on bright. Artificial illumination was not used to provide visual ground reference at the firing point. Cost of aircraft damage was $1,634,045, and there were two major injuries.



Main rotor blades hit trees during NOE flight.

• An AH-1S, along with another AH-1 and an OH-58, was scheduled to participate in a tactical training exercise. The air mission commander, who was not rated in the AH-1, decided to fly in the front seat of the Cobra and act as copilot. The pilot did not assign the copilot specific responsibilities or crew duties.

During the mission, the pilot began a right descending turn to maneuver between several tall trees. The pilot misjudged the distance to the treetops and his rate of descent, and the main rotor blades hit two of the trees. The aircraft was landed without further damage. Immediately before the tree strike, the copilot had been looking to the front through the telescopic sight unit and was not helping to clear the trees. Damage cost was $96,158.

As you can see from table 1, most tree strikes result in Class C damage, criteria for which ranges from $700 to $50,000. Rotor blades are usually the only components damaged in these mishaps, but sometimes bubbles are broken and the undersides of the aircraft are damaged. With the cost of rotor blades today, it takes only a few tree strikes for Uncle Sam to shell out a lot of money—money that could be spent buying more aircraft and equipment.

So the question is, can we train realistically and not have tree strikes? The answer has to be yes. Aircraft damaged by tree strikes aren't of much use in a real or simulated battle until they are fixed. And this increases the workload on the maintenance people. We cannot compromise our assets needlessly through preventable mishaps.

All levels of command contributing to the tree strike problem should be constantly aware of their role and be willing

AH-1 hit trees when crew's night vision was affected by rapid firing of rockets.

to take action to help solve it. The platoon commander and unit commander have to take time to analyze the problem and then have enough backbone to get the corrective action accomplished. Units can do a great deal to reduce tree strikes if they just stress commonsense, professional flying, and effective leadership. Some measures have been identified which should be effective in reducing tree strikes. A brief discussion of each should help you start your tree strike prevention campaign.

• **Awareness.** All crewmembers should be aware of the tree strike problem and the adverse or potentially adverse effect it has on operational readiness and/or the unit's ability to accomplish its mission. Other items of information that can be publicized are the cost, in terms of money and injuries, and the extra work it causes already overworked maintenance personnel. The tree strike problem should be kept alive during briefings, safety meetings, and plain old hangar talk. One thing is certain—we can't prevent a problem unless all parties are aware there is a problem and understand its consequences.

• **Procedures.** Review SOPs and directives relative to terrain flight and make sure they reflect measures for minimizing inherent risks to the types of missions being flown. SOPs should also spell out crew duties in detail, not just PIC and copilot, but pilot at the controls and pilot not at the controls. Specific duties of other crewmembers relative to flying and nonflying functions also should be addressed.

• **Crew coordination.** Using all crewmembers to look for and warn of obstacles is a key to eliminating tree strikes. The pilot at the controls generally has his hands full flying the aircraft. He must be assisted in maintaining clearance and spotting obstacles outside. Things that require attention inside the cockpit should be accomplished by the other crewmembers so the pilot can keep his head up. When using the weapons systems, the pilot must not forget about flying the aircraft, and the copilot must be especially cognizant of obstacles and drift.

• **Supervision.** Supervision is very important. A tolerant attitude toward tree strikes will do little to reduce the problem. Pilots who demonstrate errors in judgment and/or flight discipline, whether they result in aircraft damage or not, should be made aware of their shortcomings and challenged to do better. Supervisory personnel should also insure that they don't contribute to the problem by overmotivating or by not observing rest requirements.

• **Flying skills.** Professional pilots know their aircraft, its capabilities, and its limitations. They understand its dimensions and clearance requirements. They also know its weaknesses, such as tendency to run out of left pedal when hovering in a quartering tailwind condition and/or with high gross weight. They understand power requirements and know how much their helicopter will carry safely. They understand their own capabilities and those factors, such as fatigue, that affect their judgment and ability to react to unforeseen events. If they will take all the things they know and tie them together, the Army will no longer have a tree strike problem. ■

TABLE 1.—Tree Strike Mishaps by Classification From 1 October 1980 to 31 May 1983

Classification					Injuries	Fatalities	Cost
A	B	C	D	E			
8	9	154	1	78	36	9	$13,255,033

TABLE 2.—Tree Strike Mishaps by Type Aircraft From 1 October 1980 to 31 May 1983

Type Aircraft	Total Tree Strikes	Cost
UH-1	91	$ 4,963,101
UH-60	34	262,964
OH-6	3	92,043
OH-58	54	335,309
AH-1	61	3,844,647
CH-47	5	338,720
CH-54	1	3,374,413
TH-55	1	43,836
Total	250	$13,255,033

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Classs C mishap □ (H series) Pilot heard loud noises during hover, and aircraft yawed left and right. Witnesses saw flames coming from engine exhaust. Sudden stoppage required replacement of 42-degree and 90-degree gearboxes.

UH-1 Class E mishaps □ (H series) Fire warning light came on. Caused by failure of control box. □ (H series) IP noticed antitorque pedals were creeping and felt high frequency vibration. Tail rotor servo cylinder was leaking fluid around cylinder shaft. □ (H series) Oil was seen running down vertical fin during shutdown. Caused by failure of seal on 90-degree gearbox. □ (H series) Sudden drop in oil pressure during flight was caused by failure of electrical pressure switch. □ (H series) Pilot felt unusual input in cyclic during landing and then lost hydraulics. Caused by failure of hydraulic pump. □ (H series) Engine oil pressure dropped during flight. Oil filter was partially clogged with carbon.

UH-60 Class A mishap □ Aircraft was participating in fly-in/static display. Pilot was asked by display coordinator to demonstrate the flight characteristics of the aircraft. Pilot received authority from his headquarters to demonstrate the normal characteristics of the aircraft. Airfield commander told pilot that no passengers should be onboard during the demonstration. Aircraft took off with a crew of three and three passengers. During a high-speed pass, while at an altitude of 60 feet agl and airspeed estimated at 140 to 145 knots, pilot put the aircraft into a right bank which exceeded 90 degrees. Because of the excessive bank, aircraft began to lose lift/altitude. Pilot realized he was losing control and banked to the left. While aircraft was still in a right bank of approximately 10 degrees, main rotor blades, tail wheel, and right main landing gear hit the ground. Aircraft then slid to the left and hit a building. Three major injuries and three minor injuries. 8342

UH-60 Class E mishaps □ Howitzer was being slingloaded. Crew chief and pathfinder confirmed that aircraft was centered over the load. As pilot began to lift load, sling wrapped around breech bolt on right side of gun, causing gun to roll on left side. Artillery unit did not rig the load correctly. Crew did not identify the incorrect rigging because of dust and darkness. □ No. 2 engine fire warning light came on during landing. Engine was secured and aircraft landed. Caused by failure of fire sensor.

Attack helicopters

AH-1 Class E mishaps □ (S series) Aft boost pump light came on. Caused by failure of boost pump. □ (S series) Engine oil pressure increased to 150 psi. Caused by failure of pressure transducer. □ (S series) Prior to takeoff, pilot heard howling noise and felt high frequency vibration in airframe. Turbine gas temperature increased to 90° C. for 2 to 3 seconds. Postflight inspection revealed oil smoke coming from engine inlet. Main drive shaft would not rotate in either direction, indicating seizure of power turbine.

Cargo helicopters

CH-47 Class E mishaps □ (B series) No. 2 engine would not accelerate to flight when condition lever was placed in flight after single-engine procedures. Caused by failure of actuator. □ (C series) No. 2 generator and master caution lights came on. Caused by failure of generator. □ (D series) No. 1 engine fire detector light came on. Caused by electrical short in wire.

Observation helicopters

OH-58 Class C mishap □ (C series) Aircraft vibrated during climb. Pilot lowered collective pitch control to make precautionary landing. Vibration became more violent at 300 feet agl and aircraft yawed to right. Throttle was reduced until aircraft streamlined. Throttle was increased at 50 feet agl and aircraft yawed to right again. Pilot closed throttle and autorotated to ground. Touchdown was made at zero

(continued on next page)

Mishap briefs

groundspeed with centered cyclic. Tail rotor gearbox bolts sheared off, but gearbox remained attached to aircraft. Tail rotor, tail rotor drive shaft, vertical fin, and rear cross tube were damaged.

OH-58 Class E mishaps □ (A series) Aircraft was flying about 700 feet agl in 20- to 30-knot winds. Airspeed was indicating 30 to 40 knots when pilot started left turn to downwind heading. Pilot is not sure if he increased collective, but he is sure he did not change his pitch attitude while turning downwind. At that point, aircraft began rapid uncommanded right spin in nose-low attitude. Pilot partially lowered collective and neutralized pedals. Aircraft spun to the right again. Pilot lowered collective to or near the full-down position while adding forward cyclic and right pedal. Spin slowed to a stop as airspeed increased. Altitude loss was about 400 feet. Pilot had viewed the video tape on loss of tail rotor effectiveness several times. He felt that the new ATM task No. 4035 was of more help in his recovery but that the actual loss of tail rotor effectiveness was more rapid at the onset than the practiced task. □ (A series) Low rpm audio activated during takeoff. Suspect governor droop. □ (A series) Pilot pulled too much pitch during standard autorotation at night. Aircraft rocked back and forth on touchdown. IP suspected spike knock. No damage was found. IP was slow in recognizing condition and taking corrective action. □ (A series) Pilot heard clicking noise but could not see caution lights because sun was shining on instrument console. Pilot turned aircraft away from sun and could see that master caution and engine chip detector lights were on. Caused by electrical short in engine chip detector wire.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	March	2	5
3rd Qtr	April	7	6	April	5	0
	May	6	2	May	8	1
	June	2	3	June	4	4
4th Qtr	July	2	2	1-20 Jul	3	7
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	27	19

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Fixed wing

C-7 Class E mishap □ Right engine lost power twice during climbout. Caused by cracked No. 12 cylinder.

C-12 Class E mishap □ (C series) Loud popping sound was heard in vicinity of main spar while aircraft was being manually trimmed. Aircraft pitched up about 5 degrees. Pilot had to use excessive force on elevator. Manual elevator trim had no effect on control forces or aircraft attitude. On short final, elevator forces became progressively worse. After touchdown, elevator remained in last set position until yoke was forced forward, at which time forces returned to normal. Suspect binding of elevator servo.

OV-1 Class C mishaps □ (D series) Pilot noticed during climbout that No. 1 engine upper ring cowling was coming loose. Cowling then separated from aircraft. Suspect failure of dzus fasteners. □ (D series) Aircraft vibrated severely for about 90 seconds. Postflight inspection revealed left elevator trim tab had separated from elevator.

T-41 Class E mishap □ Engine backfired and then began running rough. Cylinder head temperature dropped to zero. Caused by failure of No. 4 cylinder head.

U-21 Class E mishap □ (A series) Crew noticed No. 2 engine nacelle tank cap was leaking fuel during flight. Fuel filler cap was installed incorrectly.

Maintenance

UH-1 Class E mishap □ (H series) Crew chief saw hydraulic fluid leaking under transmission area during shutdown. Fitting on hydraulic filter was loose.

(continued on back page)

Mishap briefs

CH-47 Class E mishap □ (C series) Crew noticed hydraulic leak in aft transmission area and smelled hydraulic fluid. Caused by chafed line.

C-12 Class E mishap □ (C series) No. 2 generator came off line and landing gear failed to extend when landing gear control handle was placed in down position. Gear was manually extended and aircraft landed. Aircraft was placed on jacks to inspect landing gear system. When gear handle was placed up, gear did not retract. System did not activate at all. While mechanic was preparing voltmeter for troubleshooting the system, landing gear retracted by itself. Mechanic had left gear handle in up position. Thereafter, landing gear system worked normally. Further inspection revealed electrical ground for landing gear motor controller and avionics delay may have been at fault. Ground terminal had paint underneath, possibly preventing a good electrical connection.

T-42 Class E mishap □ Fuel siphoned from left outboard fuel cap during flight. Fuel cap adjusting nut was not tight enough.

Messages received

• Safety-of-flight technical message concerning finite life schedule for parts incorporated in the servo cylinder assembly installed on AH-1 (all models) and UH-1 (C and M models only) and other components of the hydraulic actuator assembly on all AH-1 aircraft (AH-1-83-09, UH-1-83-13, 012000Z Jul 83). Summary: TSARCOM has additional information concerning the finite life and time since new (TSN) for the servo actuator. This message revises the TSN chart in TSARCOM message 232200Z Jun 83. Contact: Jimmy Simon and Ed Soteropoulos, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning approved nuts for tail rotor drive shaft clamps on EH-1/UH-1 and AH-1 helicopters (rotor and drive system) (MIM-UH-1-83-MEA-03, MIM-AH-1-83-MEA-03, 011935Z Jul 83).

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

Aircrew discipline

Do it by-the-book

ORVAL RIGHT
Chief Advisor on Matters of Aviation

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Skill/difficulty balance

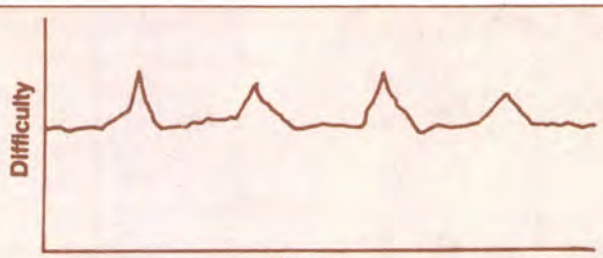
Before any attempt can be made to apportion responsibility for an error, mistake or accident, it is necessary to become familiar with the effects of this balance.

Many of the traps for the unwary occur in tasks which have a wide spread of difficulty. Flying is a good example. Fly a mission in perfect weather with everything working as it should, and then fly the same mission in foul weather with the addition of some of those curly problems the machinery can superimpose, and it becomes a very different operation.

Figure 1 is an attempt to illustrate such a task graphically. Peaks of difficulty of different magnitude occur at purely haphazard intervals. This is an imaginary plot; in some tasks some of the peaks can be foreseen, although even in those cases it is not always possible to get an indication of maximum height of a forthcoming peak or when it is liable to occur. For example, it may be that weather forecasts indicate the approach of a less than perfect weather pattern (and to that extent, a peak may be foreseen), but the probability of the simultaneous occurrence of any number of technical problems is more difficult to foresee.

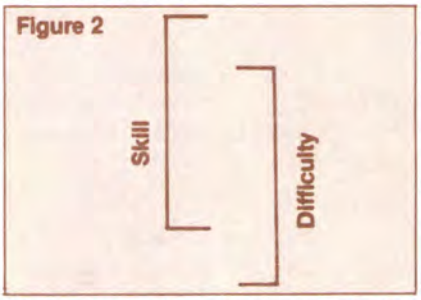
Similarly, in any group of people doing the same job there must be a spread of skill, experience, and general ability to cope.

Figure 1



If these two factors are represented by brackets they can be illustrated as shown in figure 2. As drawn here, it represents a most unhealthy situation in which only about the top third of the pilots have the ability to be really in command of the problems produced by the job when it is at its most difficult. It also shows that the pilots in the lower end of the group have the capability to cope with confidence only under virtually ideal conditions.

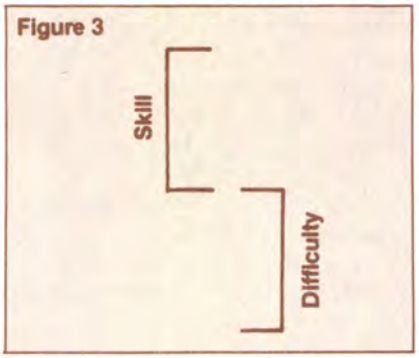
Figure 2



Obviously such a balance is highly undesirable as it will lead to a high accident rate until a more satisfactory balance is achieved. While this kind of imbalance remains, if a pilot from the lower echelon is chosen when there are indications of an approaching peak, then a major share of responsibility rests on management.

If such a situation is left entirely alone it will gradually correct itself as the skill bracket of the pilot group moves upwards, and alterations in operations brought about by experience move the difficulty bracket downwards. Although it is true that this state of imbalance will tend to correct itself, it will naturally take time, and when the probable cost in lives and equipment is considered, time can be a most expensive commodity. A lot of time, and therefore money, can be saved by a truly analytical investigation of each accident and a presentation of the reports in such a way that the causal factors can be compared statistically. This will soon show trends which point to an imbalance, as in figure 2, and meaningful corrective measures can then be taken.

Figure 3



A much more satisfactory balance is shown in figure 3. Such a balance can be obtained, and then maintained, by improving selection, training, and management of personnel and, by the use of constant analysis, reducing the problems associated with the operation.

Flying was taken as the example, but the same reasoning holds for any work situation. It is most apparent, of course, in an operation having a wide difficulty spread. A purely repetitive process has virtually no difficulty spread, but can produce its own particular kind of problem due to boredom or inattention.

Engineering involves many operations having a wide difficulty spread; for instance, changing a component on an engine while that engine is in the comfortable atmosphere of a workshop. It is

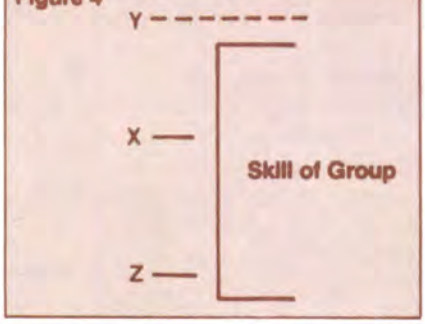
Skill/difficulty balance

mounted on a stand rendering the site readily accessible, and there is sufficient time to do the job carefully and check it thoroughly. Now set about changing that same component with the engine in situ, out on the field on a dark, cold winter night, with the operations people dancing about demanding the aircraft immediately or sooner, and that same operation becomes fraught with probabilities.

The recognition of this skill/difficulty factor is of extremely high importance to supervision and management. Given that there is a choice of operatives, it is the responsibility of supervision to pick the one best suited to the "forecastable" difficulties. It is management's responsibility to insure that all possible efforts are made to reduce built-in difficulties to a minimum, and then when an accident does occur, to insure that it is investigated with this balance in mind. This avoids any unnecessary and harmful disciplinary action against someone who was doing his best but was, in fact, the victim of a set of circumstances over which he had no control.

Figure 4 shows how a particular operator's position in the skill group can change. At any point in time, a trained and competent employee coming on to a specific job might fairly be assessed as being at Point X. Then, when familiarity with the operation increases, he may work towards a position as at Y. On the other hand, he can drop to Z or below if he is ill, tired, upset, or in any other way affected by extraneous forces. It was this sort of thing which was referred to earlier and described as "off curve" behavior.

Figure 4



There is another manifestation of this same shift of an individual which can be one of the most important challenges to supervision. Figure 5 illustrates this.

This shows a difficulty pattern of the type considered previously. The skill curve shows that when an employee is introduced to any specialized operation he may require instruction or assistance until, as shown at X, he is capable of satisfactory performance—always providing there is no difficulty peak.

As time goes by, and the length of this time scale is extremely dependent on the job and the individual, he eventually finds himself at Point Y. The job can no longer surprise him. He has mastered every trick it can produce. Put another way, the job no longer offers a challenge.

Figure 5

It is this aspect which can prove either frustrating or rewarding for supervision. This is because different character profiles react in widely different ways to finding themselves at Point Y. These reactions can vary widely between two limits. The nonadventurous type begins to breathe a sigh of relief at having finally mastered an operation and would strongly resist any suggestion of a change. At the other end of the scale is the individual who felt by Point X or even before that, he had the job licked. By the time he reached Point Y he realizes that the job holds no further challenge for him. Being the kind of character who must have a challenge, he consciously, or unconsciously, provides his own challenge. In the former case, it is the sort of thing which produces the "Look, Ma—no hands!" syndrome. In the latter case, the operative goes off on any sort of daydream which is more attractive than the job in hand, and so the job gets only a fraction of his concentration, with a consequent increase in hazard potential.

This is where a really alert supervisor can reduce the hazard probability. The technique starts with a sincere interest in each employee as a person. An assessment of the character structure, and consequently the behavior pattern, of each employee will indicate the most satisfactory operative for each job. When the adventurous type is recognized, the supervisor is at pains to offer those jobs which will represent a significant challenge. The penalty for not doing this will be either a serious mistake or the employee will soon search for distant fields for that imaginary greener grass. In other words, if the supervisor fails to find jobs that challenge, the employees will provide their own challenge or transfer to other situations. ■

—from USAF SAFETY JOURNAL and FLIGHT CREW

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Low rpm audio and light activated during takeoff. Aircraft vibrated during descent and landed hard, bending rear cross tube. Inspection and test flight could not duplicate power loss.

UH-1 Class E mishaps □ (H series) Hydraulic pressure was lost during flight. Caused by malfunction of irreversible valve. □ (H series) Thermal relief valve stuck during takeoff, resulting in high engine oil temperature. □ (H series) Engine fuel pump light came on during landing. Caused by failure of fuel pressure switch. □ (H series) N_1 gauge went to zero during landing. Caused by failure of tachometer generator. □ (H series) Rotor rpm light came on. Caused by high side governor failure. □ (V series) Pilot's greenhouse cracked during flight. Unit trainer took control and pilot held greenhouse so it would not come out. □ (H series) N_2 speed fluctuated during NOE flight. Caused by failure of dual tachometer.

Attack helicopters

AH-1 Class E mishaps □ (S series) Transmission oil bypass light came on. Caused by failure of bypass switch. □ (S series) Copilot saw transmission fluid dripping from fuselage during rapid refueling operation. Caused by failure of transmission accessory gearbox seal.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**4**
4th Qtr	July	2	2	1-27 Jul	**5**	**7**
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**29**	**19**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Cargo helicopters

CH-47 Class A mishap □ (C series) Two aircraft were on a night training flight over water. The trail aircraft had climbed from the formation to gain altitude for orientation purposes. The lead aircraft remained at 75 feet above the water at 100 knots airspeed. As the trail aircraft was trying to rejoin the lead aircraft, the crew saw what they thought was a fog bank. The "fog bank" turned out to be an island. The flight was north of their intended course, which would have taken them south of the island. The lead aircraft crashed into the island. Six fatalities. 8343

CH-47 Class E mishaps □ (C series) Pilot felt high frequency vibration in pedals and cockpit floor. Caused by malfunction of combining transmission. □ (C series) No. 1 engine chip detector light came on. Caused by failure of engine transmission.

Observation helicopters

OH-58 Class C mishap □ (A series) Pilot did a low recon of intended landing spot at field site and was aware it would be a slope landing. As collective was lowered on touchdown, spike knock occurred. Pilot raised collective sharply, applied left pedal, and tried to stabilize aircraft at a hover. Pilot had already applied forward cyclic, so when collective was raised, aircraft rotated up on toes of skids. Pilot applied rear cyclic to compensate. At this point, aircraft was airborne and control was lost. Aircraft was shaking and shuddering as pilot tried to land. On touchdown, aircraft began to slide to right around the nose. Pedals would not respond to control inputs. Pilot immediately shut down aircraft.

OH-58 Class E mishaps □ (A series) After approach to civilian airport, PIC took control of aircraft and, using the

(continued on back page)

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 20 Oct 82 issue (8301) □ Aircraft was on service mission ı mountainous terrain. Pilot attempted .light under conditions which exceeded the capabilities of the aircraft. During a low approach at or below an airspeed of 20 knots and at an altitude of approxi- ıately 75 feet agl, power required to ıaintain flight exceeded power available. Engine and rotor rpm bled off, and heavily loaded aircraft began a descending turn to the right and crashed. Pilot did not compute a performance planning card or perform an out-of-ground-effect hover check.

UH-1 Class B mishap in 3 Nov 82 issue (8303) □ IP demonstrated a simulated engine failure from about 15 feet agl. Initial ground contact was normal. Dur- ıg the 100-foot ground run, IP applied collective pitch to keep the aircraft light on the skids, causing main rotor rpm to drop below normal. During the last ne-third of the ground run, mast bump- ıg occurred due to low rotor rpm and aft cyclic inputs. Mast bumping exerted xtreme forces on the main transmis- ion support case, breaking the case.

UH-60 Class A mishap in 18 Aug 82 issue (8271) □ Aircraft was in straight-and-level flight about 300 feet agl. Observers saw aircraft nose over, complete 380-degree flip, and crash in a nose- own, left-bank attitude onto the top of military bus. Caused by failure of the longitudinal stop bearing within the flight control mixing unit. Failure of the bearing was traced back to improper main rotor blade folding procedures used during air transport of the helicopter.

ttack helicopters

AH-1 Class B mishap in 3 Feb 82 issue 8223) □ // Engine failed during auto- ɔtation and aircraft landed hard. Maintenance had incorrectly positioned the serrated washer on the flight idle stop cam. Incorrectly positioned washer allowed throttle linkage to place the engine below self-sustaining speed at autorotation.

AH-1 Class A mishap in 10 Nov 82 issue (8304) □ When aircraft touched down from straight-in autorotation, IP misjudged runway distance remaining and rate of closure to end of runway. Thinking aircraft was going to slide off end of runway, IP took controls and attempted power recovery. Aircraft continued in a powered slide down the runway for 750 feet before rising 1 to 2 feet off the ground. Aircraft then yawed right, settled into a boggy area of the runway overrun, rolled over, and came to rest on right side. The power recovery maneuver was unnecessary, as 824 feet of runway remained from the point of touchdown to the end of the runway

8304

Cargo helicopters

CH-47 Class B mishap in 15 Sep 82 issue (8283) □ Downgraded to Class C. Aft red rotor blade dropped down and struck fuselage during shutdown. Caused by failure of lag damper bracket due to fatigue.

Observation helicopters

OH-58 Class A mishap in 29 Sep 82 issue (8294) □ Downgraded to Class B. Pilot flew aircraft into conditions conducive to loss of tail rotor effectiveness. Almost expending full left pedal during a left turn into the wind and experiencing a slight right yaw condition, pilot neutralized pedal settings and allowed aircraft to turn to the right in an attempt to fly downwind out of uncommanded right turn. Yaw rate accelerated to the right. After several complete spins, pilot stopped the turn by rolling off the throttle and reducing collective pitch. There was insufficient altitude remaining in which to recover, and aircraft landed hard.

OH-58 Class A mishap in 29 Sep 82 issue (8296) □ Pilot climbed to out-of-ground-effect hover about 400 feet agl over 75- to 100-foot trees. There was a left quartering tailwind of 15 to 20 knots. As pilot started a slow, straight-ahead hover, aircraft yawed left and then right and began uncontrolled right spin. Pilot applied excessive right pedal in an attempt to fly out of the turn. This aggravated the right spin condition. Pilot made no attempt to reduce collective pitch and delayed applying left pedal until just before impact. Aircraft hit the ground in tail-low attitude.

OH-58 Class B mishap in 6 Oct 82 issue (8298) □ As aircraft was landing, tail rotor blades hit main rotor blade of parked OH-58. Aircraft spun, hit the ground, and came to rest on right side. Pilot did not properly recon his landing area.

OH-58 Class B mishap in 20 Oct 82 issue (8302) □ Engine exploded while aircraft was at 3-foot hover. Aircraft settled to the ground without further damage. Fire erupted in engine compartment and avionics compartment, but it was quickly extinguished. Explosion was caused by materiel failure in power turbine rotor assembly. ■

Accident review: mortar fire observation mission

Synopsis

Three mortars were firing from concealed positions in a tree line. As a UH-1H overflew the No. 3 mortar tube, a round was fired. The instructor pilot reacted by abruptly turning the helicopter to the right. Control was lost and the helicopter crashed into trees.

History of flight

A UH-1H IP was assigned a mission to transport the brigade commander and his staff from brigade headquarters to an observation point on the reservation so they could observe mortar firing competition. The IP planned to use the flight to give a checkride to a newly assigned pilot.

The Huey was flown to brigade headquarters, and the pilot went inside to give the passengers a safety briefing. He did not complete the briefing because the passengers said they flew the same type of mission on a regular basis. A passenger manifest was not prepared nor were the passengers' names entered on the flight plan.

The IP, pilot, crew chief, technical observer, and four passengers boarded the helicopter. The helicopter was started and an out-of-ground-effect hover check completed. The crew then proceeded towards the observation point. The pilot was flying the aircraft and making the radio calls.

The aircraft was flown past the observation point by about 1 kilometer. The pilot recognized his error, reversed course, and flew to a point just south of the observation point. He then turned right for an approach into the observation point area. The IP told the pilot his approach speed was too fast and took control of the aircraft.

During the approach, one of the passengers told the IP that the firing points were not to their immediate front, but were further down range near some bleachers. The IP tried to continue the flight and land by the bleachers. As the aircraft crossed over the edge of the tree line surrounding the observation point, the IP heard a mortar tube fire from his front and almost directly beneath the aircraft. The aircraft was flying about 20 feet above the trees, at an airspeed of 15 knots. The IP abruptly turned the aircraft to the right with a bank angle of 45 to 60 degrees and increased collective pitch to maintain altitude. The aircraft then started to spin to the right in a nose-low attitude. It continued to spin for approximately 360 degrees. The aircraft crashed into the trees in a left bank, nose-low attitude and came to rest on its left side.

The IP and technical observer sustained major injuries, and the rest of the occupants sustained abrasions and contusions.

Crewmember experience

The 41-year-old IP had more than 3,000 rotary wing flight hours, with more than 2,000 in the UH-1H. The 27-year-old pilot had more than 200 rotary wing hours, most of them in the UH-1H.

Commentary

Because of the close proximity of the firing mortar, the IP momentarily lost his composure and made an abrupt turn to the right. The steep angle of bank at such a low airspeed exceeded the performance limitations of the aircraft. The IP tried to level the aircraft and remain above the trees, but engine power required exceeded power available.

There were no written or established procedures at unit or installation level concerning aircraft operations into or out of live/hot firing positions. Flight following told the UH-1 crew the area was "hot," but there was no other guidance from range control or other sources as to what action to take when entering the firing position. It had been the habit of pilots to fly around the area until they located the firing position and then select a landing site.

Frequently, the passengers would communicate with the firing element to obtain its location. The IP was confident the passengers he had on board would keep him clear of the mortars, although he had not briefed them. He did not insure the passengers had communicated with the mortar section or were aware of its exact location. One of the passengers provided the IP inaccurate instructions as to the location of the mortars. The IP assumed the mortars were at the location described by the passenger and established an approach to the area he thought would be behind the firing mortars. The landing site was actually forward of the firing mortars which were tactically deployed in the tree line.

If the position of the mortars had been obtained before arrival at the observation point, it would have been apparent that the point was not a suitable landing area. The mortars were positioned in such a way as to eliminate the point as a landing area unless a "check fire" was initiated. ■

Mishap briefs

active runway, demonstrated NOE quick stop maneuver to copilot. Because of the entry airspeed, termination point was overshot. Aircraft hit and severed powerline that was not seen before initiation of the maneuver. Left windscreen and skin of aircraft were damaged. Local regulation prohibited NOE flight over civilian property without prior coordination. □ (C series) After refueling aircraft, POL personnel removed grounding cable from aircraft. Automatic rewind would not extract cable. POL personnel threw the cable in an attempt to clear the refueling area. End of cable hit and scratched main rotor blade.

Fixed wing

U-8 Class E mishap □ No. 2 engine began to run rough. Right mixture enrichment switch was turned and engine smoothed out. About 2 minutes later, No. 2 engine chip detector light came on. Power was reduced and descent begun. Engine then failed. Aircraft was landed at airport 6 miles away. Caused by failure of rings in No. 4 piston of No. 2 engine.

U-21 Class E mishap □ (D series) Aircraft yawed right and pitched down during climb. Crew saw smoke pouring from No. 2 engine. After verifying engine failure, crew feathered prop, placed condition lever in fuel cutoff, and leveled aircraft at approximately 4,000 feet. Crew returned to airfield and landed. Metal particles were found on mag plug. Engine chip detector light did not illuminate before or after engine failure. Chip detector circuit breaker was popped.

Maintenance

UH-1 Class E mishaps □ (H series) Aircraft yawed to left and N_1 dropped during autorotation. Bleed band was out of adjustment. □ (H series) Crew smelled fuel and landed. Fuel was dripping from fuel line. Caused by bad connection on line. □ (H series) Loud noise was heard during runup and aircraft shuddered. Master caution and tail rotor chip detector lights came on. Bolt retainer backed off and broke safety wire. Caused by incorrect torque of retainer.

OH-58 Class E mishap □ (A series) IP initiated simulated engine failure which resulted in complete engine failure when throttle was closed to idle stop. IP was able to restart engine to approximately 60 percent N_1 just before deceleration. N_1 power control lever was out of rig.

T-42 Class E mishap □ Fuel was seen siphoning from right auxiliary fuel cap after takeoff. Adjusting nut on bottom of fuel cap was adjusted incorrectly, allowing insufficient pressure on cap O-ring seal.

Messages received

- Safety-of-use, operational and maintenance criteria for the use of the high performance hoist on the UH-60 (GEN-83-02, 111930Z Jul 83). This message ends restricted use of the high performance hoist on all UH-1 and UH-60 aircraft. All units should insure the messages are followed to the letter to prevent loss of hoist.

- Maintenance information message revising the maintenance and recoverability codes on the cylinder assemblies for AH-1 and UH-1 (C and M models) (MIM-83-AH-1-MCAMA-01, MIM-83-UH-1C/M-MCAMA-01, 111900Z Jul 83).

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

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Accident review: violation of procedures

Synopsis

Two AH-1S helicopters were returning from a mission to their field location. Crossing the point of intended landing at 50 feet agl, the lead aircraft broke left for landing. The second aircraft climbed 100 feet and made a steep right turn. The nose dropped and the aircraft rolled right, entered a high rate of descent, and crashed.

History of flight

The unit was involved in a field training exercise. Two AH-1S standby helicopters were preflighted early in the morning, and the crews returned to their tents to await a mission. About mid-afternoon a call was received that there was a mission for the two aircraft. They were to depart with the air mission commander, who would be in an OH-58, and fly to a landing zone where they would be briefed by the air mission commander after he had completed the required coordination.

The flight of three aircraft departed the field site, with the air mission commander in the lead. No formation flight briefing was done. When the flight arrived at the landing zone, the air mission commander told the other pilots to hold in the area until he coordinated with the supported ground commander. A few minutes later, he returned and told the Cobra crewmembers he had been unable to locate any targets and their release time would be 1600. At 1555, the air mission commander told the crew they were to engage some ground personnel located beside a road. The Cobras left the landing zone and engaged the target. They then returned to the refueling point.

After refueling, the two Cobras formed up to return to the field site. The flight leader suggested that upon arrival at the field site they would do a low-level pass about 50 feet over the tactical operations center and that he would call the break. The PIC of the other Cobra agreed and suggested that they use an airspeed of 120 knots.

When the flight departed the refueling point, the PIC of the first aircraft was performing copilot duties from the gunner's station and the copilot was performing pilot duties from the pilot's station. The flight leader was piloting the second aircraft. Arriving over the field site, the flight leader called breaking to the left. He made a 270-degree turn to the landing site, decreasing his airspeed during the turn. He expected the other aircraft to also make a break

(continued on next page)

Violation of procedures

to the left. However, the PIC of the other aircraft was under the impression they were to make a right break. About 2 seconds after the flight leader started his turn, the PIC of the other aircraft told the pilot to apply aft cyclic. As the pilot began a climbing right turn, he increased collective and was told by the PIC to increase right cyclic inputs.

As the aircraft reached the apex of the turn, the nose was up, with a 45-degree angle of bank to the right. Shortly afterward, the nose tucked down about 30 to 60 degrees. The PIC told the pilot he had the controls. The pilot did not acknowledge and both crewmembers remained on the controls. The PIC applied aft cyclic, increased collective pitch, and leveled the aircraft, but the fast rate of descent could not be stopped. The aircraft flew through a treetop and crashed. Both crewmembers received bruises and abrasions.

Crewmember experience

The 23-year-old PIC had almost 1,000 rotary wing flight hours, with almost 800 in the AH-1S. The 27-year-old pilot had more than 300 rotary wing hours, with more than 100 in the AH-1S.

Commentary

The decision to fly across the bivouac area at a low altitude and high airspeed unnecessarily placed the aircraft in the caution area of the operator's manual height velocity diagram and was in violation of the battalion operating procedures and a local regulation. The flight leader and the PIC of the aircraft involved in the accident were motivated by boredom from their limited amount of flying and the fact that their only mission of the day had been terminated because of a lack of targets. They decided to show off for the personnel at the bivouac area.

The flight leader did not adequately brief the crew of the accident aircraft on the maneuver. He expected both aircraft to make a left break, with a 270-degree, decreasing-airspeed turn to the landing site. The pilot of the other aircraft, however, broke to the right. If the right turn maneuver had been successful, both aircraft would have approached the same landing area from different directions at the same time, with possible catastrophic results.

The PIC of the accident aircraft did not adequately brief his pilot on the extent of the intended maneuver. Because of his limited experience in the aircraft, the pilot initiated a shallower maneuver than was expected by the PIC. The PIC was overconfident in the ability of the pilot to perform a more exaggerated maneuver and tried to talk the pilot through the maneuver. He told the pilot to increase aft cyclic and add more right cyclic in the turn, which produced an out-of-trim condition. The PIC then told the pilot to trim the aircraft while at the apex of the turn. Excessive pedal input by the pilot rotated the aircraft to the right and caused the nose-down attitude from which there was insufficient altitude to recover.

The flight leader had a reputation in the unit as a good pilot who did not usually demonstrate this type of behavior. The PIC of the accident aircraft had a reputation as a highly proficient pilot with a tendency to cowboy the aircraft. He had been informally counseled on several occasions by previous platoon leaders for actions approaching or exceeding his and the aircraft's limitations. Because of the PIC's proficiency in the aircraft, the platoon leaders were confident his actions would not result in an accident. They tried to handle the problem within the platoon and did not bring the matter to the attention of the unit commander, safety officer, or standardization officer. The PIC did not recall having been counseled by his platoon leaders. The platoon leaders should have taken more positive action to get his attention and affect his behavior.

Although the PIC's reputation as a cowboy was common knowledge within the unit, the safety officer and standardization officer were unaware of it. They should have insured that they were aware of the actions of the unit pilots so they could keep the chain of command informed of potential problems. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) IP and three student pilots were on training flight. As IP initiated simulated forced landing, he noticed rapidly decaying engine and rotor rpm. IP told student he was assuming control of aircraft. Student would not release controls. IP continued to try to recover aircraft and gain controls until impact. Aircraft hit trees and crashed in swampy area. One fatality and one minor injury. 8344

UH-1 Class C mishap □ (H series) Loud bang was heard during flight. Left cargo door was missing. Door had been pinned back by crew chief at last stop and checked by pilot.

UH-1 Class E mishaps □ (H series) Aircraft yawed to left and engine ran rough. Caused by defective engine. □ (H series) Governor circuit breaker popped out and would not reset. Caused by defective solenoid. □ (H series) Master caution and IFF lights came on. Caused by defective caution panel. □ (H series) Rpm audio and warning light activated. Caused by failure of fuel control, allowing rpm to bleed off. □ (H series) Master caution and hydraulic lights came on. Caused by failure of hydraulic pressure switch. □ (H series) Tail rotor chip detector light came on. Caused by defective 42-degree gearbox. □ (H series) Excessive feedback in cyclic control was caused by defective hydraulic valve. □ (H series) Engine tachometer went to 1000 rpm during flight. Caused by sheared tachometer drive spline. □ (M series) Fire detector light came on. Caused by loose wire in fire detector control head assembly.

UH-60 Class E mishaps □ Stabilator audio and caution light came on with stabilator in 0-degree position. Caused by malfunction of stabilator. □ No. 1 engine went into ECU lockout/overspeed protection on its own accord. Caused by failure of electronic control unit.

Attack helicopters

AH-1 Class E mishaps □ (S series) Master caution light came on. Caused by failure of submerged pump. □ (S series) Rpm light came on, followed by fluctuation of transmission oil pressure. Caused by failure of pressure transducer. □ (G series) Loud popping noise was heard from main transmission area during shutdown. Inspection revealed two teeth were broken and missing from transmission tail rotor output quill gear. Teeth were found on top of oil pump. □ (S series) Aircraft was on firing run. Gun slewed 110 degrees to the right when fired. Caused by failure of electronic interface assembly.

Cargo helicopters

CH-47 Class C mishap □ (C series) CH-47 was slingloading UH-1. At termination of mission, damage was found to UH-1 main rotor blade.

Observation helicopters

OH-58 Class A mishap □ (A series) Aircraft pitched up from an altitude of 200 feet agl, began spinning, and crashed. 8345

OH-58 Class C mishaps □ (A series) Aircraft was flying at 1,000 feet agl. Pilot was beginning to climb when low rpm audio and light activated and aircraft yawed left. Aircraft then began to settle. Pilot noticed TOT at 750° C. Pilot reduced collective, reduced throttle to engine idle, and entered autorotation. Intended landing area was overshot by 50 feet and aircraft touched down in trees about 12 to 65 feet tall. Both main rotor blades were damaged on touchdown. □ (A series) Tail rotor blade hit tall grass or brush as aircraft was landing along the edge of a road. Because of the noise, pilot pulled power to take aircraft above whatever tail rotor was hitting and reposition across the road. Pilot then saw wires and pulled more power to try to miss them. When aircraft was landed, tail rotor blade was found to be damaged.

OH-58 Class E mishaps □ (A series) Master caution light came on. Caused by failure of master caution panel. □ (A series) Aircraft vibrated during flight. Caused by bonding separation of main rotor blade at tip fairing. □ (A series) On short final for landing, d.c. ammeter went from 25 amps to 120 amps. When battery switch was turned off, ammeter returned to 25 amps, confirming battery thermal runaway.

Fixed wing

U-8 Class E mishap □ (F series) Left engine chip detector light came on during climb. Chip was found on detector. Suspect internal failure.

U-21 Class E mishap □ (D series) Crew chief saw fuel siphoning from No. 1 nacelle tank after takeoff. Fuel cap was not secured correctly.

Maintenance

UH-1 Class C mishap □ (H series) Crew chief used broom handle with grease pencil taped to the end to track tail rotor. One tail rotor blade was damaged during the tracking operation.

UH-1 Class E mishaps □ (H series) Aircraft began to rotate to right during pickup to hover. Right turn accelerated and pilot lowered collective, landing from 1-foot hover. Cotter key was not installed on tail rotor bearing retaining nut, causing nut to back off. □ (V series) Pilots noticed change in FM radio reception. Reception was garbled. Postflight inspection revealed access cover for tail rotor sprocket assembly had broken loose and safety wire from retaining bolts was wrapped around FM antenna. Caused by overtorque of retaining bolts.

AH-1 Class E mishap □ (S series) Master caution and No. 1 hydraulic lights came on. Hydraulic return line was not torqued correctly.

CH-47 Class C mishap □ (C series) During maintenance operational check for replacement of No. 2 engine gearbox, flight engineer told pilots he heard unusual noise from No. 2 engine area. Engine was shut down and maintenance personnel notified. Maintenance personnel tried to start the engine again. While engine condition levers were being placed from ground to flight, N_1 and PTIT began fluctuating and popping sound was heard. Engine was shut down again. Inspection of engine revealed screwdriver handle left in intake had caused compressor blade damage.

OH-58 Class E mishap □ (A series) Throttle had been at engine idle for about 2 minutes after landing when engine quit. Caused by incorrectly adjusted throttle.

OV-1 Class E mishap □ (D series) Right and left main gears would not retract after takeoff. Caused by incorrectly set blow-down bottle dump valve.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**5**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**4**
4th Qtr	July	2	2	July	**5**	**7**
	August	8	5	1-3 Aug	**0**	**0**
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**29**	**19**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

- Safety-of-flight maintenance mandatory message concerning the force gradient on all AH-1 aircraft (AH-1-83-10, 212000Z Jul 83). Summary: The rod end bearing on the fore and aft force gradient was found to be disconnected on two aircraft in the same unit. The first indication of trouble is binding of the cyclic and loss of forced trim. All AH-1 aircraft will be inspected for proper assembly of force gradients. Contact: Jimmy Simon and Ed Soteropoulos, TSARCOM, AUTOVON 693-3300.

- Maintenance information message concerning use of molub-alloy-777-1 grease on the OH-58 drive train (MIM-OH-58-83-MEC-04, 201500Z Jul 83).

- Message concerning return of unserviceable assets for UH-60 aircraft (181455Z Jul 83).

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

TM changes

Change 27, dated 6 Jul 83, to TM 55-1520-228-23-1 for OH-58A and C helicopters, has been released.

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL36362 □ STACOM 93 □ 3 Aug 1983

Lightning—a striking matter

STACOM 84, 3 November 1982, addressed some of the hazards of lightning strikes to aviation personnel and aircraft. Unfortunately, that isn't the only area that lightning strikes. A recent lightning strike disabled our after-duty-hours answering service, telephone number 558-6487. So, if you have tried to contact DES with/for information to enhance aviation operations and training support and been unable to get through, we're sorry for the inconvenience. ■

Aircrew information/reading files

STACOM 92, 6 July 1983, addressed the importance of and need for this file. For the purpose of clarification, the term "become familiar with" does not imply that each aviator must read each publication contained in the reading file each time he reviews the file. However, he should be familiar with what information is in the file and expect that when he has to research an area from reference material in the reading file, it will contain the most recent/current data. ■

Pilot in command (PIC)

AR 95-1, paragraph 3-21, states that the designation as pilot in command or flight commander is an assignment of **command responsibility.** It is not a crew duty assignment.

A review of recent mishap data indicates that some PICs are not insuring that passengers and crewmembers adhere to regulations governing their conduct in and around the aircraft.

Does your unit SOP have adequate guidance to insure PICs are not permitted to perform prohibited missions? What about passenger restrictions? PICs, do you insure that only minimum essential crew are on board during—

- maintenance or engineering test flights?
- aerobatic flights?
- aerial demonstrations?
- hazardous flight training?
- practice of engine-out operations or other emergency procedures?
- aeronautical record attempts?
- aircraft acceptance flights?
- first flights over isolated geographic areas?
- similar flights where normal conditions exist?

Aviation standardization committee members must insure that unit SOPs provide proper guidance for selection of mature PICs who become responsible and have final authority for operating, servicing, and securing the aircraft under their control. ■

Professional leadership by example

The safety practices and accident prevention habits of instructor pilots, both during flight instruction and as observed by aviators when conducting other pilot operations, have a vital effect on safety. Aviators consider their instructor pilot to be a paragon of flying proficiency whose flying habits they, consciously or unconsciously, attempt to imitate. The instructor's advocacy and description of safety practices mean little to an aviator if the instructor is observed to violate them.

For this reason, an instructor pilot must meticulously observe the safety practices taught the aviator. A good example is the use of a checklist before takeoff. If an aviator sees the instructor pilot start an aircraft and take off without referring to a checklist, no amount of instruction in the use of a checklist will assure that the aviator will use one conscientiously when solo flight operations begin.

An instructor pilot must carefully observe regulations and recognize safety practices during all operations if a professional image is to be maintained. An instructor pilot who is seen to fly with apparent disregard for loading limitations or weather minimums creates an image of irresponsibility which many hours of conscientious flight instruction cannot correct.

Habitual observance of regulations, safety precautions, and the precepts of courtesy will greatly enhance the instructor pilot's image of professionalism. Further and more important, such habits make the instructor pilots more effective by developing the same habits in the other aviators.

One of the most productive actions an instructor pilot can take to enhance flying safety is to actively participate in the aviation accident prevention program.

The instructor pilot must go beyond the requirements of developing technically proficient aviators who are knowledgeable in the areas of their equipment, flight procedures, and maneuvers. The instructor pilot must not only teach aviators to know their own and their equipment's limitations but must also teach them to be guided by those limitations. In brief, the professional instructor pilot must make a strenuous effort to **develop good sound judgment** on the part of Army aviators. ■

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.

Nineteen receive Broken Wing Award

The Broken Wing Award is given to aircraft crewmembers who demonstrate a high degree of professional aviation 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 Broken Wing Award is approved for inclusion in the recipient's official military permanent file (OMPF). This file is used for promotion and the various selection boards. All Broken Wing Awards received at MILPERCEN will be put in the OMPF. The normal process for placing the award in the OMPF is through the installation military personnel office, but the award can be forwarded to MILPERCEN by the recipient.

Nineteen aviators received the Broken Wing Award from April through June 1983.

Broken Wing Award recipients

CW3 Otis R. Armstrong
590th Transportation Aircraft Maintenance Company,
APO Miami 34006

CW2 Arthur M. Barker
B Troop, 7/17th Cavalry,
6th Cavalry Brigade, Fort Hood

CW3 Richard E. Boylston
DOFT, 14th Company,
Fort Rucker

CW3 Francis K. Carver
HHC, 5th Combat Aviation Battalion,
Fort Polk

CW2 Richard G. Gers
DOFT, 14th Company,
Fort Rucker

CW3 Lemuel E. Grant
South Carolina Army National Guard,
McEntire ANG Base,
Eastover, South Carolina

CW3 Herschel M. Hicks
Company D, 82d Combat Aviation Battalion, Fort Bragg

CW4 James A. Hildreth
207th Aviation Company,
APO New York 09102

CW2 James P. Hughes
DOFT, 14th Company,
Fort Rucker

CW3 Raymond K. Kulm
3d Brigade, 101st Airborne Division,
Fort Campbell

James M. Lee
ACE, Inc., Fort Rucker

James R. Minter, DAC
Aviation Division, DPT,
Fort Benning

Major Joseph S. Mooneyham, Jr.
HQ, STARC
North Carolina Army National Guard,
Morrisville, North Carolina

WO1 George J. Oliver
C Troop, 7/17th Cavalry, 6th Cavalry Brigade, Fort Hood

1LT Eugene W. Reaves
DOFT, 14th Company, Fort Rucker

WO1 Richard E. Smith
D Troop, 2d Squadron, 10th Cavalry,
Fort Ord

CW2 Thomas E. Studler
222d Aviation Battalion,
Fort Wainwright

CW3 Donald R. Weeks
Davison Army Airfield,
Fort Belvoir

WO1 Robert C. Witter
C Company, 214th Aviation Battalion,
Fort Lewis

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Collateral confusion?

So your unit had an accident last night . . . Fortunately no one was hurt, but the roving Channel 4 TV News buggy was there within minutes, and you don't know what you should do. Well, commander, you ought to consider a "collateral."

Your confusion over what to do could be easily cleared by remembering that your first sources for information on collateral investigations are AR 385-40 and DA Pam 385-95, Appendix A (to be used after 1 Oct 83). But before you get into the procedures to be followed, you first need to decide if you should have a collateral investigation. Collateral investigations are required in fatal aviation mishaps, in cases where the U.S. Government or its contractors' liability may be questioned in litigation, where high public or news media interest is expected, or in cases where the commander suspects negligence or violation of safety standards/flight procedures to have caused the accident (AR 385-40, par. 1-7). Commanders may also convene a collateral investigation in any other circumstance where they feel it is necessary.

What is a collateral investigation anyway? It is nothing more than another name for the very common AR 15-6 investigation used by commanders at all levels to investigate irregularities and incidents. Collateral means side by side or parallel. Therefore, these investigations, conducted for other reasons, and at the same time as the aircraft accident investigation, are parallel to the aircraft accident investigation. This is the origin of the general and accepted use of the collateral investigation.

The purpose of a collateral investigation, like that of all AR 15-6 investigations, is to gather information, make findings of fact, submit recommendations for corrective or disciplinary action, and to preserve the information (or evidence) about what happened and why it happened for later use. Such uses are for claims against the U.S. Government, litigation, adverse administrative actions, flight evaluation boards, or disciplinary actions against the aviators involved. An additional purpose not often considered by commanders is that collateral investigations provide a good way to answer those probing news reporters' questions about what happened and what the Army is doing about the incident. Thus, a collateral investigation report serves many functions. It is a commander's tool, convened when the commander wants information which is unrestricted in its usage.

A collateral investigating board consists of one to three or more aviation commissioned officers appointed by the special court-martial convening authority (usually a brigade or separate battalion squadron commander). Warrant officers may be appointed if a commissioned officer is also appointed. Collateral board members must be senior in date of rank to the personnel involved if of the same grade, but preferably they are senior in grade. In particularly complex or serious accidents, it may be advisable to appoint field grade officers where their aviation, maintenance, and staff experience can be used to good effect. Commanders should always remember that if they want the investigation completed swiftly they need to appoint sufficient board members and provide the administrative support to accomplish the task in the manner prescribed.

Collateral officers or board members must be neutral and objective. They should not have a stake in the outcome of the investigation. This means that they should not be witnesses to the event, have close social or duty relationships to aviation or command personnel involved, and must not be appointed if they may have to evaluate or question the performance, action, or policies made by themselves or a person in their rating chain. For example, if an aviation battalion's SOP is initially indicated to have played a part in an accident, the appointing authority may want to consider appointing an officer senior to the officer whose responsibility or action led to the promulgation or establishment of the questioned procedure. It should be remembered that valid objections can be made to nullify collateral investigations in which board members or the investigating officer were biased or otherwise not properly allowed to act independently on the investigation. If it becomes apparent to a collateral officer that he may be disqualified or is biased, he should report that fact to the appointing authority. The appointing authority will then decide if the collateral officer should be replaced. Nothing prevents a commander from appointing officers from other units when he has no officer qualified for appointment by reason of prior contact with the case or bias.

Collateral officers can be orally appointed, with the appointment letter following shortly thereafter. Typical appointments direct the collateral officer to make the collateral report his primary duty until it has been completed. The sooner the collateral gets started, the easier it will be to gather the evidence before memories become blurred or distorted from another person's opinions or observations. The most important factor in achieving a detailed investigation in rapid fashion is the timing of the appointment of the

(continued on next page)

Collateral confusion?

collateral officer or board members. Collateral boards which are appointed long after the accident (after 72 hours following the accident) experience much difficulty in obtaining information since witnesses tend to disperse, the wreckage may be moved, evidence and memories grow stale, and coordination with the accident board becomes difficult. AR 385-40, par. 1-4f, charges the commander responsible for reporting and investigating aircraft mishaps with promptly appointing the collateral investigation board and rapidly getting the board to the mishap site.

The aircraft accident investigation board may already be on the scene taking pictures, inspecting the aircraft, interviewing witnesses, and making measurements. The accident investigation board will share with the collateral investigating board/officer many items which will prevent a duplication of effort. They are—

- The names and addresses of witnesses interviewed by the accident investigation board. The accident board will not provide the collateral officer with the content or nature of the testimony given.
- Photographs of the crash scene and wreckage. The collateral officer is urged to have his own photographs made but may use accident board photographs to supplement his own.
- Fuel and oil analyses.
- Teardown analysis reports and other technical reports. (Because the results are not usually immediately available to the accident board, the collateral board should make its request directly to Corpus Christi Army Depot or elsewhere as directed by the accident board.)
- Debris distribution diagrams.
- Flightpath maps. To be released to the collateral board, the flightpath derivation must be factual and determined without the aid of analysis from witnesses giving confidential statements.
- Copies of original documents taken from the unit or the aircraft such as performance planning card, weight and balance forms, flight plan, aircraft maintenance records, aviators' qualification records, and flight status records. Bear in mind that rarely does the accident board remove original documents since copies are usually sufficient for their purposes.

By whatever method evidence is obtained, collateral officers or boards are required to fix dates, places, persons, and events definitely and accurately. The collateral should develop complete answers to these questions: What happened, when, and where? What was each step in the accident sequence? What caused or contributed to each step in the accident sequence? What kind of property was involved? What is its description, value, extent of damage, and ownership? What procedures or lack of training, lack of facilities, or lack of materiel may have contributed to the accident? Using diagrams, photographs, documents, and physical evidence such as aircraft parts can help answer these and other questions raised in the conduct of the investigation.

The collateral officer or board must hold hearings to gather the evidence. The procedures for the hearings are established in AR 15-6, and the procedures which are to be followed depend on the letter of appointment. Formal board procedures may be required if a soldier is named as the person whose conduct is being investigated. Formal board procedures are rarely required but it would be a good idea to frequently coordinate with your local staff judge advocate office or legal advisor in each collateral investigation. Legal counsel can assist in detailing necessary procedures and deciding evidence admissibility questions and can act as a neutral sounding board for the collateral officer. Remember that it is the appointed officer's duty to gather the evidence, consider it, and make those findings of fact which are supported by the evidence. Only then can recommendations be made as to what corrective, punitive, administrative, or pecuniary actions should be taken.

Nothing prevents a commander from appointing the collateral board or investigating officer as the line-of-duty officer and report-of-survey officer. Evidence gathered for the collateral investigation can be used to support those investigations as well. Commanders, it makes good sense to economize your investigative requirements by replacing the collateral, the line-of-duty, and report-of-survey with one officer or board.

Remember that unlike the accident investigation report, all portions of the collateral board evidence and findings are releasable to the public on request made under the Freedom of Information Act. Newsmen will usually request a copy of the collateral report and may even be allowed to receive the recommendations made by the board.

The collateral investigation is an important tool for the Army. Convening a collateral board can provide the commander and the U.S. Army information upon which to act in the future when required. Commanders should consider convening a collateral or requesting that a superior command appoint a collateral in every nonfatal accident involving extreme injury to soldiers or costly damage to mission-essential equipment.

A collateral investigation just might pinpoint a weakness in your unit's training, maintenance, or personnel which can be corrected to prevent another wasteful loss of human assets and equipment.

Point of contact at the Safety Center on collateral investigations is Major Karl Ivey, AUTOVON 558-3819. ■

Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft was on night training flight. Crew reported power surges and compressor stalls as aircraft was on base leg for landing. Engine and rotor rpm slowly decayed, and copilot entered autorotation, selecting the median of a highway as the landing area. During approach, the addition of collective pitch to clear some powerlines caused rotor rpm to bleed off below that necessary to maintain controlled flight. Aircraft hit the powerlines, and main rotor blades hit a pole. Aircraft then crashed on the edge of a parking lot and slid into the highway. Pilot, copilot, and crew chief sustained major injuries. Suspect engine failure. 8346

UH-1 Class E mishaps □ (H series) Crew smelled fuel odor in cockpit. Caused by leaking fuel boost pump. □ (H series) Aircraft yawed slightly and fuel pressure dropped. Caused by failure of solenoid valve. □ (H series) Odd noise was heard from engine, and rpm fluctuated. Caused by failure of fuel control. □ (H series) Whistling noise was heard during hover. Caused by separation in skin on bottom of main rotor blade. □ (H series) Engine oil pressure fluctuated during landing. Caused by failure of gauge. □ (H series) Vertical vibration occurred during flight. Main rotor blade had cracked about 1 foot from leading edge. □ (H series) Master caution and transmission oil lights came on during hover. Caused by failure of oil manifold assembly.

UH-60 Class E mishaps □ No. 2 engine showed indication of torque split with high torque. Landing was made and engine failed when power control lever was moved out of flight position. Caused by failure of electronic control unit. □ No. 1 hydraulic reservoir low light and No. 1 tail rotor servo light came on. Postflight inspection revealed hydraulic reservoir was low.

Attack helicopters

AH-1 Class E mishaps □ (S series) Transmission oil pressure dropped to 30 psi during flight. Caused by failure of oil pressure transducer. □ (S series) Compressor stalls occurred during hover. Caused by foreign object damage to engine. □ (S series) Pedals froze in neutral position during landing. Caused by failure of No. 1 hydraulic pump.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Aircraft was being run up to check an adjustment to No. 2 engine ground idle N_1 speed. At approximately 130 rpm, loud bang was heard. Inspection revealed aft green rotor blade tip cap and balance weights were missing. Large hole was found in nearby chain link fence. Caused by root end sealant material coming loose inside spar of fiberglass rotor blades and being hurled against tip covers and weights. Safety-of-flight message 222145Z Jul 83 (CH-47-83-06) was issued. □ (C series) Master caution light came on during simulated engine failure. Smoke was seen in vicinity of No. 1 engine transmission. Postflight inspection revealed oil passage pin plug had backed out of engine nose box. □ (C series) No. 1 engine PTIT rose to 800° and torque dropped to 40 percent, followed by loss of power. Caused by clogged engine flow divider restricting main fuel to fuel manifold. □ (C series) During external load operations, No. 6 main drive shaft

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	March	2	5
3rd Qtr	April	7	6	April	5	0
	May	6	2	May	8	1
	June	2	3	June	4	4
4th Qtr	July	2	2	July	5	7
	August	8	5	1-10 Aug	2	0
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	31	19

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

contacted and rubbed against underside of tunnel cover. Cause unknown.

CH-54 Class C mishap □ (A series) External load was placed on the ground. Flight engineer asked for slack in cable and released hook. Clevis on sling gear hit and damaged main rotor blade.

Observation helicopters

OH-58 Class E mishaps □ (A series) Pilot lowered collective and made descending left turn to miss some jet aircraft in his flightpath. About 2 minutes after leveling off, pilot noticed N_2 at 100 percent. Pilot began descent, and rpm rose to 105 percent. Caused by malfunction of linear actuator. □ (A series) Fuel filter light came on. Caused by corroded fuel pressure switch cannon plug. □ (A series) Engine rpm dropped to 94 percent during takeoff to hover. Power-on landing was made. Rpm was beeped up to 102 percent, and aircraft was picked up and turned into the wind. Rpm dropped to 95 percent, and aircraft was landed again. Suspect worn governor control shaft assembly. □ (A series) Aircraft had N_1 failure and N1 gauge was replaced. The next day, aircraft was flown and then landed for refueling. When pilot attempted start, N_1 gauge did not register. Caused by broken electrical wire on N_1 tachometer gauge.

Fixed wing

C-7 Class E mishaps □ Crew smelled hydraulic fumes and landed at airfield. Caused by rupture in hydraulic hose. □ When landing gear was extended for landing, right main gear indicator light came on. Visual inspection revealed gear was down and locked. Caused by corroded electrical wire.

OV-1 Class E mishaps □ (D series) Master caution and No. 1 engine fuel pressure lights came on. Caused by failure of high pressure pump and No. 1 fuel control. □ (RV-1D) Right seat hatch opened on rotation for takeoff, causing Plexiglas to break and tearing support arm assembly from bulkhead. Hatch locking device was not checked sufficiently before takeoff.

U-21 Class E mishaps □ (A series) Torque fluctuated during flight. Caused by failure of preformed packing. □ (RU-21H) Loud noise was heard and vibration was felt in airframe. Caused by failure of No. 2 inverter.

Maintenance

UH-1 Class C mishaps □ (H series) Copilot saw battery fluid coming from upper battery vent during flight. Battery was destroyed because of excessive voltage input. Main generator voltage was set too high. □ (M series) Aircraft was flying with doors open. Inadequately secured engine exhaust cover blew out of aircraft and hit tail rotor blade.

UH-1 Class E mishaps □ (H series) Master caution light came on. Water had entered transmission chip detector boot when aircraft was washed. Crew chief did not check to see that boot was drained. □ (H series) Fire warning light came on during approach. Caused by loose and dirty cannon plug. □ (V series) Master caution and segment panel lights came on, indicating hydraulic power failure. Running landing was made. Lower quick disconnect on engine deck for hydraulic mule connection backed off, allowing hydraulic fluid to leak out.

AH-1 Class E mishaps □ (S series) Lateral cyclic hardover occurred during maintenance test flight. Caused by foreign matter in No. 1 pressure line lock-out valve. □ (S series) Engine oil temperature rose during takeoff. Caused by dirty compressor section and clogged oil cooler.

CH-47 Class E mishap □ (C series) As pilot was hovering to parking area, rotorwash from his aircraft blew open No. 1 tunnel cover of nearby CH-47. Rivets holding support brace to tunnel cover were broken. Crew chief had failed to properly secure cowling before leaving aircraft unattended.

OH-58 Class E mishaps □ (A series) Pilot felt slight interruption in cyclic movement on final. After touchdown, IP felt fore and aft cyclic binding. Pilot's cyclic friction uniball had an accumulation of Teflon and dirt. □ (A series) High frequency vibration was noted in all quadrants during hover. There was no preload on tail rotor hub, causing out-of-balance condition. □ (A series) Noise was heard and TOT rose to 850° F. Bleed air fitting was disconnected from diffuser scroll.

Mishap briefs

C-7 Class E mishap □ When landing gear selector lever was placed in down position, right main gear extended abnormally fast, and there was a significant jolt and loud noise as gear reached down and locked position. The remaining gear extended normally, and aircraft was landed. Incorrectly manufactured washer was inadvertently installed on bolt. The lack of a convex contour on the washer caused a shear stress failure of the bolt at base of bolt head. Inspection of bolts on hand revealed four of six were incorrectly made.

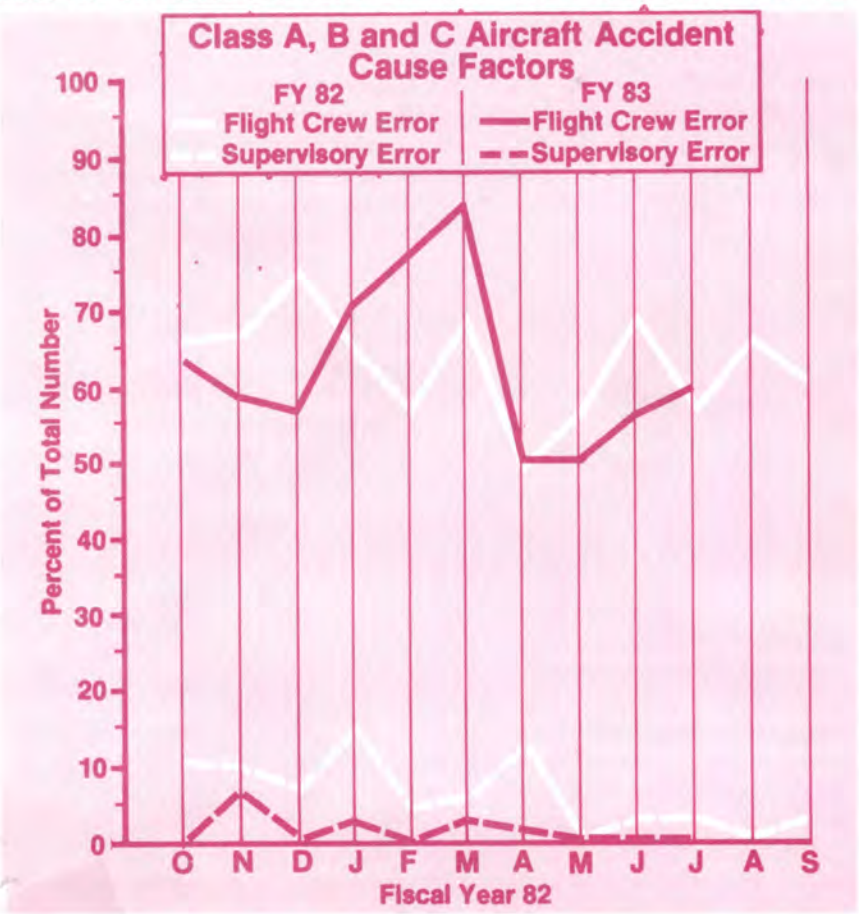
U-8 Class E mishap □ (F series) Crew was told smoke was trailing from left engine. Postflight inspection revealed loose nut on rocker arm cover oil return line, allowing return oil to be drawn into augmentor tube.

U-21 Class E mishap □ (A series) Fuel was seen siphoning from right main fuel cap during takeoff. Tension on cap was not adjusted correctly.

Messages received

• Safety-of-flight message concerning one-time inspection of CH-47C and D fiberglass rotor blade sealant installation (CH-47-83-06, 222145Z Jul 83). Summary: Three CH-47 fiberglass rotor blade tip covers have been damaged by root and sealant material coming loose inside the spar and being hurled against the cover. In one instance, the tip cover separated from the blade. In-flight loss of the tip cover causes a vibration which does not create an immediate safety-of-flight condition. However, the tip cover exits the blade at a high rate of speed and is a hazard to personnel or equipment in its path. The problem originates during manufacture when excess sealant applied at the root end oozes past a retention shield. The excess sealant sometimes forms in globules or masses inside the spar cavity. Inspection will be performed by contractor personnel. Contact: Bill Reese, AUTOVON 693-1418, commercial 314-263-1418.

• Message concerning return of unserviceable assets for UH-60 aircraft (211400Z Jul 83).



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

Notice to safety officers

To say it is important to include serial numbers of components in the Preliminary Report of Aircraft Mishap (PRAM) is a gross understatement. Tracking a failed transmission or engine without the serial number is impossible.

What about a PRAM concerning an engine problem on a twin-engine aircraft that states the ECU failed in flight? What do you do when five ECUs fail in the same day and no serial numbers, except the aircraft's, are reported? Had the engine and ECU serial numbers been reported, a quick check with the manufacturer or overhaul facility would easily identify the bad units and any additional suspect units can be quickly removed from service.

Remember, if it has a serial number, put it in the PRAM! ■

Take time for a little cooling care

"Cooling care" is what all gas turbine engines must have before shutdown to insure a long and useful life.

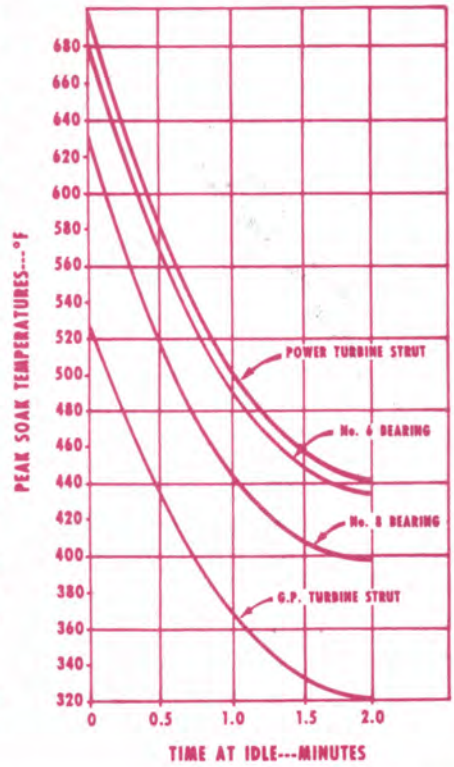
Check your engine oil temperature and exhaust gas temperature while the engine is running. There is a considerable difference between the two instrument readings. In the gas turbine engine, the compressor and power shaft support bearings are lubricated and cooled by the engine oil while the turbine wheels are being driven by the hot exhaust gas stream. Most engines use bleed air to cool the turbine blades and disk. That is why 75 percent of the air inducted into the engine is used for internal cooling. The engine oil is cooled by the oil cooler and/or the fuel heater/oil cooler and a very fast rate of flow. The lubricating oil also accounts for about 20 percent of the cooling in most engines.

When the engine is shut down, the oil pump stops and all the forced air cooling stops. This is when the temperature soak starts. Temperature soak is when the turbine blades start cooling but, at the same time, the high exhaust gas temperatures start soaking into the turbine disk and move toward the center of the engine. The power shaft, seals, and bearings that support the turbines start heating up. The oil remaining on the seals and bearings becomes overheated and is changed into coke and carbon. Both coke and carbon are very hard and will damage the smooth rotating surfaces of bearings and seals. Once these surfaces are damaged, it's downhill from there. The engine will probably be removed for metal chips in the oil or high oil consumption long before its normal life limit. Some engines have been coked so badly that the power turbine seals locked up and the power shaft would not turn when the engine was started.

The accompanying chart depicts how just 2 minutes of cooling at idle can lower the temperature of the T63-A-700 and -720 internal components. This chart is typical of all gas turbine engines. A little "care in cooling" at engine shutdown is a true mark of a professional aviator taking professional care of his equipment.

Point of contact at the Safety Center is Jack Carter, AUTOVON 558-4202/4198. ■

PEAK SOAK TEMPERATURES vs TIME AT IDLE
T63-A-700, T63-A-720



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Third quarter Class A mishap review

Eighteen Class A aircraft mishaps occurred during the third quarter of this fiscal year, compared to 15 for the third quarter of FY 82. Three of the 18 mishaps resulted in five fatalities. Fifteen of the 18 mishaps involved human error.

Following are selected synopses of the human error mishaps:

• An AH-1 instructor pilot and pilot were on a night vision goggle training mission. The IP focused his attention inside the aircraft to check radio frequencies. The front seat pilot did not tell the IP the aircraft was descending, and it hit trees and crashed.

Cause: Inadequate division of attention by IP and failure of pilot to alert IP.

Result: 1 major injury, 1 minor injury, and destroyed aircraft, at a cost of $1,426,513.

• A UH-1 standardization instructor pilot gave the pilot a simulated forced landing. When power recovery was attempted at 400 feet above the ground, the sprag clutch would not engage. The area chosen for landing at the beginning of the maneuver could not be reached. The aircraft touched down uphill on a slope in a muddy field. The skids were ripped off, and the aircraft pitched nose down and rolled to the right.

Cause: Instructor-pilot-induced rotor drive train (sprag clutch) failure and initiation of a forced landing over an unsuitable area.

Result: $219,000 in damage.

• The instructor pilot of an AH-1 initiated a simulated engine failure at 150 feet above the ground and 120 knots. The engine would not regain power, and the aircraft crashed through trees.

Cause: Failure of engine fuel control and initiation of a forced landing over an area which provided no suitable forced landing sites.

Result: 1 fatality, 1 minor injury, and destroyed aircraft, at a cost of $1,753,623.

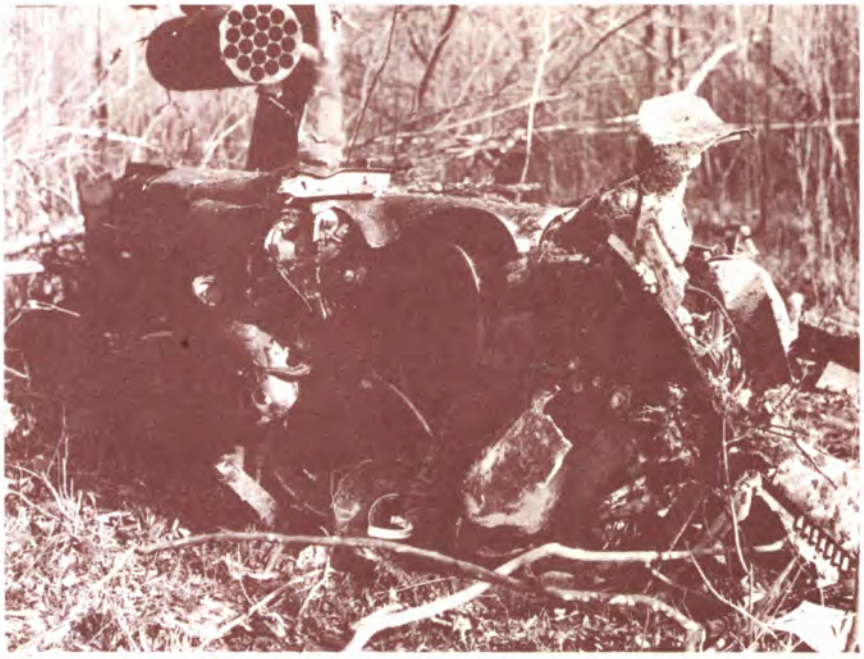
• While flying through a control zone at an altitude of 400 feet and airspeed of 80 knots, an OH-58 pilot flew his aircraft into an isolated low-hanging cloud. The pilot tried to transition to instrument flight but became spatially disoriented and lost control of the aircraft. The aircraft continued its high-speed descent until it hit trees.

Cause: Airfield tower personnel allowed aircraft to operate in a control zone in instrument meteorological conditions on a visual flight rule (VFR) flight plan and did not provide weather information to the pilot. The pilot, who had no previous actual weather flight time or documented instrument training in the OH-58, tried to maintain VFR flight in instrument conditions. Result: 1 major injury, 1 minor injury, and destroyed aircraft, at a cost of $148,712.

• A UH-1 instructor pilot gave the pilot a straight-in autorotation to a sod touchdown area. The maneuver progressed satisfactorily to a point about 25 feet above the ground where the pilot began the application of collective pitch too high to cushion his landing and allowed the aircraft to yaw. The IP took control but could not prevent the mishap.

Cause: Pilot initiated autorotative pitch pull too high, and IP was late with corrective action.

Result: Destroyed aircraft, at a cost of $922,704.



AH-1 flew into trees while IP was checking his radio frequencies.

Third quarter review

• While performing a reconnaissance mission, the pilot of an OH-58 brought his aircraft to a stable 3-foot hover and then began to hover to his left rear over rising terrain. Neither the pilot nor the onboard copilot cleared the aircraft for the rearward hover, and the left skid hit the ground and stuck in some rocks. The pilot applied power, causing the aircraft to pivot to the left around the skid. The main rotor blades hit the ground, and the aircraft rolled over.

Cause: Pilot hovered aircraft rearward without proper terrain clearance. Copilot failed to clear aircraft for rearward hover.

Result: Destroyed aircraft, at a cost of $143,782.

• Five UH-1 helicopters were supporting an Infantry airmobile operation. The air mission commander placed the mission on a weather hold—ceiling 100 feet, visibility one-half mile—but directed that the five aircraft be repositioned from their tactically dispersed parking areas to a large cleared area. The pilot of one of the aircraft, which was parked in a small clearing surrounded by trees, began a straight-up hover to about 80 feet. The aircraft entered fog and clouds. The pilot tried to transition to instrument flight but was unable to keep the aircraft from crashing.

Cause: Air mission commander directed repositioning of aircraft during instrument conditions, and the inexperienced crew became disoriented.

Result: 3 fatalities and destroyed aircraft, at a cost of $1,684,704.

• The copilot was flying an AH-1 when he noticed engine speed was fluctuating. The pilot took control and initiated a power-on landing to a level area. The aircraft landed hard at approximately 30 knots forward airspeed. It then slid for about 50 feet and hit a fence. One main rotor blade hit the forward cockpit, killing the pilot.

Cause: Suspect engine failure and failure of pilot to initiate appropriate emergency procedures for engine failure during approach. Result: 1 fatality and destroyed aircraft, at a cost of $1,753,623.

• An OH-58 pilot brought his aircraft to a hover in preparation for takeoff. As the pilot hovered rearward, his main rotor blades hit the main rotor blade of a parked OH-58. Large sections of the main rotor blades were torn from both aircraft. Control was lost and the aircraft spun and rolled left, coming to rest inverted. The aircraft was not parked in its normal parking position; normally it required rearward hover to the taxiway.

Loss of tail rotor effectiveness occurred during OH-58 training mission. IP could not recover, and aircraft crashed through trees.

The second OH-58 was parked where the accident aircraft is usually parked.

Cause: Habit transfer and inattention to task. Failure to use required ground guide.

Result: 2 major injuries, 1 minor injury, and destroyed aircraft, at a cost of $162,427.

• Four Class A mishaps occurred when OH-58 pilots operated their aircraft in a flight environment known to be conducive to loss of tail rotor effectiveness.

Result: 1 major injury, 2 minor injuries, and 4 destroyed aircraft, at a cost of $641,064.

With the seven Class A mishaps occurring during the first half of the fiscal year, the Army had 25 Class A mishaps for the three quarters. A month into the fourth quarter, five Class A mishaps have been recorded—four caused by crew error and one by a possible engine failure. Seven people died in two of these mishaps—bringing the fatality count to 19 for FY 83 through July.

Most of these mishaps would not have happened if more attention had been paid to prior planning, details, and correct performance. ■

Sprag clutch would not engage during simulated forced landing over an unsuitable area.

Selected 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 and felt stiffness in controls. Hydraulic caution light also came on. Caused by broken hydraulic line. □ (H series) Master caution and hydraulic lights came on, followed by cyclic feedback and hydraulic failure. Spring inside of check valve wore hole in valve and hydraulic tube. □ (H series) Transmission oil pressure gauge fluctuated during hover. Caused by defective pressure relief valve. □ (H series) Engine oil temperature rose during landing. Caused by carbon and metal particle buildup on filter screens. □ (H series) Transmission high temperature light came on. Caused by failure of thermostatic switch. □ (H series) Feedback was felt through cyclic during hover. Caused by defective right lateral servo. □ (H series) Engine tachometer failed during flight. Caused by defective N_2 tachometer generator. □ (H series) Antitorque pedal started to motor forward during takeoff. Caused by failure of tail rotor servo.

UH-60 Class E mishaps □ Pilot heard loud bang and felt severe vibration in airframe. Caused by failure of No. 2 input module. □ No. 1 generator and left access module lights came on. Inspection revealed wiring harness from No. 1 generator had burned, causing generator to short out.

Attack helicopters

AH-1 Class A mishap □ (S series) Aircraft crashed into trees during reconnaissance mission. Aircraft was being flown by the copilot from the front station at an altitude varying from 10 to 40 feet above the trees and an airspeed of about 35 knots. Pilot was concentrating most of his attention outside the aircraft. Pilot and copilot were injured. 8347

AH-1 Class E mishap □ (S series) Transmission oil bypass and master caution lights came on. Caused by failure of pressure switch.

Cargo helicopters

CH-47 Class C mishap □ (C series) Pilot's jettisonable door separated from aircraft at lower attaching point.

CH-47 Class E mishaps □ (A series) No. 1 engine egt indicated high and torque decreased 75 pounds. Torque was matched using normal engine trim. Aircraft landed and was refueled. IP decided to do a HIT check on engine. During the check, flight engineer told pilot that pieces of engine were blowing out of exhaust. Engine lost power turbine blades and exhaust diffuser cone. □ (C series) Crew smelled smoke after takeoff. No. 1 generator was smoking and sparks were coming from generator cooling vents. Caused by internal failure of generator. □ (C series) Pilot tried to apply brakes and flight engineer tried to operate ramp during runup. Neither system would operate. Hydraulic cooler fan screws had stripped out, causing loss of utility hydraulic pressure.

Observation helicopters

OH-6 Class E mishap □ During demonstration of autorotation, IP allowed vertical fin to hit the ground. Fin was slightly damaged.

OH-58 Class C mishaps □ (A series) Damage was found to right side of aircraft during preflight. Suspect seatbelt was left outside of aircraft during flight. □ (C series) Aircraft was leaving

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**6**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**4**
4th Qtr	July	2	2	July	**5**	**7**
	August	8	5	1-17 Aug	**2**	**0**
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**32**	**19**

* Includes 1 ground accident

** Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

the ground and accelerating forward when pilot felt a bump. Wire strike protection system dug into ground on takeoff and was damaged. □ (C series) Damage to tail rotor blade was found after maintenance test flight and compass swing. Suspect flying debris hit blade.

OH-58 Class E mishaps □ (A series) Crew saw smoke coming from overhead circuit breaker panel during hover. When circuit breakers were pulled, engine deice circuit breaker came out of console in two pieces. Inspection revealed that deice circuit breaker failed to open when wire was short circuited. □ (C series) IP pulled initial pitch too low during autorotation. Tail skid hit the ground.

Fixed wing

U-21 Class E mishaps □ (RU-21H) Four times within a week, missions had to be aborted because of fuel transfer problems in this aircraft. The first time, the No. 2 fuel flowmeter fluctuated and engine stopped. The second time, the No. 1 fuel transfer pump light came on. Fuel would not transfer. As crew was returning to base, pump began to operate. Suspect pump froze because of water in system. The third time, the No. 1 fuel transfer pump light came on. Twenty minutes later, the No. 2 fuel transfer pump light came on. The No. 1 pump then began to work. Caused by failure of one fuel gauge and incorrect adjustment of the other. The fourth time, the No. 1 fuel transfer pump light came on and the system would not function. As aircraft was descending, system began to function normally. □ (A series) Power was reduced on both engines on base leg for landing. Explosion was heard from No. 2 engine. Caused by failure of power turbine blade.

U-8 Class E mishap □ (F series) Aircraft yawed to right and oil pressure dropped. Caused by engine failure. Piston rod came through engine case below No. 4 cylinder.

OV-1 Class A mishap □ (D series) Pilot was unable to land at home base because of heavy ground fog. Pilot diverted to alternate airport and attempted one approach without success. He then diverted to another airport. During the approach, controllers reported that aircraft descended below normal glidepath and crashed. Both occupants ejected successfully, with minor injuries. Suspect fuel starvation. 8348

Maintenance

UH-1 Class C mishap □ (V series) Scored No. 3 drive shaft was seen during preflight. Four tools—speed wrench, long-nose pliers, screwdriver, and socket—were found in drive shaft area. Hole was then found in skin of tail boom underneath No. 3 hanger bearing. Aircraft had been test flown 2 days before damage was found after completion of phase maintenance. Preflight and postflight inspections at that time did not detect tools or damage.

UH-1 Class E mishaps □ (H series) N_1 speed was 66 percent at flight idle during runup. Washer on engine idle linkage was not seated correctly. □(H series) Transmission oil pressure fluctuated and caution light came on during landing. Transmission drain valve was in fully open position, and about 90 percent of the oil had drained out. Investigation revealed that the transmission oil drain tube was clogged before takeoff and maintenance personnel opened the oil drain valve in an attempt to clear the tube and then did not close the valve. □ (H series) Crew smelled burning odor. Wire to landing light was too small. Wire overheated and insulation melted. □ (H series) Pilot could get no airspeed indication during takeoff. Tee fitting was installed incorrectly.

UH-60 Class E mishaps □ No. 2 engine oil pressure dropped to caution range. Engine was brought to idle and attempt was made to fly aircraft to airfield. Aircraft could not maintain altitude and there was no place to jettison auxiliary tanks. Engine was brought back up, and aircraft landed at airfield. Engine was run 10 to 15 minutes with no oil pressure. Inspection revealed that No. 2 engine oil cap, which had been installed incorrectly, came off in flight. Engine will be changed. □ No. 1 engine oil pressure dropped to 10 psi and caution light came on. Crew chief had not secured oil cap, causing oil to leak out in flight.

AH-1 Class E mishap □ (S series) Pitch SCAS motored to cyclic full forward on final approach. Pitch SCAS channel card was out of adjustment.

Messages received

- UH-60 maintenance information message concerning expanded aft center-of-gravity limits and revision of the component overhaul/retirement life (rotor and drive system) (MIM-UH-60A-83-MEA-11, 021900Z Aug 83).
- Maintenance information message concerning revision of the "note" following paragraph 2-3B(4) of TM 55-1500-328-25 dated 3 Apr 81 (MIM-MPSD-GEN-83-01, 141545Z Apr 83).

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

Accident review: lack of planning

Synopsis

The UH-1H copilot lost left pedal control while hovering about 5 feet agl over rough terrain, with a left quartering tailwind of 20 to 30 knots. The Huey started an uncommanded right turn and continued to turn to the right as engine and rotor rpm bled off. The main rotor blades hit a tree and the aircraft crashed.

History of flight

The unit was assigned a service mission for two flights of five aircraft each to insert and extract troops in a training area. Since there were no significant changes in the weather from the previous day, the pilot-in-command (PIC) of the No. 2 aircraft in one of the flights decided to use the same performance planning data he had used the day before. Weight and balance computations were based on a DD Form 365F located in the logbook which the crew assumed was similar to the actual weight configuration.

The crews were awakened at 4 o'clock and departed for the mission a little after 6 o'clock. After making a troop insertion, the flight would shut down and wait for a call from the ground troops to continue with the mission. In between lifts, the aircraft would refuel at the hot refueling site.

During the third refueling stop, it was determined that the fuel load should be 800 pounds to provide lift capability for the aircraft and a load of six passengers. After the No. 2 aircraft was refueled, the copilot picked it up to a 5-foot hover and hovered toward the flight leader. During the hover, the copilot told the PIC that he had hit the left pedal stop. At this point, the aircraft began a slow, uncommanded turn to the right. The PIC immediately took the controls, slightly reducing collective while trying to fly out of the turn. The aircraft continued to turn right about 225 degrees as engine and rotor rpm bled off. The main rotor blades hit a 10-foot tree, and the aircraft crashed.

The PIC sustained major injuries, and the copilot and two passengers sustained abrasions.

Crewmember experience

The 29-year-old PIC had more than 700 rotary wing hours, with more than 600 in the UH-1H. The 27-year-old copilot had more than 200 rotary wing hours, most of them in the UH-1H.

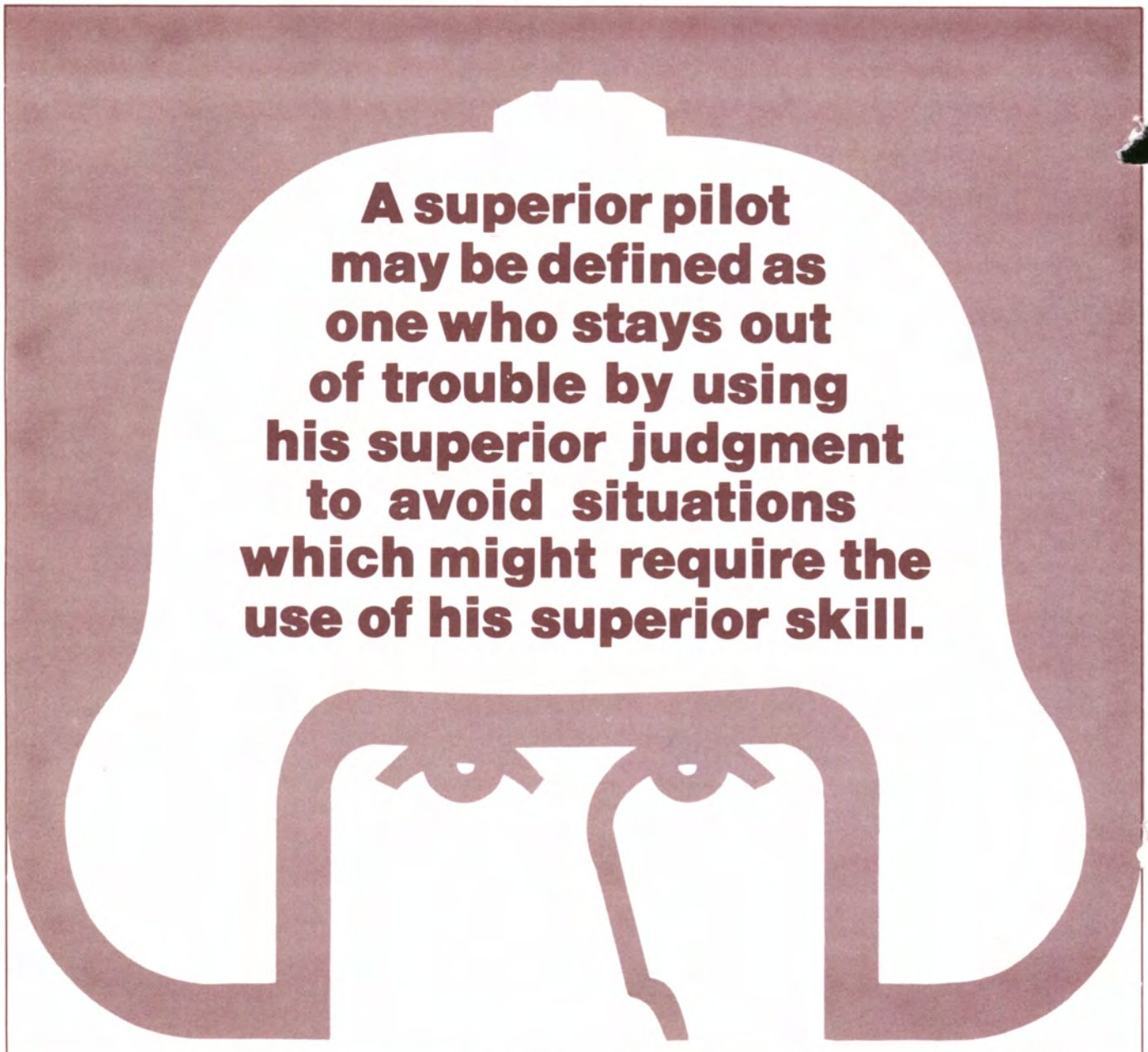
Commentary

The PIC and copilot were unaware of the critical parameters in which they were operating. They hovered their critically loaded helicopter in a downwind condition over rough terrain, causing the operating limits of the helicopter to be exceeded.

The environmental conditions at the training area, specifically an ever-changing wind speed and direction, wind shear effects, and high density altitudes, caused performance planning to be of utmost importance. The PIC did not calculate a new weight and balance form for the mission. An "on-file" copy was used which did not accurately duplicate the weight and balance of the aircraft at the time of the accident. The performance planning card (PPC) used for the flight was also based on the previous day's flight. AR 95-1 and TC 1-135 require a PPC be filled out for each flight. A PPC filled out after the accident revealed that engine power available for the flight was marginal and the aircraft did not have a safe antitorque pedal margin. The terrain characteristics, predicted power required, and marginal aircraft controllability dictated an out-of-ground-effect hover check. The crew did not perform an OGE hover during the mission.

Trained air traffic control personnel and radios were available but not used during the exercise. This resulted in a weak communication network, frequent air traffic conflicts, unresponsive range control, and unsatisfactory dissemination of significant meteorological changes.

The PIC and copilot had slept only 9 hours in the 48 hours before the accident. They were both assigned major additional duties that occupied much of their nonflying duty day and reduced their rest periods. This may not have directly contributed to the accident, but it could have resulted in a degraded level of performance. During the same period, the air mission commander was flying consecutive day and night missions with inadequate rest periods. ■



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Keeping the record straight

All of you involved in the maintenance of aircraft and the keeping of the records know that you have to fill out a seemingly endless volume of paperwork on aircraft. This gets to be a very tedious and boring job at times. But do you know how very important these records are to flight safety?

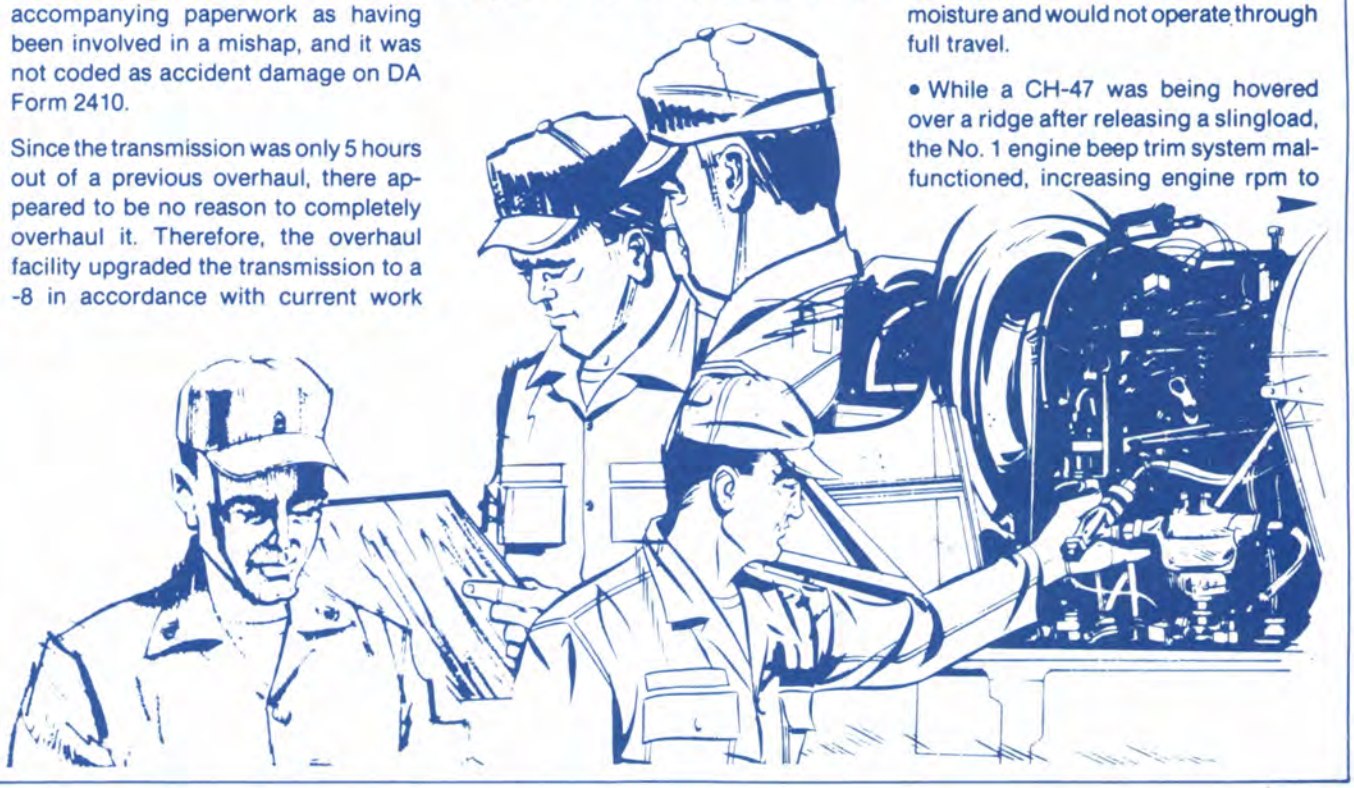
As remote as it may seem, failure to maintain accurate records has resulted in serious mishaps. About 3 years ago, a combining transmission was removed from a CH-47 which had been involved in a ground mishap. The transmission was sent to an overhaul facility through normal supply channels. Unfortunately, the transmission was not identified on the historical record or any of the accompanying paperwork as having been involved in a mishap, and it was not coded as accident damage on DA Form 2410.

Since the transmission was only 5 hours out of a previous overhaul, there appeared to be no reason to completely overhaul it. Therefore, the overhaul facility upgraded the transmission to a -8 in accordance with current work orders, completed a functional operational check, and sent the transmission back to the field where it was installed in another CH-47—with a broken bolt in the phasing lock handle. The crew was lucky that the bolt failed, the transmission dephased, and the main rotor blades meshed during a ground run maintenance operational check instead of during a flight. The aft transmission of the aircraft involved in the first mishap was later found in another aircraft and removed before a mishap occurred.

While investigating aircraft mishaps, the Safety Center often finds record-keeping discrepancies; and we learn of others through Preliminary Reports of Aircraft Mishaps. Sometimes, these discrepancies did not contribute to the mishap, but in many cases they could have and sometimes did.

• An OH-58C crashed when the fuel control and/or governor malfunctioned because of incorrect internal adjustment and lubrication, causing a decrease in engine and main rotor rpm and a resultant loss of tail rotor effectiveness. The aircraft was being flown in a red X condition. A month before the mishap, the following deficiency was entered on DA Form 2408-13: "N_2 at max governor 100%." The deficiency was not assigned a status symbol, was not resolved by any recorded maintenance action, and was not carried forward to the next day's form. Teardown analysis revealed that the governor linear actuator was contaminated with moisture and would not operate through full travel.

• While a CH-47 was being hovered over a ridge after releasing a slingload, the No. 1 engine beep trim system malfunctioned, increasing engine rpm to



Keeping the record straight

the point that rotor rpm increased to approximately 242. Beep trim decrease was not effective, and the aircraft began to lose rotor rpm and settle. The pilot turned toward a forced landing site. On touchdown, rotor system unloading allowed rotor rpm to surge again. The aircraft lifted off, pitching nose down. The forward rotary wings struck and killed a soldier and then damaged the upper fuselage of the aircraft.

The system malfunctioned because the unit electrician incorrectly installed the pilot's No. 1 engine beep trim switch. The unit maintenance officer did not place the aircraft on a red X status for a previous engine trim malfunction or during the switch replacement. As a result, the switch replacement was not given a technical inspection nor was a maintenance operational check done.

• Several bolts connecting the diffuser and combustion sections of a UH-1 were rusted. When the bolts were replaced, the starting fuel hose assembly had to be disconnected from the check filter valve. This was not documented in the aircraft records. Therefore, the work was not checked by a technical inspector. The aircraft was then flown on a mission. On the next attempt to start the aircraft, a nut that attaches the fuel hose assembly to the check filter valve on the top right side of the engine backed off. Fuel sprayed over the top and both sides of the engine.

• The lower rescue hatch door separated from a CH-47 during flight, damaging the aircraft skin. The records (DA Form 2408-13 and -14) showed that the aircraft was airworthy and suitable for the mission. When the crew chief pulled his daily inspection the morning of the flight, he noticed that the supporting rod for the rescue hatch door was broken but had apparently been repaired with safety wire. He decided to say that the aircraft was airworthy because it had already flown several days with the rod safetied as it was, and he expected it to hold. Therefore, he did not write up the discrepancy, costing the Army $10,505.

• A UH-60 crashed into trees while returning to base from a training mission. The cause of the accident could not be definitely determined, but teardown analysis revealed no materiel failures. Although they did not contribute to the accident, numerous errors were found in the aircraft maintenance records. One such error involved an entry on the DA Form 2408-13 concerning the intermediate transmission oil segment light. The entry was not given a status symbol, was not carried forward to the next day's -13, and was not transcribed to the DA Form 2408-14. The entry simply disappeared with no record of the corrective action. The aircraft was also unknowingly allowed to overfly a required main rotor blade spar pressure inspection.

While one minor error in recordkeeping may seem insignificant and easily corrected during routine audits, errors should never be allowed to compound into an accumulation of faulty data that could combine into a potentially dangerous condition.

Keeping accurate records requires a concentrated effort on the part of mechanics, technical inspectors, supervisors, ASOs, and maintenance officers. It is important that the people keeping the records realize that a seemingly insignificant error can create a life or death situation for aircrews. A recordkeeping error is as negligent and as potentially hazardous as the negligence of those who fail to safety a nut or who willfully violate established standards and procedures.

Although paperwork may seem like an unimportant and certainly not very glamorous part of aviation, safety depends on it. ■

Rules for quick success . . . and long range disaster

1. If you make a mistake that results in a potentially hazardous incident, **don't** report it. So long as **you've** learned **your** lesson that's all that matters.

2. Ridicule others for their reported mistakes. That's the best way to insure **they** learn **their** lessons.

3. When you experience a problem that tests your skill or judgment, keep it to yourself unless, of course, it makes a good "there I was" bar story.

4. Wait until just prior to your annual proficiency examinations to review flying manuals, etc. Don't waste time during the rest of the year—you've got more important things to do.

5. Let those responsible look after problems or deficiencies outside **your** area of responsibility.

6. Don't question accepted operating procedures. If you're **sure** there's a better way, experiment until you find the way that's best for you.

7. When in doubt, remain silent and look intelligent. If it's important enough, others are sure to ask questions.

8. Don't tolerate the conflicting views and discontent of others. If they can't understand the proper way of doing things, that's their problem.

9. Be success-oriented. Don't let personal problems, minor illnesses, lack of proficiency, or inadequate resources stand between you and mission accomplishment.

10. Lastly, do everything you can to make others aware that you have the "right stuff." No one will dare question your credibility and you'll be sure to reap your due rewards—sooner or later. ■

—from FLIGHT COMMENT

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Aircraft was at 50-foot hover. Pilot decided to land and wait for weather to clear. As descending right turn was made, both windshields began to fog. Bleed air was turned on. About 10 feet agl, pilot increased power. Aircraft did not respond to power input and settled, hitting the ground hard. Skids were spread and pilot's greenhouse, bottom wire cutter, and FM antenna were broken. □ (H series) As rpm was being increased during engine runup, loud bang was heard from engine compartment. Rpm increased rapidly to 6900. Power turbine wheels disintegrated and scattered debris over rear of aircraft, damaging tail rotor blades, tail rotor drive shaft, and drive shaft cover. □ (H series) As aircraft was landing, rotorwash blew a camper shell off of a civilian pickup truck parked near heliport. The shell dropped onto a parked automobile. Although the vehicles were parked outside the helicopter landing area, they were very close to the outer limits of the pad. □ (V series) As aircraft was hovering in tight landing zone at night, main rotor blade hit blade of parked aircraft.

UH-1 Class E mishaps □ (H series) N_2 tachometer generator failed during hover. Caused by sheared tachometer generator drive shaft. □ (H series) Feedback was felt in cyclic control during flight. Caused by failure of irreversible valve. □ (H series) Fuel boost pump light came on. Caused by defective boost pump. □ (H series) As jumper was exiting aircraft, his web gear caught on eyebolt used for attaching ground handling wheel to skid. Jumper stayed attached to skid while pilot brought aircraft to hover. Jumper was then disconnected from eyebolt. Eyebolt was taped but did not have padding. □ (H series) Loud whining sound was heard from transmission compartment, followed by illumination of master caution and hydraulic pressure lights. Caused by hole in hydraulic line. □ (H series) Transmission hot light came on. Caused by pressure relief valve failing in closed position. □ (V series) Crew heard three banging sounds and aircraft pitched up and left. Caused by separation of skin on trailing edge of main rotor blade. □ (H series) Hose on CS canister seal broke, disbursing gas inside cockpit and cargo area. Crew and passengers were wearing protective masks. Copilot's mask did not adequately seal against his face, allowing gas to enter mask. Helmet head band pushing against mask facepiece caused mask to not seal against copilot's face.

UH-60 Class C mishap □ Main rotor blade hit tree during landing. Two main rotor tip caps were damaged.

UH-60 Class E mishaps □ IP noticed different feel in tail wheel during landing. Postflight inspection revealed upper strut assembly casing was split along vertical seam and around upper seam. □ Loud noise was heard from rear of aircraft during shutdown. Crew chief saw fireball in APU exhaust stack. APU compressor section came apart, causing failure of APU.

Attack helicopters

AH-1 Class C mishap □ (S series) Both external stores pods jettisoned during runup. Pods cracked when they hit the ground.

AH-1 Class E mishaps □ (S series) Crew heard muffled thump and felt feedback in controls during takeoff. Caused by failure of mast bearings. □ (S series) Pilot heard low rpm audio. Caused by failure of rotor tachometer generator shaft. □ (S series) Transmission oil pressure gauge indicated zero and transmission oil pressure light came on. Caused by failure of pressure switch.

Cargo helicopters

CH-47 Class C mishap □ (D series) Aircraft was hovering toward landing area on ramp where rotor blades were to be loaded. As aircraft approached the area, blade container lid was blown off and flew into parked UH-1, damaging main rotor blade, synchronized elevator, and tail boom of UH-1.

CH-47 Class E mishaps □ (C series) Master caution and transmission chip detector lights came on. Caused by broken wire on C box chip detector. □ (C series) Crew was hauling external loads. After the fourth or fifth load, flight engineer grabbed the chocks, threw them inside the aircraft, and proceeded to raise the ramp. The chocks slid and one of them was pinned between a hard point and the ramp. The ramp was crushed by the chock. □ (C series) No. 1 engine failed and aircraft began to descend rapidly. Based on performance planning, pilot was aware he did not have single-engine capability and jettisoned external load. Cause of engine failure is unknown.

CH-54 Class B mishap □ (B series) While ground taxiing under control of ground guide, pilot taxied too close to utility pole. Main rotor blades hit pole. Flying debris caused damage to a parked CH-54. 8349

Observation helicopters

OH-6 Class E mishap □ Noise was heard and smoke was seen coming from passenger/cargo compartment. Drain assembly had cracked and insulation foam struck oil cooler fan blades.

OH-58 Class C mishap □ (A series) Engine low rpm audio activated during left pedal turn. While checking engine response, IP allowed aircraft to hit the ground, damaging aft cross tube.

OH-58 Class E mishaps □ (A series) Master caution and fuel boost lights came on during takeoff. Caused by deteriorated boost pump switch. □ (A series) Pilot noticed that engine power was bleeding off during takeoff. Power available was sufficient to maintain 500 feet agl at 70 knots. Landing was made at airfield. Maintenance inspection revealed no systems malfunctions or failure. □ (C series) Rotor rpm decreased during hover. Caused by failure of power turbine governor.

Training helicopters

TH-55 Class C mishap □ Student pilot was on second approach of his first supervised solo flight. Approach was terminated at a 25-foot hover over the lane. Student pilot inadvertently activated antioverspeed device and lost control of aircraft. Aircraft crashed and came to rest on left side.

TH-55 Class E mishap □ Aircraft would not maintain power for hover and engine ran rough. Caused by failure of fuel servo.

Fixed wing

U-21 Class E mishaps □ (RU-21H) Crew noticed smoke in cabin compartment and landed. Wet cargo had been stored and secured on top of a power cable, causing short in cable. □ (A series) Right nacelle fuel cap started siphoning fuel during climb. Cap was not seated correctly.

U-8 Class C mishap □ (F series) Left inboard engine cowling separated from aircraft during takeoff. The four retaining fasteners were not secured correctly. Fasteners should have been secured during preflight.

U-3 Class E mishap □ (B series) Right engine was switched from auxiliary tank fuel to main tank fuel. About 5 minutes later, left engine was switched from auxiliary to main. Shortly afterward, right engine began to run rough. Fuel flow was low and egt was fluctuating. Mixture control was very sensitive, with less than three-fourths-inch travel between rich and idle cutoff. Boost pump application and induction air application made no difference. Left engine then began to run rough. Aircraft lost altitude but was controllable. As aircraft was landed, while reducing power for touchdown, rpm increased dramatically. Suspect water contamination of fuel.

Maintenance

UH-1 Class E mishaps □ (H series) Postflight inspection revealed damage to drive shaft cover. Further inspection revealed damage to No. 4 drive shaft, aft drive shaft cover, coupling clamps, and 42-degree gearbox cover. Screwdriver was found under drive shaft cover near No. 4 hanger bearing. □ (H series) Crew heard loud banging noise from engine and felt vibration during climb-out. Bleed band actuator was out of adjustment. □ (H series) Hydraulic pressure light came on. Caused by loose cannon plug. □ (H series) Pilot heard grinding noise during takeoff.

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	November	2	2
	December	4	6	December	0	0
2nd Qtr	January	4	1	January	1	0
	February	3	2	February	0	0
	March	5	3	March	2	5
3rd Qtr	April	7	6	April	6	0
	May	6	2	May	8	1
	June	2	3	June	4	4
4th Qtr	July	2	2	July	5	7
	August	8	5	1-24 Aug	2	0
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	32	19

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

The instructor pilot... good old boy or professional

How you perceive yourself as an instructor pilot may not be the way others see you. Most of us consider ourselves capable of meeting our instructor pilot responsibilities and have the confidence and ability to meet any contingency that might arise in the performance of our duties.

There are a few of our breed who claim additional attributes such as being suave, debonair, articulate, and definitely a cut above the average Army aviator. You've met the type; he always sticks out in a crowd. His Nomex is always new-looking and freshly pressed, while the rest of the crowd looks rag-tag, rumpled, and wrinkled. There's a suspicious quality in the fit that makes one believe that his flight suit has been form-fitted while everyone else appears to have been suited up by Omar the tent-maker.

Military appearance is not necessarily the sole criteria for evaluating the unit IP. True, at least initially, a well-dressed individual with brightly polished boots creates a more positive attitude than one whose Nomex is rumpled and boots are scuffed. Don't be fooled! The creases and polished boots, while commendable, may not tell the full story. We must look beyond the surface glitter and smudges to find the real professional. For example, when did you last keep a shoe shine intact while conducting a thorough preflight?

The instructor pilot will not look upon his position as a status symbol. He has the confidence and ability mentioned earlier and can be counted on to deliver on schedule. He can do so because he has a positive outlook toward his job. He knows what kind of performance is expected and what his limitations are, and he has set limits to maneuvers beyond which he will not allow the aviator undergoing training to deviate. This professional will tolerate aviator shortcomings and allow continuation

of a procedure to a predetermined level, but will not permit further degradation of the maneuver. He knows that continuation under such circumstances greatly increases the accident potential, that the situation is embarrassing to the aviator undergoing training, and that the learning process has been adversely affected.

The responsibilities of the IP are too great to allow shortcuts or deviations from established procedures and standards. Some of the following situations are typical of a nonprofessional attitude toward instructional duties:

- Not having the aviator fill out a performance planning card because "we will stay in the local area."
- Not knowing the conditions, standards, and description of tasks outlined in his aircraft ATM.
- Telling how bad the ATM is because he doesn't like it.
- Permitting an aviator to pass a checkride when the aviator's performance was below the standards described in the ATM.

Of course, many other nonprofessional stunts are performed daily in the aviation community. If you are one of the instructors involved in such observations, then the time is right for some serious self-evaluation and corrective action.

The professional instructor's paramount interest should be imparting knowledge to his unit's aviators. Of equal importance to the teaching/learning process is the instructor's outlook toward the performance of the aviator and thorough evaluation of that performance. This is where we separate the "professional" from the "good old boy." The professional instructor pilot is like Flip Wilson's Geraldine, "What you see is what you get." If he sees an unsatisfactory performance, he declares it to be unsatisfactory without equivocation. He should not pass the aviator hoping that the aviator will improve in the future. The periodic checkride is not the time to discover that the aviator cannot perform as expected. Furthermore, the aviator is entitled to know how he is performing. The instructor's analysis of the aviator's work, followed by an honest and constructive critique, will do much to keep him informed. This timely feedback enhances the learning process.

The "good old boy" syndrome must be made to disappear from the instructor pilot's ranks if we are to maintain Army aviators' proficiency at a high level, and expect them to perform effectively and safely "above the best." ■

—from STACOM

Mishap briefs

Hydraulic light came on and moderate control feedback was felt. Running landing was made. Incorrectly installed hydraulic lines caused chafing against control tube and failure of line and control tube.

AH-1 Class E mishaps □ (S series) Fuel quantity gauge stuck at 1,500 pounds during fuel consumption check. Caused by loose cannon plug to fuel gauge. □ (S series) Tail rotor pedals motored during hover. Yaw channel SCAS card was not adjusted correctly. □ (S series) Pilot experienced SCAS hardover in pitch channel during flight. Postflight inspection revealed pylon transducer was worn and pitch and roll cards were out of adjustment. □ (S series) Transmission oil temperature rose to 110° C. and segment light came on during takeoff. Engine oil had been flushed prior to flight and transmission oil from oil cooler was also inadvertently drained. Oil in transmission showed full on preflight, but it was 9 pints low on landing.

Messages received

• Safety-of-flight technical message concerning one-time inspection of CH-47C and D fiberglass rotor blade sealant installation (CH-47-83-07, 111517Z Aug 83). Summary: This message provides all addressees with the schedules of fiberglass rotor blade inspection teams and information concerning shipment of new blades from the contractor. Contact: Bill Reese, AUTOVON 693-1418, commercial 314-263-1418.

• Safety-of-use message concerning one-time inspection of all tiedown adjusters (111900Z Aug 83). Tiedown adjusters, P/N 42189-10, with manufacturer's code 31272 stamped on the side of the adjuster, will be removed from all aircraft in the Army.

• CH-54 maintenance information message concerning caution advisory panel operational check (airframe system) (MIM-CH-54-83-MEC-02, 111515Z Aug 83).

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

TM changes

Change 18, dated 30 June 83, to TM 55-1520-214-23 for OH-6A helicopters, has been released.

ALSE bits and pieces

• If you've ordered sunscreen lotion and receive something labeled aminodenzoic acid, don't send it back. Aminodenzoic acid is a pharmaceutical term for sunscreen lotion or cream. Use it as directed.

• Water purification tablets are not to be opened for inspection locally. Fort Detrick, Maryland, will issue medical bulletins on inspected lots that did not pass. The wax seal on the bottle is not to be broken or removed.

Point of contact: Jim Angelos, TSARCOM ALSE, AUTOVON 693-3112/3114. ■

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Accident review: failure to plan

Synopsis

A UH-1H crew was on a service mission in mountainous terrain. During a low approach at or below an airspeed of 20 knots and an altitude of approximately 75 feet above the ground, engine and rotor rpm began to bleed off. The Huey made a descending turn to the right and crashed.

History of flight

Three UH-1H aircraft and crews were involved in dropping hay to sheep stranded in heavy snow in a mountainous area. After flying about an hour and dropping hay to some of the sheep, the pilot of one of the aircraft directed a crew change be made. The aircraft was landed and the copilot got out. Another aviator, who was not qualified in the UH-1H, took over the copilot duties. The aircraft was refueled with 138 gallons of JP-4, making a total of 1,080 pounds of fuel on board.

The crew, consisting of the pilot, copilot, and crew chief, flew to a road intersection on a ridge line and resumed flying hay to the sheep. Two loads of hay were dropped. A third load (21 bales weighing from 60 to 90 pounds each) and a civilian familiar with the area were then picked up and flown to the east side of the ridge line where some sheep were stranded at the bottom of a box canyon.

The pilot began an approach from east to west into the mouth of the canyon. As he approached a tree line where the sheep were located, engine and rotor rpm began to decay and the rpm audio and warning light activated. The aircraft was at an altitude of 75 feet agl and an airspeed of approximately 20 knots. The pilot was unable to regain engine and rotor rpm. The aircraft began a descending turn to the right and crashed in a clearing in 3 feet of snow, coming to rest upright.

All of the occupants exited the aircraft without assistance through the normal exits except the crew chief, who sustained only minor injuries. Some of the hay bales had shifted and pinned him in the aircraft.

There were no survival radios or cold weather survival equipment on board the aircraft. The crew used pen flares and the aircraft radios to direct search aircraft to the crash site. Cold weather gear was air dropped, and the accident victims spent the night with the aircraft and were rescued the next morning.

Crewmember experience

The 39-year-old pilot had more than 700 rotary wing hours, with almost 400 in the UH-1H. The 36-year-old copilot had about 60 rotary wing hours—3 in the UH-1H.

Commentary

The pilot did not prepare a performance planning card for the mission and was therefore unaware of power requirements versus power available. As airspeed was reduced below that required to maintain effective translational lift, power required for flight exceeded power available. The pilot did not anticipate or properly consider the effects of low airspeed, high gross weight, and high altitude on aircraft performance.

Neither the pilot nor the copilot was fully qualified for the mission. The pilot, who had not received the necessary mountain training required by his facility's SOP, was confident that he could complete the mission even though he had only the assistance of an inexperienced pilot who was not qualified in the UH-1H.

The aircrew participated in the mission in mountainous terrain during extreme weather conditions without adequate survival and emergency communications equipment in the aircraft. The lack of this equipment did not severely hamper survival of the downed aircrew in this case, but it could have under slightly different conditions. ■

Good, better, best

A golfer was once quoted as saying, "The older I get, the better I used to be." To those aircrewmembers who are also golf enthusiasts, there is an understandable and acceptable degree of humor in such a statement. However, an aircrewmember speaking of his flying ability would not be greeted with the same accord.

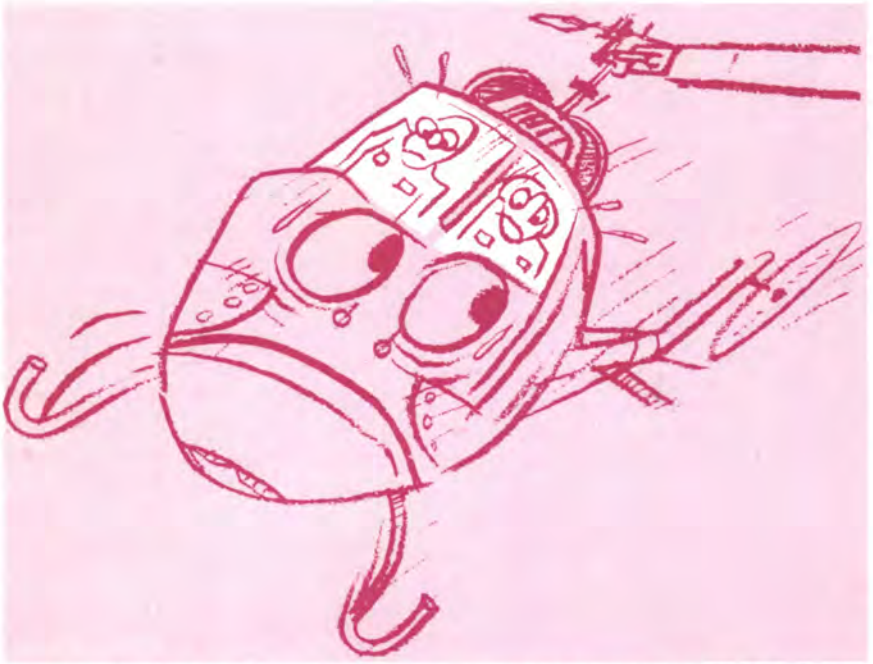
As aircrewmembers, we should always be looking for techniques to improve our particular skills and, ultimately, provide a safer arena for all.

A technique I would like to share is related to emergency procedures. The one emergency procedure practiced that gives more gray hairs to rotary wing instructor pilots (IPs) than any other is hydraulics/boost-off. The thing IPs dislike most (about any emergency procedure) is not knowing how far "behind" the aircraft the individual is until it's too late, making the recovery a most stimulating and colorful (pink) event.

The technique suggested is to go-up "private" on the intercom selector (ICS) once established on final. This offers several advantages: The individual receiving the training does not have to worry about depressing the intercom switch to speak, the IP does not have to worry about searching for the floor mike to speak (or grab the cyclic), and scanners/observers realizing a potentially hazardous condition are free to "call it out."

The major advantage goes to the IP, who can place his feet in a position to recover without the concern of depressing the floor mike. Moreover, the IP can determine earlier if the individual is experiencing any unusual tension just by listening to (pardon the expression) "grunts and groans."

Consider this hypothetical case: You are the IP and the individual you are



giving instruction to has just turned final for hydraulics/boost-off. He announces, "Let's all go-up private." So far the approach looks good. All parameters were met as the approach was initiated (heading, altitude, airspeed). Nearing the point of intended touchdown, the nose of the aircraft begins to move left of center, then right, then left again. Because you (the IP) are on "private," you can hear the individual really working at getting the aircraft down. But he hasn't said anything or indicated any need for assistance (enter, stage right, the pilot Ego). Ego may very well be **the** leading cause for mishaps during training. Your attention is drawn even more closely now to the "grunts and groans" as you near the ground and anticipate the use of collective for cushioning. At that very instant you hear those famous two words golfers use after missing a 2-foot putt: "Oh, !?#*." You come on the controls, recover, and take the next few minutes to critique the maneuver (and allow your heart to stop the road race it has established with rotor rpm's). You had the advantage because you could see and **hear** the situation developing.

To reiterate, this technique can be used for all emergency procedures. Hydraulics/boost-off was chosen and emphasized because safety is a critical factor throughout this maneuver.

To complement the above technique it is also suggested that only the IP and observers monitor tower frequencies during the practice of emergency procedures (especially hydraulics/boost-off). This will contribute directly to minimizing distractions of the individual performing the maneuver.

By suggesting this technique, I make no claim to originality. It is a technique acquired during training and suggested with the intent of contributing to flight safety. How does the saying go? "Good, better, best; don't be satisfied 'till your 'good' is 'better' and your 'better' is 'best.'" ■

—Lieutenant Tom Mira
Unit FSO
George AFB, California

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap □ (V series) Copilot noticed decrease in engine rpm and tried to increase rpm by placing governor increase-decrease switch in increase position. Engine rpm decreased rapidly. Pilot took the controls and placed aircraft in autorotation by decreasing collective pitch control. Pilot applied collective pitch to clear a tree line, resulting in low rotor rpm at touchdown. Aircraft slid about 137 feet after touchdown. Main rotor blade severed tail boom and chin bubble was broken. Caused by engine failure. 8350

UH-1 Class C mishaps □ (H series) As IP started a turn during terrain flight, rotor blades hit top of tree, damaging underside of both blades. □ (H series) Right cargo door separated from aircraft during climbout. Aircraft was being flown with cargo doors open. □ (H series) As pilot picked aircraft up to a hover, tail drifted to right. Pilot heard noise and landed. Tree branch had pushed FM antenna into tail rotor, causing damage to one tail rotor blade. □ (H series) Main rotor blades hit top of tree as pilot was hovering to parking area. Both blades were damaged.

UH-1 Class E mishaps □ (H series) Engine fuel pump light came on. Pilot decided to continue flight to an airfield despite the availability of suitable landing areas. Illumination of light was caused by broken cannon plug on engine fuel pressure switch. Pilot did not follow prescribed emergency procedures when he did not land immediately. □ (H series) Pilot heard high frequency noise, and master caution and hydraulic lights came on. Failure of hydraulic tube caused loss of hydraulic oil. □ (H series) Transmission oil pressure indicated zero and transmission oil pressure light came on. Main transmission oil line had closed at quick disconnect, causing pressure to back up and damage cuno filter and allow oil to be blown out through vents. □ (H series) Vertical vibration and vibration in main rotor system were caused by worn rod end bearing. □ (H series) Loud banging noises were heard from engine during runup. Caused by failure of fuel control. □ (H series) Pilot noticed lack of tail rotor authority during takeoff to hover. Tail rotor control slider assembly was worn, causing binding. □ (H series) Crew smelled strong fuel odor in aircraft and landed. Fuel vent line had ruptured, leaking fuel into pylon area.

UH-60 Class E mishaps □ As aircraft was taking off with nine troops on board, one of the troops pulled the right cargo door emergency exit window release handle, jettisoning the rear window. The forward window turned sideways in the cargo door and was pulled into the aircraft by the crew chief. □ Pilot felt severe vibration during takeoff. Bushing for antiflap assembly on main rotor blade caused binding on antiflap, resulting in out-of-track main rotor blade. □ While aircraft was being hovered rearward, pilot allowed stabilator to hit the ground.

Attack helicopters

AH-1 Class E mishaps □ (S series) Pitch SCAS hardover occurred as aircraft was hovering. Pitch SCAS card was out of tolerance and could not be adjusted into tolerance. □ (S series) Copilot noticed lead aircraft of a flight of two turning left and converging into his flight path. Copilot tuned left abruptly and applied excessive collective, resulting in overtorque of 107 percent. □ (S series) Fire light came on during flight. Caused by broken wire on fire detector sensing element connector. □ (S series) Engine oil pressure and

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**6**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**4**
4th Qtr	July	2	2	July	**5**	**7**
	August	8	5	August	**5**	**3**
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**35**	**22**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

engine oil temperature increased. Caused by failure of pressure transducer. ☐ (S series) As aircraft was being hot rearmed, piece of heavy-gauge plastic being used as a protective cover for rockets came loose and floated through main rotor system.

Cargo helicopters

CH-47 Class E mishaps ☐ (B series) On final approach to LZ, pilot pressed control centering button and felt strong resistance when trying to move controls. When button was released, controls moved freely. Caused by failure of control centering switch. ☐ (A series) Utility pressure began dropping, and crew noticed spray of hydraulic fluid on rearview mirror. Entire aircraft filled with a mist as crew landed to nearest suitable area. Loss of fluid was caused by cracked utility cooler fan tube. ☐ (B series) Right nosebox pressure indicated 100 psi during flight. Caused by failure of pressure transducer.

Observation helicopters

OH-6 Class C mishap ☐ Pilot heard banging sounds during flight. Postflight inspection revealed that ADF sensing antenna was missing and two main rotor blades were dented.

OH-6 Class E mishap ☐ Pilot smelled hot oil and saw mist of fluid in cockpit during takeoff. When aircraft was landed, oil was seen behind instrument panel and all over the chin bubbles. Plastic line that transports oil to torquemeter failed at connection on back of torquemeter, and approximatey 1 pint of engine oil was sprayed about the cockpit.

OH-58 Class E mishaps ☐ (A series) Master caution and hydraulic lights came on. Caused by failure of hydraulic switch. ☐ (A series) Engine lost power when aircraft was picked up to a hover. Pilot landed and IP took the controls. Seconds after aircraft was picked up, power was partially lost. IP told pilot to get out so he could do another hover check to try to determine the extent of the power loss by himself. Two or three seconds after takeoff, engine quit. Postflight inspection revealed fuel valve handle was in off position. Pilot failed to check overhead switches and circuit breakers during preflight. IP did not notice incorrect position of handle. ☐ (A series) Three attempts were made to start the aircraft. After the first two attempts, battery was changed and another attempt was made unsuccessfully. Maintenance was then called. Dirty fuel nozzle did not allow fuel flow. ☐ (A series) Pilot noticed feedback in cyclic and collective. Hydraulic reservoir was low on fluid, causing hydraulic pump to cavitate.

Fixed wing

OV-1 Class E mishaps ☐ (D series) Right main landing gear indicator showed unsafe gear condition during landing. Caused by failure of downlock switch. ☐ (D series) No. 2 engine oil temperature light indicated 100° C. Engine oil cooler was found to be partially obstructed, reducing oil flow and allowing oil temperature to approach upper limits in all flight ranges.

U-21 Class C mishap ☐ (A series) As aircraft was being taxied to hangar after full-flap landing, smoke was seen in passenger compartment. Flap motor was damaged.

U-21 Class E mishaps ☐ (A series) Fuel was seen siphoning from left nacelle filler cap during flight. Fuel cap was seated incorrectly. ☐ (A series) No. 1 engine exploded during climb after takeoff. Pilot returned to airfield and landed. ☐ (RU-21H) No. 2 engine instrument gauges fluctuated. Caused by failure of fuel control.

Maintenance

UH-1 Class E mishaps ☐ (H series) After aircraft was picked up to a hover, hydraulic oil was seen on the ground. Preformed packing was pinched during installation. ☐ (H series) Crew chief saw hydraulic fluid leaking from aircraft during refueling operation. Caused by crimped O-ring.

CH-47 Class E mishaps ☐ (C series) No. 2 rectifier light came on during approach. No. 2 generator light then came on. Caused by loose wire terminal. ☐ (B series) No. 1 engine transmission hot light came on. Transmission chip detector had picked up a chip, but crossed wiring had caused the wrong caution light to illuminate. ☐ (C series) No. 2 SAS off light and No. 1 generator light came on during descent. Caused by incorrectly installed cannon plug.

U-21 Class E mishaps ☐ (A series) No. 1 engine oil pressure gauge fluctuated and oil pressure dropped to 60 psi. Oil was seen leaking from right side of No. 1 engine cowling door. Crew chief had not completely secured oil filler cap after taking oil samples. ☐ (D series) No. 2 engine torque gauge fluctuated. About 5 seconds later, torque and engine oil pressure gauges began to drop. No. 2 engine was secured, and aircraft was landed at airfield. Nut on pump end of hose assembly between oil pump and oil cooler was loose. Engine had just been replaced, and nut was apparently not tightened at that time.

Messages received

• Maintenance information message concerning weighing intervals of UH-60A helicopters (MIM-UH-60A-83-MEA-12, 122100Z Aug 83). Message provides Black Hawk users with information pertaining to clarification of aircraft weighing intervals.

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

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 94 □ 31 Aug 1983

Operator's Manual and Checklist update

Listed below are the effective dates of the current aircraft operator's manuals and checklists with the number and date of the latest change. Please check your weekly AG Publications Center Bulletin for subsequent changes.

Fixed Wing TM 55-1510-	Aircraft	Basic Manual	Last Change	Basic Checklist	Last Change
201-10/4	RU-8D				
	U-8D/G	3 Apr 78		Jul 78	
201-10/5	U-8F	21 Mar 78	4, 23 Nov 82	Jul 78	3, 24 Nov 82
204-10/3	OV-1B	9 Mar 79	4, 23 Mar 82	Feb 79	2, 23 Mar 82
204-10/4	OV-1C	10 Apr 79	5, 2 Apr 82	Apr 79	2, 5 Apr 82
208-10	T-42A	27 Feb 79	2, 12 May 82	Feb 79	1, 7 Jan 82
209-10	U-21A	29 Oct 82		Oct 82	
209-10-1	RU-21A/D	29 Oct 82		Sep 82	
213-10	OV-1D/RV-1D	4 Aug 78	7, 28 May 82	Nov 78	3, 12 Dec 81
214-10	RU-21B/C	28 Oct 82		Oct 82	
215-10	U-21G	29 Dec 82		Dec 82	
215-10-2	RU-21H(GR-V)	29 Jan 83		Nov 82	
216-10	U-3A/B	11 Dec 78	2, 5 Apr 82	Dec 78	1, 8 Feb 82
218-10	C-12A/C/D	7 Oct 82	1, 1 Apr 83	Oct 82	1, 1 Apr 83
TO1C-7A-1	C-7A	1 Oct 70	10, 11 Jan 80	Oct 70	13, 11 Jan 80
	T-41	31 Oct 74	2, 18 Mar 77	Oct 74	

Rotary Wing TM 55-1520-	Aircraft	Basic Manual	Last Change	Basic Checklist	Last Change
209-10	CH-47A	9 Jan 79	5, 11 Jan 83	Dec 78	3, 26 Nov 82
210-10	UH-1D/H	18 May 79	18, 18 May 83	Feb 79	6, 18 May 83
214-10	OH-6A	17 Dec 76	11, 11 Jan 82	Dec 76	4, 8 Feb 82
217-10-1	CH-54A	8 Apr 77	3, 20 Aug 82	Mar 77	2, 10 Oct 79
217-10-2	CH-54B	15 Apr 77	3, 23 Aug 82	Mar 77	3, 4 Aug 82
219-10	UH-1B	16 Jan 69	19, 28 Jul 82	Dec 68	8, 11 Apr 79
220-10	UH-1C/M	8 Sep 80	13, 9 May 83	Sep 80	3, 7 Dec 82
221-10	AH-1G	18 Mar 80	2, 5 Feb 82	Mar 80	
227-10-1	CH-47B	23 Aug 78	3, 14 Nov 80	Dec 78	3, 30 Oct 80
227-10-2	CH-47C	23 Aug 78	11, 23 Nov 82	Nov 79	4, 15 Apr 82
228-10	OH-58A	7 Apr 78	28, 6 Jul 83	Jul 78	15, 14 May 83
223-10	TH-55A	30 Sep 76	6, 25 Feb 83	Oct 76	6, 1 Dec 82
234-10	AH-1S (MOD)	17 Nov 76	14, 25 Aug 82	Nov 76	3, 30 Nov 79
235-10	OH-58C	7 Apr 78	32, 6 Jun 83	Jul 78	17, 20 May 83
236-10	AH-1S (PROD)	11 Jan 80	7, 24 Jun 83	Jan 80	4, 17 Aug 83
237-10	UH-60A	21 Mar 79	19, 14 Feb 83	Dec 78	14, 15 Feb 83

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-717 during duty hours; 558-6487 after duty hours.

Who has the answers?

When an aircraft crashes, particularly if someone is killed, it is only natural for all members of that unit to want all the facts about the crash. Understandably, aviation personnel are especially concerned about what caused the crash. This concern goes far beyond curiosity. The questions in their minds are legitimate ones, highly relevant to their own safety. Did a mechanical problem cause the crash? If so, was it caused by maintenance error? Was materiel failure involved? Is the problem peculiar to a particular aircraft? These are only a few of the many questions that come to mind. And they need to be answered.

It is usually months after an accident occurs before we can publish a detailed review of the investigation results. If the Safety Center learns that litigation is pending on a certain accident, we do not publish the details until the litigation has been completed. We also do not publish details of accidents until the original copy of the investigation report has been reviewed by all levels of the chain-of-command and has been returned to the Safety Center. However, we do publish preliminary findings of all mishaps the week after they occur.

The Safety Center often receives requests from aviation personnel for information about an accident that occurred in their unit. Some of these inquiries are made in writing; others, by phone. All basically ask one question: What caused the crash? Typical of such requests is the following (paraphrased) sent in by one concerned aviator: ". . . It's been more than 3 months since this accident occurred in our unit. As yet, we have not been given any facts about the cause. Can you give us any information?"

The need to tell unit personnel of the circumstances of a mishap is twofold: to prevent other mishaps from similar causes and to lessen any anxiety or apprehension that air, ground support, and maintenance personnel may have. The big question, then, is whom to ask.

During the on-site crash investigation, board members gather important facts. From these facts, they draw preliminary conclusions. These conclusions are then translated into findings. If, during the investigation, these findings indicate there is an immediate threat to the safety of others, the board president has the responsibility to inform the commander of the unit having the mishap, and the Safety Center commander, of the facts so that preventive measures can be taken quickly. If applicable, safety-of-flight messages are issued at this time.

When the on-site investigation is completed, the board briefs the appointing authority and the unit command group on all the preliminary findings. This is followed at a later date, usually 30 to 45 days after the investigation, by the formal written investigation report. This report includes both findings and recommended corrective actions and is reviewed and commented on by all commanders.

It is the commander, then, who has the authority to pass on—for mishap prevention purposes—the information made available by the investigators. The investigation board has no such authority. It is the **obligation of command** to disclose mishap information to unit members to the extent deemed necessary for prevention purposes. Quarterly aviation safety briefings are but one way in which commanders and aviation safety officers can disseminate the causes of mishaps and prevention measures.

So, the next time you wonder what really happened, remember that your chain-of-command is available to receive and respond to your concerns. ■

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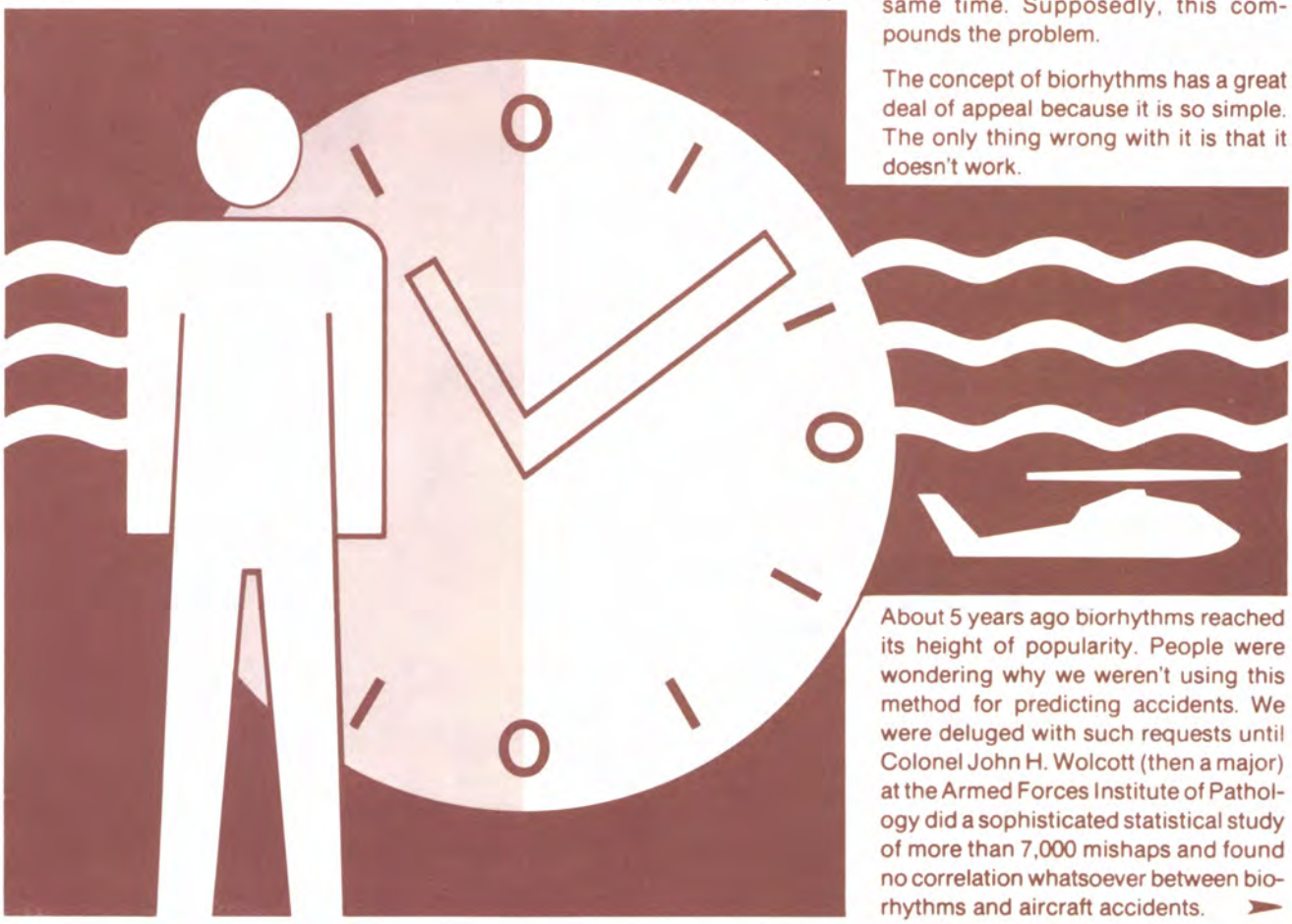
Biological rhythms

Whereas biological rhythms and biorhythms are often thought to be one and the same, the concepts are diverse and only one is applicable to mishap prevention. Both the biorhythms and biological rhythms theories are built around the fact that the human body operates in time. Changes in time result in changes in the body. The most obvious cycle is the 24-hour sleep cycle. In conjunction with this time cycle are temperature, hormonal and activity changes, among others.

Biorhythms is the name of a specific system which attempts to postulate certain changes occurring in the body on a cyclic basis. These changes are purported to begin at birth, to be immutable and to be the same for everyone. Specifically, the biorhythms theory suggests that there are three fundamental cycles: a 23-, 28-, and 33-day cycle. The 28-day cycle is associated with the lunar month (and frequently correlated to menstrual cycles). This is referred to as the emotional cycle. The original founder of the concept of biorhythms, a physician, thought he had also isolated a 23-day cycle, referred to as the physical cycle. Later it was postulated that a 33-day cycle, the mental cycle, existed. These cycles were originally studied in relation to health but, later, attempts were made at correlating cyclic fluctuations to accident proneness.

The theory is that the critical days are the points at which the sine wave cyclically crosses the baseline. Because these cycles are of varying length, they occasionally cross the baseline at the same time. Supposedly, this compounds the problem.

The concept of biorhythms has a great deal of appeal because it is so simple. The only thing wrong with it is that it doesn't work.



About 5 years ago biorhythms reached its height of popularity. People were wondering why we weren't using this method for predicting accidents. We were deluged with such requests until Colonel John H. Wolcott (then a major) at the Armed Forces Institute of Pathology did a sophisticated statistical study of more than 7,000 mishaps and found no correlation whatsoever between biorhythms and aircraft accidents. ➤

Biological rhythms

Biorhythms is a fad which has come and gone. It will undoubtedly resurface. From our standpoint at the Safety Center, biorhythms offers no possibility for use in accident prevention. Having stated that quite flatly, I should hedge a bit. If people, for any reason, can be convinced to be extra careful 4 or 5 days a month, it is bound to have a good effect.

Having disposed of biorhythms, let's now discuss biological rhythms which do, in contrast, have an effect on performance. The introduction of shift work was one of the first systematic ways of disrupting the cycle—specifically when there is a rotating shift. I guess everyone knows if you stay awake too long or get too hungry, you don't function well. These are the obvious symptoms of upsetting the biological cycle.

Considering it takes anywhere between 2 days to a couple of weeks to re-establish biochemical balances after a major change in the sleep/wake cycle, this kind of approach to work can keep the individual upset continually. All it proves is you can be productive even when uncomfortable.

Because the human body is built to travel at about 4 mph, until the development of auxiliary means of locomotion, man couldn't move far enough in one day to affect his day and night cycle. But with aviation you can travel through enough time zones to seriously upset and even reverse your sleep/wakeful cycle.

As far as the body is concerned, the effect is the same as with rotating shift work. The result is discomfort and a reduction in efficiency. The combination of these symptoms results in increased errors and sometimes accidents.

A case in point would be the F-100 that made a steep right turn at low altitude following a bomb delivery. Repeated radio calls to "pull up" went unheeded and the F-100 continued its turn until ground impact. The pilot initiated ejection outside the envelope and was fatally injured. The pilot's lack of adequate crew rest was subsequently found to be a contributing factor.

Another example is the crash of a C-130 which had been flying a low-level tactical exercise mission. One of the mishap investigation board's findings was that the crew's fly-night, sleep-day cycle was interrupted by a daytime mission the day prior to the mishap. Also, the pilot had not complied with crew rest regulations and was tired when he went to fly. The mishap mission was a night predawn flight when the crewmembers were at the low points in their circadian performance cycles.

A practical implication of circadian shifts is that the potential for accidents has increased in a very practical way, in contrast with the hypothetical cycles envisioned by the biorhythm proponents.

There have been numerous studies of circadian rhythms and the general conclusion is that while the individual may be uncomfortable and somewhat inefficient, that the demands of the situation are ordinarily such that accident-free performance can still be accomplished. This isn't always the case and while the accident is frequently attributed to something else, these disruptions are often the real culprit.

When the system is basically disrupted, the addition of toxic substances can be particularly deleterious to skilled behavior. One such substance is alcohol. When the body is already tired and worn, the depressant effect of this substance can be even more marked than it ordinarily would be in the same individual.

The general conclusion here is that whenever possible, a routine of waking and working should be established. When this is disrupted, the individual should be prepared for the probability of errors increasing and be duly cautious.

After all, we are still designed to go only 4 mph. ■

—from FLYING SAFETY
Anchard F. Zeller, PhD
Directorate of Aerospace Safety

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (H series) While landing in LZ, pilot noticed a panel marker moving on the ground. Pilot tried to move aircraft away from marker, but it blew into main rotor system, denting one blade. Tall grass and weeds obscured panel marker from pilot's view. □ (V series) Engine oil temperature rose during flight. When engine was shut down after landing, oil temperature was 140° C. Caused by failure of flow control thermostat. □ (H series) Aircraft developed extreme vertical vibration after takeoff. Trim tab had fallen from rotor blade. □ (H series) Cyclic control binding in left lateral quadrant position was caused by worn lateral magnetic brake. □ (H series) Airspeed indicator fluctuated from 160 knots to 0 knots. Caused by broken pitot tube. □ (H series) Transmission oil hot light came on. Caused by defective thermostatic switch. □ (H series) Pilot felt unusual feedback in cyclic during hydraulics-off check. Caused by worn hydraulic cylinder servo bearing. □ (H series) Postflight inspection revealed oil cooling fan compartment door was broken off. Crew preflighted aircraft at night and may not have insured that latches were secured after inspecting compartment.

UH-1 aviation-related mishap □ Truck was parked close to aircraft, and driver got out. Truck rolled forward and hit aircraft, damaging left cargo door and bulkhead. Truck driver backed his truck and got out. Truck again rolled toward aircraft, but driver was able to stop it before it hit aircraft.

UH-60 Class C mishap □ As aircraft was taking off and rolling forward at about 10 knots, main rotor blade hit small tree on side of runway.

UH-60 Class E mishaps □ As aircraft was at 10-foot hover, piece of plastic sheeting was blown into main rotor system. Blades were not damaged. □ Stabilator would not respond to control inputs and could not manually slew to full down position below 40 knots airspeed during landing. Caused by failure of stabilator amplifier. □ No. 1 fuel pressure light came on during hover. Caused by failure of O-ring seal in fuel hose coupling.

Attack helicopters

AH-1 Class C mishaps □ (S series) Main rotor blades hit tree during NOE flight. Both blades were damaged. □ (S series) Pilot tied main rotor blade with tiedown but did not secure both ends of blade. Rotorwash of landing helicopter caused rotor to flex down and hit No. 4 tail rotor drive shaft.

AH-1 Class E mishaps □ (S series) Pilot felt lateral feedback in cyclic control. Caused by failure of lateral servo. □ (S series) Master caution and engine oil pressure lights came on. Caused by failure of engine oil pressure switch. □ (S series) Copilot encountered brownout during takeoff, noticed collective above 96 percent, and told pilot to take the controls. Overtorque light came on. Pilot increased collective to keep from hitting a tree while applying forward cyclic. Trunnion bolts were replaced.

AH-1 aviation-related mishaps □ As aircraft was lifted with a crane, aft skid tube caught on raised asphalt surface. When aircraft broke loose from surface, it hit right front corner of crane. □ Mechanic removed firing mechanism from aircraft and removed safety pin from mechanism. Mechanic cupped his hand over the discharge end of the mechanism. As he did, the mechanism discharged, burning his hand.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
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	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**4**
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	Total for Year	59*	46**	Total to Date	**35**	**22**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Cargo helicopters

CH-47 Class C mishaps □ (C series) Pilot attempted to ground taxi aircraft to runway. Aircraft would not respond to power steering inputs, so pilot locked the swivels, engaged the SAS, and picked the nose up to two-wheel taxi to the runway. As pilot started to turn right, aft end of aircraft shifted about 10 feet to left, causing left aft landing gear to strike concrete culvert. Gear housing assembly was cracked. Suspect swivels did not lock as designed when switch was placed in lock position. □ (C series) Aircraft was struck by "suicidal" bird. Windshield was cracked.

CH-47 Class E mishap □ (B series) Popping noise was heard and No. 2 engine flight boost dropped to 1000 psi after shutdown. Caused by failure of hydraulic hose.

Observation helicopters

OH-6 Class E mishaps □ Tail rotor chip detector light came on during approach. Caused by failure of gear tooth. □ N_2 fluctuated during flight. IP was unsuccessful in reducing N_2 to within limits. Engine overspeed was caused by N_2 governor failure.

OH-6 aviation-related mishap □ Truck and trailer with OH-6 on board were participating in a parade as part of a recruiting effort. The vehicles were parallel parked along a curb. As the driver started forward and began to turn left away from the curb, OH-6 horizontal stabilizer hit a telephone pole located 6 inches from the curb, causing $3,500 damage to the aircraft.

OH-58 Class C mishap □ (A series) Aircraft was flying convoy cover. When convoy stopped at a rest stop area, pilot landed nearby for coordination. During takeoff from the area, main rotor blades hit road sign. Tips of both blades were damaged.

OH-58 Class E mishaps □ (A series) Transmission oil pressure light came on. Caused by failure of transmission input seal. □ (C series) Aircraft was overtorqued to 105 percent during recovery from simulated loss of tail rotor effectiveness. □ (C series) Pilot noticed buzz in tail rotor control pedals at 60 knots and 25 feet agl. Aircraft shuddered violently during descent. Postflight inspection revealed three of the four tail rotor gearbox mounting studs had sheared and white tail rotor blade had thrown the antierosion tape approved for use in desert operations.

Fixed wing

C-12 Class E mishaps □ (C series) Crew heard loud squealing noise from No. 1 engine. Torque increased to 110 percent. Propeller was feathered, and single-engine landing was made at airport. Caused by internal engine failure. □ (C series) Left rudder pedal made full deflection when application of left brake was attempted during landing roll. Preformed packing had deteriorated on brake housing pistons.

T-42 Class E mishap □ Loud bang was heard from right engine, and copilot saw oil streaming from engine. Connecting rods had torn through top engine cases and damaged propeller.

U-21 Class E mishap □ (A series) Fuel was seen siphoning from No. 1 nacelle fuel cap during climbout. Cap was not seated correctly.

Maintenance

UH-1 Class C mishap □ (H series) Right cargo door separated from aircraft. Door had been written up as being out of adjustment. Piece that broke off of door track failed because of apparent fatigue which may have started by the door not being adjusted correctly.

UH-1 Class E mishaps □ (H series) Copilot saw oil leaking from underneath aircraft during hot refueling operation. Jam nut had backed off, causing excessive wear on fitting to transmission oil return line and rupture in line. □ (H series) Engine oil temperature fluctuated during landing. Caused by loose cannon plug. □ (H series) Engine air inlet caution light came on. Engine inlet filter was clogged. Caution system should not have been installed.

AH-1 Class E mishap □ (S series) Transmission oil pressure increased during flight. Transmission tube fitting was not torqued correctly and came loose.

OH-58 Class E mishap □ (A series) IP noticed high frequency vibration in antitorque pedals during pickup to hover. Tail rotor trunnion jam nuts were loose or out of adjustment.

OV-1 Class E mishap □ (D series) Fluid was seen leaking from No. 1 engine nacelle during start. O-ring was installed incorrectly in elbow fitting, causing leak.

U-21 Class E mishap □ (A series) Nose gear gave unsafe indication when lowered. Tower personnel indicated gear appeared to be down, and aircraft was landed safely. Gear down-lock switch was out of adjustment.

Messages received

- Maintenance information message concerning advance notice of forthcoming change to TM 55-1500-204-25/1 (airframe system) (MIM-GEN-83-MEA-03, 221900Z Aug 83).
- Maintenance information message concerning CH-47C aft rotary wing drive shaft overhaul interval (rotor and drive system) (MIM-CH-47-83-MEC-08, 242000Z Aug 83).

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

Aviation mishap prevention forum

This forum begins a weekly column of need-to-know information and questions and answers on matters pertaining to aviation safety. Each week we will carry a 4- to 5-question quiz and the reference publications for each question. The answers will appear in the next week's issue, along with some new questions.

Hopefully, this forum will help all of you aviation professionals reacquaint yourselves with or stay abreast of the tons of literature you must be familiar with. If you have any questions or ideas you would like to include in this forum, your contributions will be welcomed. Please address them to: Commander, U.S. Army Safety Center, ATTN: PESC-M, Fort Rucker, AL 36362.

Aviators court-martialed as a result of collateral investigations

Reports from the field indicate that aviators are being held accountable for mishaps caused by breaches of flight discipline and willful misbehavior while flying. Commanders state that action which focuses on accountability for individual performance is helping to correct accident-causing behavior. We have learned of two instances where aviators, as a result of collateral investigations, have recently been convicted and sentenced by courts-martial for dereliction of duty while operating Army aircraft. Each aviator operated his aircraft in an unsafe manner, causing an accident with injury to the occupants on board. One of the aviators was fined $500 a month for 12 months and was restricted to his home and base of operation for 2 months. The other aviator received an official reprimand. He was subsequently separated from the service for other reasons.

These court-martial trials were convened as a result of the recommendations of collateral investigations, **not** the safety investigations (which cannot be used for any purpose except accident prevention). Collateral investigations are required in fatal aviation mishaps and also in cases where the commander suspects negligence or violation of flight procedures. Commanders may convene a collateral board any time they feel it is necessary to document what happened in a mishap.

From now on, aviators who damage aircraft or cause injury because of willful breaches in flight discipline should reasonably expect a collateral investigation into their actions. The idea we are passing to you is that undisciplined aviators are likely to pay in court for their misconduct.

Review time

You all know that SF 368 (Quality Deficiency Reports—Category II) for submitting Equipment Improvement Recommendations (EIR) is the authorized means for users of Army materiel to report:

- Equipment faults in design, operations, and manufacture.
- Equipment improvement recommendations to suggest improvements in Army materiel.
- Reworked/new materiel received that is unsatisfactory due to a quality defect of workmanship or materiel.

You also are aware of the requirements to submit Category I EIRs. You realize the need to submit EIRs, **but for some reason very few are being sent in.** Your assistance is requested. **Send in EIRs.**

If you have any questions on EIR preparation, conditions, or where they are to be sent, the necessary information is contained in TM 38-750.

DA Form 2028

You can help improve all manuals. If you find errors or if you know a way to improve the procedures, prepare and mail your DA Forms 2028 (Recommended Changes to Publications and Blank Forms) to the address contained in each manual. The aviation community can use your recommendations and ideas.

Questions for aircrews

1. Personnel operating aircraft engines must be seated at the controls and secured with a seatbelt. True or false? **Reference: AR 95-1, with change 1, Army Aviation: General Provisions and Flight Regulations**

2. Use of Army aircraft solely to obtain or renew an FAA rating may be authorized by the battalion commander. True or false? **Reference: AR 95-1, with change 1, Army Aviation: General Provisions and Flight Regulations**

3. When landing a helicopter in sandy conditions, an approach to a hover should always be made with a vertical descent to landing. True or false? **Reference: FM 1-202, Environmental Flight**

4. When flying in the vicinity of a mountain wave, what are five conditions that may exist? **Reference: FM 1-202, Environmental Flight** ■

It's yours, IP

Come up with the wrong response to an unforeseen situation and you may find yourself in a dangerous predicament. Navigation errors caused by misplotted coordinates, incorrect time, distance, and headings, and improper formation positioning and tactics are all unanticipated discrepancies. They often provide that momentary distraction from your primary duty of ground avoidance with deadly and catastrophic results.

Faulty and incomplete mission planning and poor quality control of such planning are common causes of such distracting situations. But a conscientious instructor pilot can help reduce these planning errors considerably. The benefit of IP participation in mission planning cannot be overemphasized. The IP's guidance is important in shaping the thought and decisionmaking processes of younger, less experienced aircrewmembers. Without this positive influence and guidance, the likelihood of catastrophic mishaps increases.

How many times has your instructor arrived midway through mission planning expecting to be spoon-fed with essential mission detail? Even if your instructor is in the unit, if his attention is diverted from flight planning to other projects, his presence could do more harm than good. After all, if you know you're going to have to count exclusively on yourself, you won't be caught short when the IP lets you down. Although his diversions and interruptions may be legitimate, inattention to mission planning jeopardizes the safety of the mission. If the IP misses the first half of the mission planning, he has missed out on most of the critical decisions concerning the conduct of the mission.

The IP's absence robs the other flight members of the benefits of his knowledge and decisionmaking expertise. The usual constructive critique of mission planning (to extract the maximum training from each sortie) is lost in the rush to catch up. You are now being supervised by someone who does not understand the essential elements of a mission for which he is directly responsible.

In the absence of an experienced IP, too much time will probably be spent planning simple, routine portions of a mission. An IP's supervision of mission planning insures that all elements are adequately addressed and the most important phases of the mission receive a proportionate share of attention.

Although IPs are not to be held accountable for all aircraft mishaps, they can minimize the confusion considerably. An instructor who is absent for a major portion of the flight planning should not drop in and propose significant, last-minute changes to a flight scenario. Such changes may require major alterations to planning already accomplished and, in the process, a critical detail could easily be overlooked. It's bad enough that aircrewmembers are often required to plan missions under time constraints which are inadequate for complete and thorough mission preparation. But last-minute changes can lead to omissions and errors which could prove disastrous.

Finally, an instructor pilot who is not active in mission planning is often unaware of all the elements of a mission. He is also unprepared to check for errors that will surface later during the execution of the mission. The prevention of these errors, which should occur prior to the mission briefing, could prove to be the key factor in preventing a Class A aircraft mishap. ■

—from FLYING SAFETY
Captain Paul J. Ribarich
Directorate of Aerospace Safety

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No aircraft is immune

Foreign object damage (FOD), according to AR 385-95, is damage to or malfunction of an aircraft caused by an object that is alien to an area or system or is ingested by or lodged in a mechanism of an aircraft. Some examples of FOD are ingestion of tools and loose hardware by engines, flight controls jammed by tools or hardware, and propellers and rotor blades damaged by debris on the ramp or taxiway. FOD is caused by poor maintenance as well as poor housekeeping.

Damage from foreign objects not only costs several hundred thousand dollars a year but also causes unscheduled aircraft maintenance, premature removal and repair of aircraft components, and possible injury to personnel. During the 46-month period from 1 October 1979 through July 1983, 405 cases of FOD involving Army aircraft were reported. Most of these mishaps were Class C and Class E. But there were some A's and B's.

The kinds of foreign objects vary, as do the areas of aircraft damage. But no part of an aircraft is immune. Let's look at some of the more frequent types of FOD.

Loose hardware causes many FOD mishaps each year. Sometimes the object is completely foreign to the piece of equipment that fails. In most cases, a thorough inspection would have revealed the foreign object before the flight. By-the-book maintenance and inspections will reduce FOD from hardware.

• A high-pitched noise was heard as the pilot landed his OH-58. Inspection revealed FOD in the compressor section. A bolt was left in the plenum chamber after phase maintenance.

• A UH-1 yawed to the right twice during flight. A piece of safety wire was found hung up on the first-stage compressor blade.

• A banging noise was heard from the transmission area of an OH-58, and the collective was excessively stiff. A washer was found under the collective sleeve.

• Sparks were seen coming from the No. 2 engine of a CH-47 after shutdown. When a mechanic installed the nose box cowling, he did not use a bolt with a barrel nut and the nut vibrated loose and was ingested into the engine.

• The No. 2 engine of a CH-47 was slow to accelerate to the flight position. As the engine stabilized in flight, the engine torque indication dropped to zero and N_1 began to surge. A portion of an engine inlet FOD ring (donut) had been ingested.

• UH-1 transmission oil pressure went to zero during flight. A cotter pin was lodged in the transmission oil line quick disconnect valve.

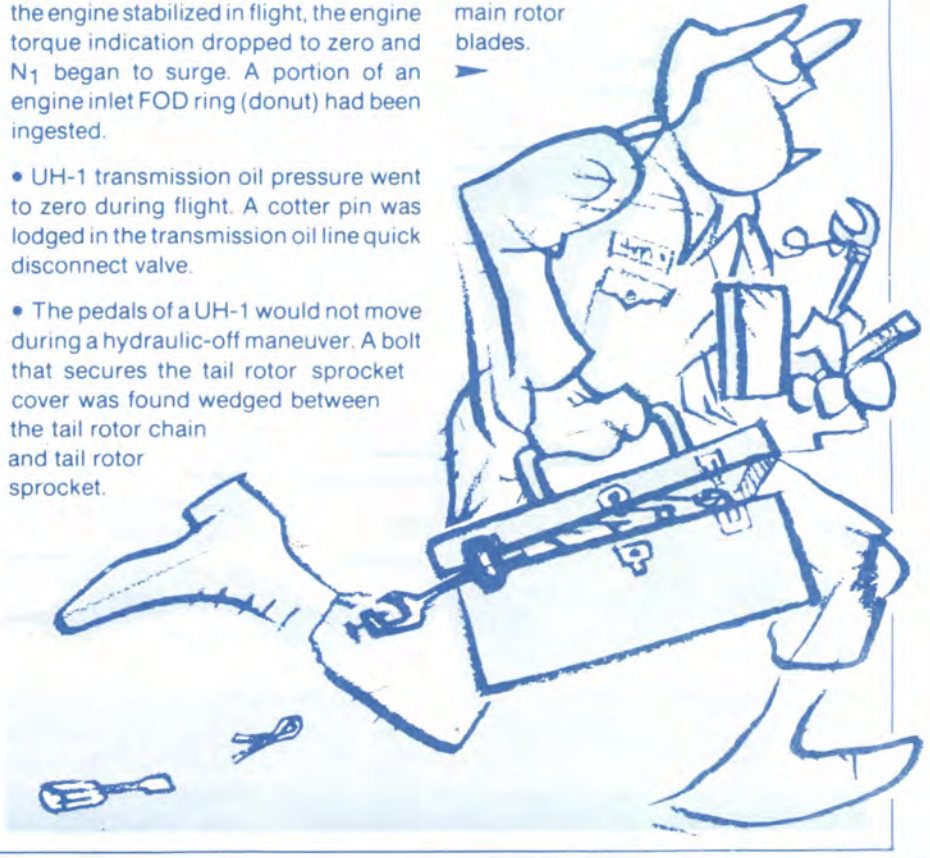
• The pedals of a UH-1 would not move during a hydraulic-off maneuver. A bolt that secures the tail rotor sprocket cover was found wedged between the tail rotor chain and tail rotor sprocket.

Policing of runways and airfields is essential to the prevention of FOD. Routine removal of loose objects would greatly reduce damage caused by items such as parachute canopies, rocks, etc.

• As an AH-1 was brought to a hover, a piece of a wood packing crate was drawn through the main rotor blades, damaging one blade.

• Loud popping noises were heard from the rear of a UH-1 during hover over pad. A paper shop towel had blown up through the main rotor blades.

• While a UH-1 was hovering at the airfield, a piece of parachute canopy was drawn into the main rotor blades.



No aircraft is immune

Unsecured items in aircraft cause several mishaps each year. Compliance with published procedures would prevent mishaps of this type.

• A bump and yaw were felt during autorotation, followed by a vibration. Inspection of the UH-1 after landing revealed the pilot's helmet bag had fallen from the aircraft and gone through the tail rotor system.

Water and trash particles in fuel and fuel systems can cause mishaps. Faulty refueling tankers and refueling personnel not complying with published procedures before refueling aircraft are the main causes of water in fuel.

• A UH-1 pilot noticed a decrease in engine and rotor rpm. Altitude could not be maintained, and the pilot was forced to land. A large amount of water was found in the auxiliary fuel tanks.

• An OH-58 fuel filter caution light came on during flight. The fuel filter was clogged with carbon and metal particles.

• A UH-1 engine quit during a rapid refueling operation. Fuel samples from the aircraft and fuel hose revealed water in the system. The fuel bladder at the rapid refueling point had split open the previous day and fuel had filled the protective berm and mixed with water from heavy rains. POL personnel had pumped the contaminated fuel to a tanker, using the pump and filter separator. The filter separator had apparently become full of water and the water float ball failed to function.

Screwdriver was found in engine intake, along with broken parts, after UH-1 mishap.

Dust, sand, grass, insects, and birds are some of the major environmental problems.

• The airspeed indicators of a UH-1 would not operate during takeoff. A wasp nest was found in the pitot static line.

• Binding in the pedals of an AH-1 was caused by trash from a bird nest lodged in the tail rotor silent chain.

• N_2 fluctuated during NOE flight in an AH-1. A large amount of grass was on the inlet screen.

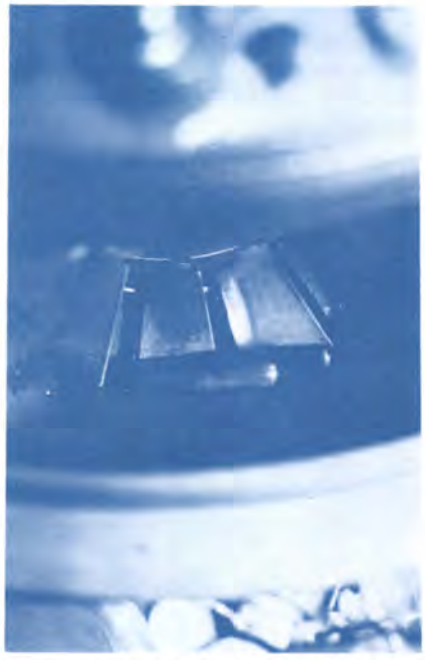
Thrown objects damage numerous rotor blades.

• A POL handler found a rock on the refueling pad, picked it up, and gave it a toss. The rock hit and damaged an OH-58 main rotor blade.

• When the grounding cable was removed from an OH-58, the automatic rewind would not extract the cable. The refueler then threw the cable. The end of the cable hit a main rotor blade.

Tools and items associated with toolboxes cause several high-cost mishaps each year. Toolbox inventory is one of the best weapons maintenance personnel have in the war on FOD. The following cases emphasize the fact that not just maintenance personnel but crew chiefs and pilots must always be on the alert for foreign objects.

• After an OV-1 was test flown, a mechanic heard a loud sound from the No. 1 engine during shutdown. Inspection revealed damage to the engine vanes. A pair of electrical cutting pliers was found lodged between the first row of inlet guide vanes and the inlet air separator. During their inspections of the aircraft before the flight, the technical inspector, crew chief, and maintenance test pilot did not see the pliers.



Pliers lodged in the No. 1 engine of an OV-1 caused extensive damage to engine vanes.

• Mechanics removed the outer filters and top half of the particle separator to flush the engine of a UH-1. When the flushing operation was completed, the top half of the particle separator was reinstalled. After a technical inspector checked the engine, the outer filters were reinstalled. As the pilot advanced the throttle, he heard an explosion and saw smoke coming from the rear of the aircraft. Inspection revealed numerous broken compressor blades and other damage, as well as a common screwdriver. It was concluded that the screwdriver was probably one that had been missing for several weeks and had been in the engine inlet for some time before being drawn into the compressor. The screwdriver was not spotted because the lower half of the particle separator was not removed.

• A mechanic walking past a UH-1 saw a bird fly into the aircraft just under the tailpipe. Aware of the bird nest FOD problem, the mechanic checked the tail rotor drive shaft housing and found a large nest of grass and straw. He took off the cowling and removed the nest. He had trouble replacing the cowling and used a short screwdriver to align the holes in the cowling. The tail rotor drive shaft cover had to be opened to allow for installation of the cowling, and the mechanic left the screwdriver under the cover. The screwdriver damaged the drive shaft.

• A wrench was left on top of an AH-1 main rotor system after the mechanic adjusted the pitch change link. The wrench knocked a hole in a rotor blade when the aircraft was started.

• A screwdriver was left in the engine inlet of a CH-47 before the FOD screens were put in place. When the engine was started, the screwdriver caused considerable damage to the compressor blades.

In many cases, personnel **did not secure cowlings and did not remove engine inlet covers and rotor blade tiedowns.** In other instances, **oil sample bottles were left in aircraft, antennas broke off and damaged rotor blades, and fire extinguisher nozzles were ingested into engines.** At least three Class C mishaps involving nozzles occurred during this period. The following is typical.

• Two mechanics were flushing an engine on an AH-1. One of the mechanics was motoring the starter while the other was injecting water into the engine air intake. The mechanics heard a loud bang and a grinding sound. The brass nozzle on the fire extinguisher had come off and was ingested into the engine. The mechanic had not seen the nozzle come off the extinguisher and had no idea what caused the loud bang.

A supervisor was called, and he asked one of the mechanics to motor the starter so he could determine where the noise was coming from. An FOD check was not made. The supervisor determined that the noise was caused by a sheared starter shaft and that the shaft should be replaced. (The starter shaft had been sheared when the fire extinguisher nozzle entered the engine.) The shaft was replaced, and the aircraft was prepared for a maintenance operational check.

When a pilot tried to start the engine, it would not start. The engine was then checked and the nozzle and extensive damage to the engine were found.

FOD prevention should be an essential part of each unit's aviation accident prevention program, and it is a command responsibility to see that it is. The first step toward a successful FOD prevention program is the development of a good SOP. AR 385-95 contains a sample FOD prevention SOP which commanders can use to develop their own. An FOD prevention officer and NCO should be appointed to carry out the program. Everyone in the unit must look for and remove hazards that could cause FOD.

If an aircraft has been maintained by a tool-conscious crew, if the aircrew has every movable item secured, and if the runways and ramps are clean, most of your FOD worries are over. They are over, that is, if this is standard procedure day after day, year after year. ■

Fire extinguisher nozzle came off while mechanics were flushing an AH-1 engine. The nozzle was ingested into the engine, damaging the compressor blades.

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) IP gave pilot simulated forced landing. As collective pitch was being added to cushion the landing, IP told pilot to hold aircraft off the runway until more of the forward speed had dissipated. As aircraft touched down left skid first and then right skid, lateral vibration began. IP took control and abruptly lowered collective pitch control in an attempt to stop the rocking motion. This caused the transmission to shift forward and enter into pylon rock, damaging tail rotor blade, transmission well, FM antenna, tail rotor drive shaft, and mount pylon. □ (H series) Aircraft hit powerline while flying low level down a canyon. Line was marked on wire hazard map.

UH-1 Class E mishaps □ (H series) Master caution light came on during flight. Water was found in transmission chip detector cable nipple. □ (H series) Oil was seen on runway as aircraft was hovering. Left lateral servo was leaking. □ (H series) Hydraulic caution light came on and controls became stiff. Caused by hole in hydraulic pressure line. □ (H series) Engine oil pressure dropped to zero during takeoff. Caused by failure of oil pump. □ (H series) Three loud bangs were heard during hover and rpm audio came on. Caused by failure of compressor section. □ (V series) Crew was spraying for mosquitoes with new type of spray rig slung beneath helicopter. While spraying, pilot inadvertently pushed cargo release button, releasing the load. Spray rig was damaged when it hit the ground.

UH-60 Class E mishaps □ Pilot noticed fluctuation of No. 2 engine during flight. Caused by failure of ECU. □ Stabilator would not reset after simulated stabilator failure. Caused by failure of stabilator amplifier.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**6**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**4**
4th Qtr	July	2	2	July	**5**	**7**
	August	8	5	August	**4**	**3**
	September	10	13	1-14 Sep	**1**	**0**
	Total for Year	59*	46**	Total to Date	**35**	**22**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Attack helicopters

AH-1 Class A mishap □ (S series) Pilot felt shudder and vibrations while aircraft was at a hover. Aircraft then spun to right. Pilot lost control and aircraft descended rapidly, landed hard, and came to rest almost inverted. Preliminary findings indicate seizure of No. 1 drive shaft hanger bearing, causing loss of antitorque control. 8351

AH-1 Class C mishaps □ (S series) Postflight inspection revealed extensive damage to main rotor blades. Suspect tree strike. □ (S series) Aircraft hit tree during NOE flight, damaging main rotor blade. □ (S series) As copilot was landing aircraft, tail boom hit 6-foot bush, dragging tail rotor through trenches and damaging both blades.

AH-1 Class E mishaps □ (S series) No. 2 hydraulic light came on. Caused by failure of hydraulic pressure switch. □ (S series) N_2 dropped and tgt increased during hover. Aircraft had just flown over freshly cut hay field. Hay blocked engine intake and cooler fan screens.

Cargo helicopters

CH-47 Class E mishaps □ (C series) No. 2 engine failed when IP placed condition lever to ground idle to simulate engine failure. Caused by failure of N_1 control box. □ (C series) As No. 2 engine was started, hydraulic fluid was seen leaking from engine start manifold. Caused by valve cap on manifold blowing off.

Observation helicopters

OH-58 Class A mishap □ (C series) Aircraft began slow uncommanded turn to right about 5 feet agl during termination phase of approach to hover. Pilot applied full left antitorque pedal in an unsuccessful attempt to stop the turn. Aircraft spun at least two complete

(continued on next page)

Mishap briefs

revolutions before pilot closed throttle to initiate hovering autorotation. Aircraft hit the ground nose high, tail boom first. Suspect loss of tail rotor effectiveness. 8352

OH-58 Class C mishaps □ (C series) As pilot started right turn at 15 to 20 feet over 75-foot trees, aircraft entered uncontrollable right spin. Pilot reduced power and neutralized pedals. Spin slowed and power was increased to clear trees. Spin increased and aircraft went into extreme nose-low attitude. Pilot closed throttle and spin stopped. Aircraft landed hard, spreading skids and wrinkling tail boom. □ (A series) Aircraft spun to right 1½ turns during approach to landing. Pilot entered autorotation. Aircraft landed hard, spreading cross tubes and wrinkling tail boom.

OH-58 Class E mishaps □ (A series) Aircraft started to spin during approach to pinnacle landing. Pilot relaxed pressure on antitorque pedals, reduced power, and applied left forward cyclic. Aircraft turned 90 degrees to right, cleared ridgeline, and descended 50 feet. As aircraft accelerated through 40 knots, directional control was regained. Pilot attempted approach and again lost tail rotor effectiveness at 20 feet agl and 10 knots. Pilot again relaxed pressure on antitorque pedals, reduced power, and applied left forward cyclic. Control was regained and pilot landed. □ (A series) Hydraulic light came on and controls became stiff during takeoff. Caused by leak in locally manufactured hydraulic line.

Fixed wing

C-12 Class C mishap □ (C series) Postflight inspection revealed dent in left engine air inlet deice lip. Caused by bird strike.

C-12 Class E mishaps □ (A series) IP simulated No. 1 engine failure by placing throttle to idle position. Pilot correctly identified the engine but did not apply enough rudder. IP called "more right rudder." Pilot reacted by feathering No. 2 engine propeller. No. 2 engine torque was seen descending through 142 pounds. Aircraft was landed, checked, and found to be okay. □ (C series) When gear handle was raised after takeoff, gear handle light stayed on. Gear was cycled down and red lights in handle went out. Three green lights were on. Pilot raised gear. Three green lights went out and red stayed on. Pilot lowered gear and got normal indications. Landing gear motor was weak, causing gear to cycle but stop at a different place each time. □ (C series) After manual landing gear extension was demonstrated, landing gear drive mechanism could not be engaged to landing gear motor. Aircraft was landed with gear extended. The normal procedure for manual extension of landing gear is to pump until the three green gear-down lights illuminate. In this case, the handle was pumped until it would not move. This caused pressure inside the clutch mechanism which prevented it from engaging with gear motor. Pressure was relieved by raising cabin floor and moving clutch by hand.

Maintenance

UH-60 Class A mishap □ Aircraft was on maintenance test flight after maintenance had been performed on stabilator and adjustments had been made on main rotor system pitch change links. Witnesses saw aircraft yaw to left and nose tuck down. Shortly afterward, parts began to separate from aircraft. Aircraft crashed on its side and burst into flames. Available evidence indicates that the upper retaining bolt for the pitch change link to red main rotor blade pitch change horn was installed on the aircraft the day before the mishap without a cotter pin or safety wire on the bolt's retaining nut. Three fatalities. 8353

AH-1 Class E mishaps □ (S series) D.C. generator would not stay on line during runup. Voltage regulator was adjusted incorrectly. □ (S series) Master caution, transmission oil pressure, and transmission oil bypass lights came on. Crew chief incorrectly installed transmission oil filter O-ring, causing loss of oil.

CH-47 Class E mishap □ (C series) No. 2 engine oil light came on during takeoff. Crew chief did not secure oil cap while servicing engine, causing oil to blow out.

Messages received

• Safety-of-flight technical message concerning one-time inspection of certain OH-58C (round glass) helicopters (OH-58-83-04, 301605Z Aug 83). Summary: Message applies only to Fort Lewis and Fort Hood. Certain OH-58C (round glass) helicopters will be inspected to determine if both flapper assemblies, P/N 206-070-332-1, have been removed from the heating and ram air duct system. Some duct assemblies were installed without being modified. The flapper assemblies would block the entrance of hot air into the defroster/defogger system. Contact: Tom Bell or Howard Johnson, AUTOVON 693-2470, commercial 314-263-2470.

• Safety advisory message from CECOM concerning personal protection and handling of dielectric fluid containing polychlorinated biphenyls (PCB).

• Message from AFISC, Norton AFB, concerning passenger protection and aircraft interior fires.

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

Aviation mishap prevention forum

Fuel and oil caps

We are receiving an increasing number of PRAMs reporting U-21/RU-21 fuel and oil caps not properly seated and locked before flight. Aviators, be sure you doublecheck these caps during your preflight to prevent an early return from your mission.

Answers to last week's questions

1. Personnel operating aircraft engines must be seated at the controls and secured with a seatbelt. True or false? False. Personnel operating aircraft engines must be seated at the controls and secured with a seatbelt **and a shoulder harness. AR 95-1, page 2-5, par. 2-10**

2. Use of Army aircraft solely to obtain or renew an FAA rating may be authorized by the battalion commander. True or false? False. Use of Army aircraft solely to obtain or renew an FAA rating is prohibited. **AR 95-1, page 2-5, par. 2-7**

3. When landing a helicopter in sandy conditions, an approach to a hover should always be made with a vertical descent to landing. True or false? False. The best procedure to minimize blowing sand and dust is a running landing. If the terrain does not permit a running landing, an approach to touchdown should be made. A landing should not be made to a hover. **FM 1-202, page 2-11, par. 2-16a**

4. When flying in the vicinity of a mountain wave, what are five conditions that may exist?

- Vertical currents of 2,000 feet per minute are common. A severe case would be 5,000 feet per minute.
- Turbulence varying from moderate to severe.
- Wind gusts up to 22 knots per hour exist between waves. This condition is most severe near the mountain where the waves are close together.
- Altimeter errors as much as 1,000 feet may be experienced.
- Icing may be expected in clouds when temperatures are below freezing. **FM 1-202, page 4-5, par. 4-3g(2)**

Questions for aviation personnel

1. What are the dangers associated with lubricating oil, Military Specification MIL-L-7808 and MIL-L-23699? **Reference: TM 55-1500-204-25/1, General Aircraft Maintenance Manual**

2. Is it permissible to fabricate static grounding cables? **Reference: TM 55-1500-204-25/1, General Aircraft Maintenance Manual**

3. Fuel supplies held by the unit/organization must be tested to confirm their identities and to detect water by what methods? Reference: **FM 10-68, with Change 3, Aircraft Refueling**

4. How often are filter elements in filter/separator in aircraft fuel dispensers changed? **Reference: FM 10-68, with Change 3, Aircraft Refueling** ■

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 49 □ 21 Sep 1983

Accident review: misjudged runway distance

Synopsis

As an AH-1S touched down on a runway, the IP, thinking the aircraft was going to slide off the end of the runway, attempted a power recovery. The aircraft continued in a powered slide down the runway, rose 1 to 2 feet off the ground, settled into a boggy area of the runway overrun, and came to rest on its right side.

History of flight

An IP and pilot were on a training flight. They completed several hydraulics-off landings, running landings, and simulated stuck left and right antitorque pedal maneuvers. The crew then hovered to the rapid refueling point and the aircraft was serviced. After reentering the traffic pattern, the IP demonstrated a standard autorotation to the runway. The runway lights were on, as it was getting dark.

The pilot attempted two standard autorotations, which were terminated with power recoveries. The pilot then entered another standard autorotation and maintained an airspeed of 90 knots to the point where he began the deceleration portion of the maneuver about 126 feet above the ground. The IP told the pilot to increase his deceleration at 100 feet because the aircraft was still at 90 knots. The pilot then applied initial collective pitch at 15 to 20 feet, followed by an excessive amount of cushioning pitch at 3 feet, which caused the aircraft to float.

After the aircraft touched down, the IP announced that he had the controls, rolled the throttle on, maintained runway heading, and tried to make a power recovery. The aircraft became airborne 64 feet from the departure end of the runway, with the main rotor blades coned up at low rpm. Neither the IP nor the pilot noted low engine or rotor rpm indications. The low rpm audio warning device had been disabled earlier in the flight when the IP directed the pilot to pull the circuit breaker.

Forward speed was very slow and the aircraft was 1 to 2 feet off the ground when it began to yaw to the right. It then settled back to the ground. The IP increased collective and added left pedal but was unable to stop the descent. The AH-1 touched down 67 feet past the departure end of the runway in the soft, muddy runway overrun. The right skid then left the ground as the aircraft yawed right, the left skid dug into the ground, and the aircraft rolled over.

Crewmember experience

The 27-year-old IP had more than 1,200 rotary wing hours, with more than 200 in the AH-1S. The 28-year-old pilot had more than 200 rotary wing hours, with almost 50 in the AH-1S.

Interior view of rear cockpit showing UHF and ADF radios (arrows) as they came out of their mounts when AH-1 crashed and rolled over.

Commentary

After the aircraft touched down from a straight-in autorotation, the IP misjudged the runway remaining and thought the aircraft could not be stopped before sliding off the end of the runway. The IP attempted an unnecessary power recovery, as 824 feet of runway remained from the point of touchdown to the end of the runway. Under worst case conditions, the aircraft would have stopped 536 feet short of the end of the runway. The power recovery maneuver is not taught in any course of instruction.

The IP had a reputation for meticulous attention to detail and unswerving compliance with by-the-book flying habits. His uncharacteristic error was caused by a combination of factors—reduced vision (dusk to dark ambient light), optical illusions created by city lights, and possible chronic fatigue. The IP had been involved in several back-to-back field exercises, aircraft transitions, intensive unit training, and inspections.

Sometime during the flight, the IP had directed that the low rpm audio warning circuit breaker be pulled. This deprived him of a signal that would have warned him of the low main rotor rpm condition existing during the attempted power recovery.

When the aircraft rolled over during the crash sequence, the UHF and ADF radios came out of their mounts and were retained only by electrical and antenna connections. The mount latches were not secured, causing the radios to dislodge. Unsecured radios could injure the backseat occupant, as well as create an electrical fire ignition source.■

Aviation mishap prevention forum

Quality control

Quality control activities complement those of production control to complete the overall control aspect of maintenance management. Properly designed quality control procedures can assure an acceptable level of quality and a decrease in inspection requirements and management efforts. However, in no event are quality standards sacrificed solely to increase production.

What is quality control? Quality control is a management function. It insures that the maintenance is performed correctly and is in accordance with the maintenance manuals for the specific aircraft. An appropriate balance must be established to maintain maximum production effectiveness without lowering quality standards. By demanding high levels of quality, unscheduled maintenance, which disrupts flight and maintenance schedules, can be decreased. Thus, more aircraft will be available to fly.

Why do we need quality control? The application of a high level of quality control will minimize waste of time, labor, and material. It will also lessen the possibility of maintenance error or inadequate inspection of aircraft, which can lead to aircraft damage, personal injury, and even death. As a technical inspector, you are the commander's system of "checks and balances." You insure that the entire maintenance effort is of the highest quality. If high standards of quality are constantly maintained, the need for quality control will be satisfied.

Does the preceding information look familiar? It was extracted from FM 55-411, which contains a vast amount of general information on the duties and responsibilities of aircraft maintenance quality control personnel, specifically the technical inspector. Keep it handy and refer to it often. This FM will make your quality control duties a little easier.

The following production/quality control errors have contributed to numerous FY 83 mishaps:

Fixed wing

- Not adequately checking the security of cowlings on fixed wing aircraft prior to flight (also aviators).
- Fixed wing retractable landing gear system malfunctions due to improperly adjusted switches, broken and brittle wires, improperly installed components, and lack of landing gear retract tests after maintenance.
- Nonuse of publications when performing maintenance.
- Improperly adjusted fuel and oil caps (also aviators not adequately checking caps before takeoff).

Rotary wing

- Tools left under drive shaft cowling.
- Improperly installed O-rings and gaskets.
- Engine fuel control not properly rigged.
- VIGV and bleed bands not properly adjusted.
- Washing compound found in fuel samples taken after a Class A mishap.
- Engine drive shaft (short shaft) not lubricated.
- Maintenance failed to properly torque hydraulic line.
- T55-L-7C engine quill shaft installed on T55-L-11 engine (two cases).
- Shop rag left in engine intake after maintenance, causing FOD to engine.
- Screwdriver left in engine intake during installation of No. 2 engine transmission, causing FOD to engine.

Remember, quality control is the responsibility of every individual who works in or around aviation.

Answers to last week's questions

1. What are the dangers associated with lubricating oil, Military Specification MIL-L-7808 and MIL-L-23699? MIL-L-7808 and MIL-L-23699 contain an additive which is poisonous and which is absorbed easily through the skin. Do not allow oil to remain on skin any longer than necessary. **TM 55-1500-204-25/1, page a**

2. Is it permissible to fabricate static grounding cables? Yes. **TM 55-1500-204-25/1, page 1-13, par. 1-54**

3. Fuel supplies held by the unit/organization must be tested to confirm their identities and to detect water by what methods? API gravity test and aqua-glo. **FM 10-68, page 2-3, par. 2-9**

4. How often are filter elements in the filter/separator in aircraft fuel dispensers changed? Every 24 months or when laboratory tests show excessive sediment or water, or when pressure differential limits are exceeded. **FM 10-68, page 2-7, par. 2-14**

Questions for aviation personnel

1. What is the purpose of the Operational Hazard Report (DA Form 2696)? **Reference: AR 95-1, with Change 1, Army Aviation: General Provisions and Flight Regulations**

2. What AR provides instructions for completing the Operational Hazard Report? **Reference: AR 95-1, with Change 1, Army Aviation: General Provisions and Flight Regulations**

3. A flammable liquid is one with a flashpoint below 100° F. (37.8° C.) and a vapor pressure not above 40 pounds per square inch (psi) (absolute) at 100° C. True or false? **Reference: FM 1-300, Flight Operations and Airfield Management** ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (H series) Transmission oil pressure fluctuated. Caused by failure of oil pressure relief valve. □ (H series) Cyclic control binding in all quadrants was caused by defective servo cylinder. □ (H series) Fuel pressure fluctuated during hover. Caused by defective fuel boost pump. □ (H series) Engine surged and egt rose during hover. Caused by failure of fuel control assembly. □ (V series) Crew smelled burning rubber odor during takeoff. Caused by failure of compass. □ (V series) Engine oil temperature rose during flight. Caused by stuck engine oil thermostat. □ (H series) Master caution and hydraulic pressure lights came on and controls stiffened. Caused by failure of hydraulic pump.

UH-60 Class C mishap □ Popping sound was heard from rear of aircraft as pilot was landing from a hover. IP took controls and returned to a hover before the weight of the aircraft was completely on the ground. IP hovered aircraft while tower personnel and backseat student made a damage assessment. IP was told that tail wheel was hanging a little lower than normal. IP raised stabilator to keep it from being damaged and landed. Postflight inspection revealed tailwheel strut piston had slipped out of its cylinder and penetrated tail cone.

Attack helicopters

AH-1 Class B mishap □ (S series) Pilot heard loud noise from engine compartment during runup. Main drive shaft failed, causing damage to one main rotor blade, particle separator, engine cowl, main transmission, and engine. 8354

AH-1 Class E mishaps □ (S series) Master caution and alternator-rectifier lights came on, and grinding noise was heard. Caused by failure of alternator. □ (S series) Transmission oil pressure increased to 80 psi. Caused by failure of oil pressure transducer. □ (S series) Thump was felt in cyclic control during takeoff, causing cyclic to move without pilot input. Caused by failure of fore and aft hydraulic servo cyclinder. □ (S series) Engine oil pressure steadily dropped during flight. Caused by cracked oil line from pressure sending unit.

Cargo helicopters

CH-47 Class E mishap □ (B series) No. 1 and No. 2 engine chip detector lights came on. Caused by failure of engine nose box.

CH-54 Class E mishap □ (A series) Transmission oil temperature gauge moved to maximum during approach to landing. Caused by failure of transmission oil temperature sending bulb.

Observation helicopters

OH-58 Class A mishap □ (A series) Aircraft began uncommanded right turn at an altitude of 75 feet agl and airspeed of 30 to 50 knots. Pilot reduced collective pitch and left pedal input, but turn rate increased. Aircraft crashed through trees and came to rest on right side. Suspect loss of tail rotor effectiveness. Three injuries. 8355

OH-58 Class C mishap □ (A series) While performing standard autorotation at night with landing light off, pilot leveled aircraft for touchdown and began collective pitch application higher than IP expected him to. IP was late with corrective action. Aircraft landed hard, resulting in spike knock.

FY 83 Class A Accident Countdown

		FY 82			FY 83	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**6**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**5**
4th Qtr	July	2	2	July	**5**	**7**
	August	8	5	August	**4**	**3**
	September	10	13	1-21 Sep	**3**	**0**
	Total for Year	59*	46**	Total to Date	**37**	**23**

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

OH-58 Class E mishaps □ (A series) Cyclic control became stiff during hover. Caused by failure of swashplate. □ (C series) While trying to assume position in formation during takeoff, copilot inadvertently increased power to 105 percent torque for 2 seconds. □ (A series) Engine surged during runup. Caused by failure of fuel governor. □ (A series) With PIC positioned as fireguard, copilot started the aircraft. TOT rose to 940 degrees. Hot start was caused by copilot failing to properly monitor TOT gauge.

Fixed wing

C-12 Class C mishap □ (C series) Weather radar showed storm cells along flightpath. Twenty-degree left turn was made to avoid cells. Lightning strike occurred about 2 minutes later. Left prop, left outboard flap, right elevator, and No. 1 engine nose case were damaged.

Maintenance

UH-1 Class E mishaps □ (H series) Master caution and hydraulic lights came on, followed by stiffness in all controls. Running landing was made. Hydraulic input line to left cyclic servo had chafed against servo connecting link, wearing a hole through the line. Hydraulic fluid leaked out through hole. □ (H series) Pilot heard loud noise during start and noticed egt was abnormally high. Large plastic bag was found in left top side of intake. The bag is the type used by mechanics to prevent foreign objects from entering engine intake during maintenance. Somehow the bag was stuffed into the intake and left there during reassembly of particle separator. □ (V series) Electrical system lost power intermittently during flight. Voltage regulator was set too high. □ (H series) Crew smelled fuel fumes in cockpit. Auxiliary fuel line T fitting located in hellhole was undertorqued.

CH-47 Class E mishap □ (C series) Smoke was seen coming from No. 1 engine during flight. An oversized gasket (O-ring) had been installed on No. 1 engine hydraulic motor pump, causing gasket to be pinched and allowing hydraulic fluid to leak from motor.

C-12 Class E mishap □ (A series) Passenger cabin area filled with smoke during climbout. Pilot completed smoke and fume elimination emergency procedure and smoke stopped. Postflight inspection revealed right engine compartment was oil soaked and oil level was 4 quarts low. When oil fillercap was unlocked and removed to check fluid level, it was very difficult to unlock and cut was found on rubber packing. It is suspected that after oil sample was taken, oil fillercap was installed in such a manner that the rubber packing was displaced and failed to seal. This could allow engine oil to blow out oil filler port and enter engine compartment.

Messages received

• UH-60 supplemental maintenance information message concerning removal of rubber boots from main rotor control rod bearings and main rotor damper bearings and change to the recurring inspection of the bearings (rotor system) (MIM-UH-60A-83-MEA-10, 071400Z Sep 83). Message provides additional information pertaining to inspection of the main rotor control rod and damper bearings.

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

Info available on hazardous materials

The Hazardous Materials Technical Center (HMTC) was established by the Defense Logistics Agency (DLA) to provide technical information and guidance on the handling, storage, transportation, and disposal of hazardous materials. The center is operated by the Dynamac Corporation of Rockville, Maryland. DLA is the program manager; the technical monitor is the U.S. Army Environmental Hygiene Agency.

The primary purpose of HMTC is to gather, analyze, synthesize, store, and disseminate information related to the management of hazardous materials and wastes. The center develops handbooks, prepares state-of-the-art reports, publishes abstracts of the current literature on a quarterly basis, and responds to technical inquiries.

HMTC responds to technical inquiries with a technical analysis of available information and the rendering of substantive advice on the value and reliability of the information. This service is free to all Department of Defense organizations. HMTC was established for your use. If you have a hazardous materials or waste problem, contact HMTC.

For more information, call 800-638-8958 or write to HMTC, P.O. Box 8168, Rockville, MD 20856-8168. ■

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Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL36362 □ STACOM 95 □ 21 Sep 1983

U.S. SAR satellite launched worldwide coverage

The first of two U.S. satellites designed to pick up and transmit Emergency Locator Transmitter (ELT) signals to search and rescue (SAR) centers was launched March 28 and is now operating 470 miles above the earth in a polar orbit. The combined weather/SAR satellite joins two Soviet packages in orbit for the same purpose.

Location of the ELT signals of downed aircraft is accomplished by Dopplar shift and is accurate to within 12 miles. A second U.S. satellite is scheduled for a spring 1984 launch, as the last phase of an evaluation program to assess the practicality of a satellite net that would provide worldwide coverage.

One problem of concern is possible inundation by "false alarms," since the satellites will pick up virtually every ELT activated anywhere in the world—and 97 percent of the signals are inadvertent. The already time-consuming task of segregating false alarms from genuine signals could be increased several fold.

The biggest problem with ELTs, other than not having one, is one sending out a false signal. Pilots must insure that ELTs are off when not in use.

Additional information concerning ELTs can be found in paragraph 454 of the current **Airman's Information Manual.**

—from **FAA General Aviation News** ■

Performance Planning

As numerous questions continue to be asked about the use and importance of performance planning cards, we are reprinting the following two previous STACOM articles.

UH-1 and AH-1 gross weight validation factor (torque)

Task 2002, **Perform hover (power) check,** in TC 1-135 and TC 1-136 provides the methodology for computation of several different torque values. These computed values, entered on the performance planning card (PPC) and properly used by aircrews, enhance our ability to safely and effectively operate the aircraft.

Some confusion exists with regard to gross weight and its applicability to the go-no-go torque values. The go-no-go values derived for a specific set of environmental conditions are constant, regardless of aircraft gross weight. However, when the indicated torque at a 5-foot hover exceeds the go-no-go value, the only method available to the pilot that will reduce the indicated torque is the reduction of aircraft weight.

Because go-no-go values do not directly consider aircraft gross weight, they may equate to an aircraft gross weight in excess of the maximum allowable as specified within the operators manual. For this reason, a gross weight validation factor (torque) should be computed. The gross weight validation factor is computed in the same manner as "predicted torque," except that maximum allowable gross weight is used; i.e., 9,500 pounds—UH-1 and AH-1G; 10,000 pounds—AH-1S.

This torque value should be entered on the PPC and compared to the actual indicated torque during performance of the power check. Indicated torque values above the gross weight validation factor (torque) during the power check denote aircraft gross weight may be in excess of maximum allowable. Weight and balance forms and performance planning figures must be reaffirmed and/or aircraft gross weight must be reduced before continuation of the mission.

This gross weight validation factor (torque) has no effect on the go-no-go torque values and once aircraft gross weight is confirmed, the appropriate go-no-go torque values must be consulted to insure the availability of sufficient engine power.■

Directional control margin

Numerous inquiries indicate confusion about the correct use of the "Directional Control Margin" chart in TM 55-1520-210-10, figure 5-1.1, sheets 1 and 2.

The purpose of this chart is to determine wind azimuth and relative speed where at least 10 percent pedal margin can be maintained for a given pressure altitude, temperature, and gross weight. Use of the following procedures should answer questions about this chart.

Known conditions:

- Pressure altitude—5,000 feet.
- FAT—0° C.
- Gross weight—8,500 pounds.

Correct procedure:

- Enter the chart (figure 5-1.1, sheet 1) at a pressure altitude of 5,000 feet.
- Move right until intersecting the index line of 0° C. FAT.
- Move down towards Density Altitude.
- Reenter the chart at gross weight of 8,500 pounds.

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■ The intersection of gross weight and density altitude lines is 19 knots. This indicates the maximum 90° right crosswind that can be encountered and still maintain 10 percent directional control margin. If the predicted winds (steady winds or highest gust) are 19 knots or below, mark "yes" in the safe pedal margin block of the PPC.

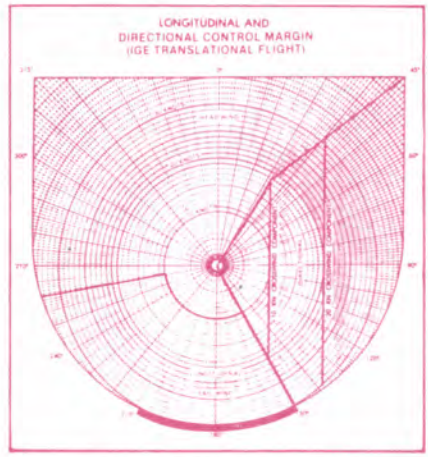
■ If the winds are predicted above 19 knots, refer to figure 5-1.1, sheet 2, to find the wind azimuths where the control margin may be less than 10 percent.

1. To find the wind azimuths, follow the 19-knot windspeed line (as determined on sheet 1) till it intersects the 90° line.

2. Using the 20-knot "crosswind component" line, draw a line parallel to it from the 19-knot intersection point.

3. With the predicted winds, e.g., 25 knots, intersect the parallel line of 19 knots with the wind azimuth line (49 and 131 degrees). These azimuths are in relation to the nose of the aircraft. (0° on figure 5-1.1, sheet 2, is always the nose of the aircraft.)

Note 1: To find the maximum azimuths, follow the 19-knot parallel line up to the dark bold line and down to the



bottom of the chart (or the bottom of the dark bold line). The intersections of these points are 39° at the top and 141° at the bottom. These are the maximum azimuths.

Note 2. If safe pedal margin cannot be maintained, the gross weight of the aircraft should be adjusted. This can be accomplished by referring to sheet 1, figure 5-1.1. Intersect the PA and FAT line with the predicted winds and move left to that gross weight. If possible, adjust your gross weight to that figure or less before attempting the mission. If gross weight cannot be reduced sufficiently, flight may be made only if the nose of the helicopter can be maintained within the safe area during hover, takeoff, and landings.

Note 3. The longitudinal tailwind area depicts winds in excess of 10 knots from azimuths 150° to 260° that can affect both the 10 percent directional control margin and aft cyclic movements and can be verified during the hover check.

Note 4. This information is only valid for a helicopter at a stabilized hover at rpm and does not predict capabilities in flight such as in a maneuvering mode during NOE operations.■

Maintenance test flight evaluators (MTFE)

In accordance with FM 55-44, to become qualified as an MTFE, an aviator must successfully complete a course of instruction for maintenance test pilots at the U.S. Army Transportation School (USATSCH) or satisfactorily complete an equivalency evaluation given by the USATSCH. He must also successfully complete an MTF evaluation (per FM 55-44) by an MTFE designated by the local installation commander. ■

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Accident sense and the FY 82 record

II. Flight crew error: Violation of regulations/flight discipline

This is the second in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. This week we will focus on violation of regulations/flight discipline, one of the five flight crew problem areas involved in 67 percent of the 58 flight-related Class A accidents in fiscal 82. Accidents attributed to violation of regulations/flight discipline last year resulted in three fatalities and cost the Army almost $6 million.

The costly errors in these cases were committed by aviators who knowingly violated regulations or performed a prohibited or unauthorized action with full confidence in their ability to handle any problem the unsafe action might produce. What they failed to remember is that flight safety rules and regulations are the result of a lot of hard-earned and very costly experience, written for their protection and the protection of their aircraft and passengers.

• An OH-6 pilot, while practicing confined area operations, set up a final approach, with no intent to land, to an area he knew was not authorized for confined area practice. His aircraft hit two power cables and crashed. The pilot violated flight manuals and regulations by flying below 500 feet agl, not doing a high recon, and not identifying a forced landing area. Result: destroyed aircraft and $145,000 in losses. The pilot had 379 rotary wing hours, with 33 in the OH-6.

• An OV-1D pilot was on a VFR photo mission of a target located about 2 miles from a major airfield. On arrival in the area, he was told to remain clear of the airfield control zone because of IFR weather conditions. About 400 feet agl, the pilot began a right turn by applying 30 degrees of bank and penetrated the restricted airspace by 2½ miles after acknowledging instructions to remain clear. In the turn, he increased the bank angle to about 90 degrees and allowed the aircraft to assume a nose-low attitude. The 90-degree bank angle exceeded the maximum angle of bank for steep turns in accordance with TC 1-144. The aircraft crashed in a near-level attitude, with a very high sink rate and high forward airspeed. Result: destroyed aircraft, two fatalities, and $2,633,000 in losses. The pilot had 3,764 fixed wing hours, with 1,638 in the OV-1D.

• Two AH-1S pilots were returning from a mission and decided to make a low-level, high-speed pass over their field site. The flight leader expected both aircraft to break to the left and land. The No. 2 aircraft made a break to the right with a cyclic climb. The PIC in the front seat told the pilot to increase aft and right cyclic during the turn. The aircraft was at 150 feet and out of trim at the apex of the climb. The PIC told the pilot to trim the aircraft. The pilot applied excessive right pedal, and the aircraft rolled to the right and nosed down. The PIC got on the controls with the pilot, but there was not enough altitude to recover. The aircraft flew through trees and crashed. Result: destroyed aircraft and $1,561,000 in losses. The PIC had 1,028 rotary wing hours, with 859 in the AH-1S. The pilot had 317 rotary wing hours, with 125 in the AH-1S.

• A UH-1H pilot was flying at cruise airspeed about 100 feet above a bay. The aircraft hit two wires which severed the tail rotor drive shaft. The pilot flew the aircraft about one-half mile to the shore and tried to make an emergency landing. Airspeed was allowed to dissipate to the point that the aircraft went into a spin and crashed on the shoreline. The pilot had been counseled twice before for unauthorized low-level flight. Result: destroyed aircraft, three major injuries, one minor injury, and $949,000 in losses. The pilot had 3,375 rotary wing hours, with 1,644 in the UH-1H. The copilot had 216 rotary wing hours, with 162 in the UH-1H.

• An OH-58A pilot lost visual references soon after takeoff and could not maintain VFR flight. The aircraft was seen about three-fourths of a mile from the takeoff point coming out of low clouds in a steep right turn at or exceeding normal cruise airspeed. The OH-58 crashed in a near-level attitude. Result: destroyed aircraft, one fatality, and $474,000 in losses. The pilot had 329 rotary wing hours, with 140 in the OH-58A.

Next week's article will focus on failure to follow established procedures. ■

Helicopter in-flight icing

How should pilots treat the icing environment? Some will respond to this query by emphasizing the many hazards and uncertainties associated with helicopter in-flight icing. Others, more casually, may reflect upon prior fixed wing icing experience and conclude that icing, unless severe and extensive, is not a restriction to helicopter operations. Still others will perceive in-flight icing to be a problem only in the operational sense, i.e., the freezing of windshields, without associating the consequences of in-flight icing to flight safety.

As the demand for helicopter IFR operations has grown in response to military requirements, in-flight helicopter icing has increasingly been identified as a major limitation. Today, military units and numerous other helicopter users routinely undertake helicopter IFR operations. No longer is the old "avoid visible precipitation" rule of thumb viable or adequate for dealing with helicopter icing.

Concern over helicopter operations in the icing environment is not without justification. In the early and mid-1970s, research conducted by the U.S. Army and other government agencies disclosed the unique and dangerous effects of rotor blade icing. During these tests, the helicopter's autorotational characteristics deteriorated significantly when only a small amount of ice accumulated on the rotor blade's leading edge.

Further research and field operations have raised still other concerns relating to helicopter operations in the icing environment and include:

- Ice-induced engine failures.
- Asymmetrical shedding of main rotor and tail rotor icing with associated vibrations.
- Increased power requirements due to additional drag of the rotor system.
- Hazards to life and property from shedding rotor blade ice.
- Operational penalties associated with in-flight helicopter icing, i.e., restricted airspeed, premature blade stall, and significantly reduced range and endurance.

Ice-induced engine failures

Field reports from aircraft operators have repeatedly verified the susceptibility of helicopter turbine engines to in-flight icing. In 1977, the U.S. Navy reported several helicopter accidents and incidents involving ice-induced engine failures. On one occasion, a CH-46 helicopter on a cross-country flight to the San Francisco Bay area was operating in instrument meteorological conditions (IMC) and experienced a dual-engine flameout, because engine screens were installed on both engines.

Yet another incident involved a Navy H-2 helicopter on a night flight in IMC over mountainous terrain. While climbing to a higher altitude, icing was encountered (neither forecast nor anticipated), causing severe vibrations and the loss of both turbine engines, resulting in the necessity for a night autorotation on instruments over mountainous terrain. Subsequently, the H-2 broke out, the pilot located a lighted civil airport and landed, despite the loss of both engines.

Another Navy CH-46 was lost due to ice-induced engine failures while flying at 3,000 feet in IMC and below the freezing level only minutes after liftoff. Shortly after takeoff, ice was noticed forming on the windscreen and over the engine screens. Despite the pilot's immediate action to initiate an emergency descent, a dual-engine flameout was experienced, requiring an autorotation and ditching, after which the helicopter sank. The flight from takeoff to ditching consumed less than 13 minutes, illustrating dramatically the disastrous effects of in-flight icing on helicopter engine air screens.

More recently, a U.S. Air Force HH-3 crashed in Iceland and was destroyed when one of its two turbine engines failed due to the internal failure, or malfunction, of a pressure valve in the engine anti-icing system used to channel heated air from the engine compressor over the inlet guide vanes and struts of the front frames of each engine.

Failure of the pressure valve does not activate any cockpit annunciator light or instrument to alert the pilot of an unreliable engine anti-icing system. So the crew initiated a takeoff, and the engine with a malfunctioning anti-icing system failed shortly after takeoff when the crew was preoccupied with takeoff duties.

Rotor blade icing

Helicopter in-flight icing difficulties are not always associated with the powerplant. The rotor blades are equally, if not more so, susceptible to in-flight icing problems.

Helicopter operators in Canada, the U.S., Europe, and the Far East are familiar with the effects of helicopter rotor blade icing. North Sea pilots have reported extreme vibrations resulting from blade icing shortly after entering an icing environment. Occasionally, pilots have experienced vibrations sufficiently severe to prevent an accurate interpretation of cockpit instruments. Army test pilots have documented several occasions where test flights into natural icing conditions were abandoned only moments after entering the icing environment because of excessive vibrations caused by blade icing.

Airspeed reductions to 60 to 70 knots often will lessen vibrations resulting from blade icing. Such a remedy, however, treats only the symptom (severe vibrations) and not the illness (rotor blade icing).

Apart from causing severe vibrations, rotor blade icing challenges flight safety in an almost unnoticeable manner by deteriorating the rotor system's autorotational qualities. The adverse effects of main rotor icing on autorotational performance had gone relatively unnoticed for many years.

In the early 1970s, artificial and natural icing tests conducted by the Army revealed that moderate ice accumulation (about one-half inch) on inboard portions of the UH-1H rotor blade was sufficient to preclude a safe autorotation in the event of an engine failure. Even small amounts of rotor blade ice (one-eighth of an inch over one-third of the blade span) were noted by Army researchers to have a significant effect upon the UH-1H's autorotational characteristics.

The loss of autorotational qualities results from greater ice accumulation on the inner portions of the rotor disc, which directly affects the blade's efficiency with respect to upward airflows during autorotation. Consequently,

when the leading edge of the rotor blade accumulates approximately one-half inch of ice on the first half of the blade span, minimum (safe) rotor rpm cannot be maintained during autorotation.

Helicopter pilots should not judge or estimate main rotor blade ice accumulations by observed buildups on the windscreen or other parts of the helicopter. A more reliable method for pilots of UH-1-type helicopters is to estimate ice buildup on the main rotor blades by monitoring the power required (torque indications). Researchers indicate that blade icing of one-half of an inch or greater on the UH-1 will be accompanied by a 5- to 6-psi torque increase over the "no ice" power requirement. For other helicopters, a noticeable increase of 5 to 10 percent in power required while in the icing environment is reason to suspect a deterioration of autorotational performance.

Rotor blade ice shedding

Many helicopter pilots are inclined to disregard the hazards associated with rotor blade icing and rely instead upon in-flight ice shedding to mitigate the critical effects of ice accumulations on the rotor blades. While in-flight ice shedding can, and does, occur, it is as likely to create a problem as it is to relieve one.

Symmetrical (affecting all rotor blades simultaneously in the same way) shedding of rotor blade ice in flight can be beneficial by restoring the rotor blades to a more efficient or clean configuration and by minor reductions in aircraft weight.

Asymmetrical shedding (affecting less than all of the main rotor blades), however, can create extremely severe vibrations, depending on the amount of ice discharged, the rotor system, and factors.

Asymmetrical shedding can be minimized by avoiding static air temperatures of below -5° C. Research indicates that, by operating in environments of -5° or warmer, shedding generally will occur symmetrically. Tests with UH-1 type aircraft suggest that, by rapidly

varying main rotor speeds or by going into autorotation, symmetrical shedding may be induced when static air temperatures are -5° C. or warmer. Collective and cyclic inputs generally are ineffective in producing symmetrical shedding and may result in asymmetrical shedding. **At temperatures below -5° C., generally it is not possible for the pilot to induce shedding.**

Rotor blade ice shedding presents still other dangers. Since ice shedding is most likely to occur when rotor rpm speed is varied significantly, the "shutdown operation" may send ice deposits from the rotors flying unpredictably in any direction at high speeds. Pilots and ground personnel should be especially alert when landing helicopters after flight in suspected icing conditions to insure that ground personnel, other aircraft, and valuable property are well removed from the immediate area surrounding the helicopter to preclude injury or damage by rotor blade ice shedding.

In-flight icing operational penalties

When helicopters enter the icing environment, severe operational penalties can be expected. To mitigate vibrations, airspeed often must be reduced significantly to the 60- to 70-knot range. Further, as the rotor blade's efficiency is deteriorated by ice accumulations, significant increases in power will be required, with an accompanying reduction in endurance and range. Maneuvering and performance also will be restricted as the blade-stall region is lowered markedly from the "no-ice" condition.

Hoists and cargo slings also have been known to malfunction after prolonged exposure to the icing environment. Unheated windscreens and windows also can be expected to ice over completely, reducing forward visibility entirely.

Options, actions to reduce helicopter icing hazards

Over the long run, technological developments in helicopter design and support systems will enable the pilot to effectively cope with in-flight icing hazards. Until research and technology progress to this point, however, the actions and options listed below may be of limited assistance to the helicopter pilot in minimizing the threat of in-flight icing hazards.

- Monitor engine instruments continuously for indications of increasing power demands. Early detection of rotor blade icing may be noticed by increasing power requirements.

- Use weather reports and icing forecasts with caution. Current icing definitions used to describe the icing environment (trace, light, moderate, and severe) do not differentiate with respect to different types of aircraft. Therefore, a problem with these definitions is that a particular liquid water content and drop size distribution may be light with respect to one aircraft and moderate to another. The forecaster, however, does not differentiate between types of aircraft when forecasting icing conditions as "light" or "severe."

- Avoid icing conditions if uncertainty exists about the magnitude or scope of the icing environment. When unexpected in-flight icing is encountered, do not hesitate to initiate any and all actions reasonably calculated to depart the icing environment expeditiously.

- Avoid abrupt or erratic cyclic and collective inputs when attempting to shed rotor blade ice accumulations, since such inputs may cause asymmetrical shedding and accompanying severe vibrations. Rapid variations in rotor rpm may be of some assistance in achieving symmetrical shedding.

- Recognize the extreme susceptibility of light helicopters to in-flight icing. The limited power available and faster rotor systems of light helicopters make these aircraft extremely sensitive to in-flight icing (severe vibrations, control difficulties, and insufficient power reserves).

- Do not attempt to judge or estimate main rotor blade ice accumulations by observed buildups on the windscreen or other parts of the aircraft, since ice accumulates on the rotor blades at an accelerated rate. A 5- to 10-percent increase in power required to sustain normal flight over the "no ice" condition is a more reliable method of determining critical rotor blade ice buildups.

- After flight in the icing environment, helicopters should be shut down to prevent shedding ice from main rotors and tail rotors from injuring personnel or damaging other aircraft or structures.

- When icing conditions prevail, avoid sustained flight in the upper half of cumulus and stratus clouds where large water droplets and high liquid water content normally are found.

- When severe vibrations due to blade icing occurs, reduce airspeed from normal cruise to 60 to 70 knots or less, depending on the aircraft, mission profile, and prevailing meteorological conditions.

- Penetrate the airspace over mountainous terrain perpendicular to the mountain range so as to minimize the helicopter's exposure to intensive icing in regions where strong upward air currents on the mountain's windward side are capable of supporting larger than average water droplets, compounding the icing hazard.

- Never take off with even the smallest amount of ice on any of the rotor blades. Rotor blade efficiency is deteriorated by the smallest amounts of ice. ■

—adapted from an article by Arthur J. Negrette in the Flight Safety Foundation Helicopter Safety Bulletin

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (H series) Whistling noise was heard from rotor system during flight. Caused by separation of skin from main rotor blade. □ (H series) Transmission oil hot light came on. Caused by defective thermostatic switch. □ (H series) Unusual feedback and stiffness in cyclic during hover were caused by failure of cyclic servo. □ (V series) Crew was notified by tower personnel that drive shaft cowling appeared to be open. Open fasteners on cowling were not detected during preflight. □ (V series) After practicing emergency governor operations, crew placed governor switch in auto position. Governor would not return to automatic. Caused by failure of governor solenoid.

Attack helicopters

AH-1 Class E mishaps □ (S series) During low-level flight, pilot's door latch connecting link broke 1½ inches aft of forward latching roller assembly. Door partially opened. Pilot transferred controls to copilot and held door closed until aircraft was landed. □ (S series) Pilot noticed both N_1 gauges at zero during NOE flight. Caused by failure of N_1 tachometer generator.

Observation helicopters

OH-58 Class E mishaps □ (C series) Main rotor blades hit tree during takeoff. Caused by improper crew coordination. Copilot was flying aircraft and pilot was looking at his map. □ (C series) Master caution and fuel boost pump lights came on. Caused by failure of fuel pressure switch. □ (A series) N_2 dropped during takeoff. Caused by cracked accumulator.

Fixed wing

U-8 Class E mishap □ (F series) No. 2 engine chip detector light came on as engine was being feathered after single-engine operation. Caused by failure of gear reduction system.

U-21 Class E mishap □ (A series) Crew heard grinding noise and felt minor airframe vibration shortly after takeoff. Caused by failure of main inverter.

Maintenance

UH-1 Class E mishaps □ (V series) Pilot's instrument lights went out during night flight. Smoke and fumes were noted in cockpit. Leads to rheostat had been modified in an unauthorized manner, causing electrical wire to become hot and burn. □ (H series) Transmission oil hot light came on. Caused by loose ground wire. □ (H series) Transmission fluid was seen dripping from transmission well onto skids during runup. Spacer was not installed at elbow fitting between oil filter and oil pump, allowing O-ring to leak. □ (H series) During takeoff, right pedal could not be pushed in forward of center. Nut had backed off of stud and worked its way into silent chain assembly.

AH-1 Class E mishaps □ (S series) Crew saw smoke during hover check. IP felt stiffness in pedals. Servo line had chafed against electrical bundle line. □ (S series) Master caution and transmission oil hot lights came on. Caused by frayed electrical lead grounding to airframe.

OH-58 Class E mishaps □ (C series) Fuel boost pump light came on. Caused by loose connection to cannon plug. □ (A series) When fuel boost pump switch was turned on during runup, boost pump light came on and circuit breaker popped. Wiring for fuel boost pump was installed in reverse order. □ (A series) Loud noise was heard from rear of aircraft during takeoff. Caused by FOD in engine compressor section.

C-7 Class E mishap □ As pilot was taxiing for takeoff, he was told there was a

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	1-27 Oct	2	0
	November	2	0	November		
	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	2	0

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

large hydraulic leak in left brake area. Caused by loose fluid pressure line bolt.

Messages received

• Revision to safety-of-flight emergency technical message concerning one-time inspection of connecting link, rigid, left cyclic, and connecting link, rigid, right cyclic, for all UH-1H/V, EH-1H, and EH-1X aircraft (UH-1-82-06, 082100Z Oct 82). Summary: Rivets with the letters **VS** stamped on the heads have been used on serviceable connecting links since 1974. This message contains serial numbers of aircraft which must be inspected. All other aircraft are released for flight. Contact: Dick Mooy, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of anti-icing valve poppet seat screw for proper staking on all T62-A-5A/700 and T63-A-720 gas turbine engines (OH-6-82-01, OH-58-82-03, 071530Z Oct 82). Summary: The screw holding the teflon poppet seat in the anti-icing valve poppet assembly has been found loose in a number of instances. Loss of the screw inside the engine can cause engine failure. Screw should be inspected to insure it is staked securely. Contact: Dave Giratos, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning wiring clearance of the AN/ALQ-144 IR jammer on the AH-1S (AH-1-82-12, 061300Z Oct 82). Summary: During initial installation of the AN/ALQ-144 IR jammer, an interference problem was observed between the heavily shielded connecting cable and the outer screen of the IR suppressor fairing assembly. About 350 IR suppressor fairings that are subject to this interference fit were produced. This message provides means to readily identify the errant screen fairings and describes the temporary fix that will be performed during initial installation of the IR jammer. Contact: Ed Soteropoulos, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance advisory message concerning definitive handling and shipping instructions for emergency parachutes and related equipment (122130Z Oct 82).

• Maintenance information message concerning potentially faulty oil level sight gauge indicators on OH-58A/C helicopters (MIM-82-58-03, 132002Z Oct 82).

• UH-60A maintenance information message concerning T700-GS-700 engine primer nozzle/fuel injector TBO (MIM-T700-82-MEA-06, 151935Z Oct 82).

• Safety-of-use message concerning AN/PSS-11 metallic mine detectors (SOU-MES-82-01, 081915Z Oct 82).

• Safety-of-use message concerning AN/PSS-11 metallic mine detectors (SOU-MES-82-03, 082000Z Oct 82).

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

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Accident sense and the FY 82 record

III. Flight crew error: Failure to follow established procedures

US Army Aviation Training Library
Fort Rucker, Alabama 36360

This is the third in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. This week we will focus on failure to follow established procedures, one of five dominant flight crew errors involved in fiscal 82 Class A flight accidents. Accidents caused by failure to follow established procedures last year resulted in two fatalities and cost the Army more than $5 million.

• An AH-1S maintenance test pilot, when confronted with an in-flight SCAS malfunction, misinterpreted the aircraft actions as being caused by a main transmission mount failure. When the aircraft began a series of uncommanded rolls to the left and right, the pilot did not release the SCAS or make sufficient cyclic control inputs to compensate for the displaced neutral position of the cyclic control stick in accordance with the operators manual. The AH-1 continued in uncontrolled flight until it crashed. Result: destroyed aircraft, one fatality, one minor injury, and $1,608,000 in losses. The pilot had 2,111 rotary wing hours, with 381 in the AH-1S.

• During a two-engine go-around, at an airspeed of about 104 knots and an altitude of 150 feet agl, the left engine of an OV-1D failed. The aircraft began rolling to the left. Flaps and landing gear were down. The IP continued flight at the low altitude and airspeed while trying to restart the inoperative engine, reducing allowable time for a safe ejection. When it became apparent that control would be lost, the IP ordered the rated student pilot to eject. The IP ejected but the rated student pilot did not. Result: destroyed aircraft, one fatality, one major injury, and $2,033,000 in losses. The IP had 6,200 fixed wing hours, with 1,000 in the OV-1D. The rated student pilot had 1,783 fixed wing hours, with 343 in the OV-1D.

• A UH-1H maintenance test pilot, flying at 90 knots and 700 feet agl, felt a shudder in the aircraft. The pilot climbed to 1,500 feet and increased airspeed. The aircraft shuddered again, and the pilot initiated a precautionary landing to an open field. Suspecting an impending engine malfunction, the pilot used excessive airspeed during the approach and overshot the intended touchdown point, placing the aircraft over trees and stumps. As collective was applied, partial power loss occurred because of internal failure of the engine fuel control. Rotor rpm could not be maintained, and the aircraft descended into trees. Result: destroyed aircraft and $618,000 in losses. The pilot had 389 rotary wing hours, with 260 in the UH-1H.

• An OH-58A pilot, while performing a through-flight inspection with the aid of a checklist, did not remove all of the tiedowns. When flight was attempted with the left rear tiedown rope still attached, the helicopter crashed and came to rest on its left side. There was not a crew chief present to help the pilot with his preflight, to clear the aircraft during takeoff and ground operations, and to stand fireguard during engine start. Result: destroyed aircraft and $143,900 in losses. The pilot had 347 rotary wing hours, with 144 in the OH-58A.

• An OH-58A pilot's unsecured flight jacket blew out of the aircraft and hit the tail rotor system, causing loss of both tail rotor blades and gearbox. After losing antitorque control, the pilot began an altitude-over-airspeed cyclic climb and allowed airspeed to decrease below that required for directional control. The aircraft began an uncontrollable turn to the right. The pilot closed the throttle and autorotated into trees. Result: destroyed aircraft, one major injury, and $148,500 in losses. The pilot had 744 rotary wing hours, with 619 in the OH-58A.

• A UH-1H crew was making an approach to a field site at night. The PIC told the pilot to shoot the approach to the ground because the landing site would be dusty. The pilot terminated the approach at a hover, and the aircraft began to drift to the right. The PIC again told the pilot to land. The aircraft continued to drift and the PIC lowered the collective. The right skid hit the ground first, and the aircraft rolled inverted. Result: extensive damage and $618,000 in losses. The PIC had 318 rotary wing hours, with 260 in the UH-1H. The pilot had 199 rotary wing hours, with 140 in the UH-1H.

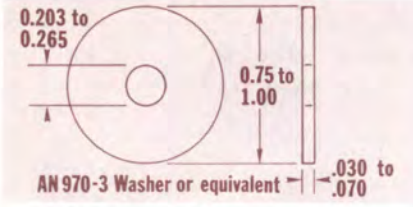
Next week's article will focus on inattention to tasks. ■

Shortfax

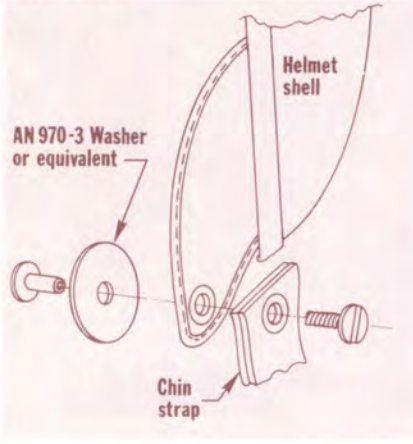
Helmet chin strap modification

Several cases have been reported in which the SPH-4 helmet chin strap was pulled through the cloth retention assembly, not only during mishaps but also through normal use. Action has been taken to change the present design, but it will be some time before all helmets are retrofitted. Therefore, until new chin straps are available, it is recommended that a washer be added to the inside of the cloth retention harness to prevent the metal grommet from pulling through the cloth. The washer may be steel, brass, or aluminum. Plating is not required since this is an interim solution.

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



The washer should be installed as shown below:



Near midair

An Army U-21 took off from an airfield on a VFR flight plan. The pilot did not make use of available stage III radar service from departure control. About the same time, a flight of three Air Force C-130 aircraft took off from another airfield on an IFR flight plan. Climbing through 2,500 feet, the U-21 and one of the C-130s passed within 100 feet of each other. The C-130 pilot took evasive action, preventing a midair collision.

Departure control was unable to warn the C-130 pilots or the Army pilot of the potential conflict since only the C-130s were under radar service. The U-21 was not visible to the radar controller until after the near midair collision.

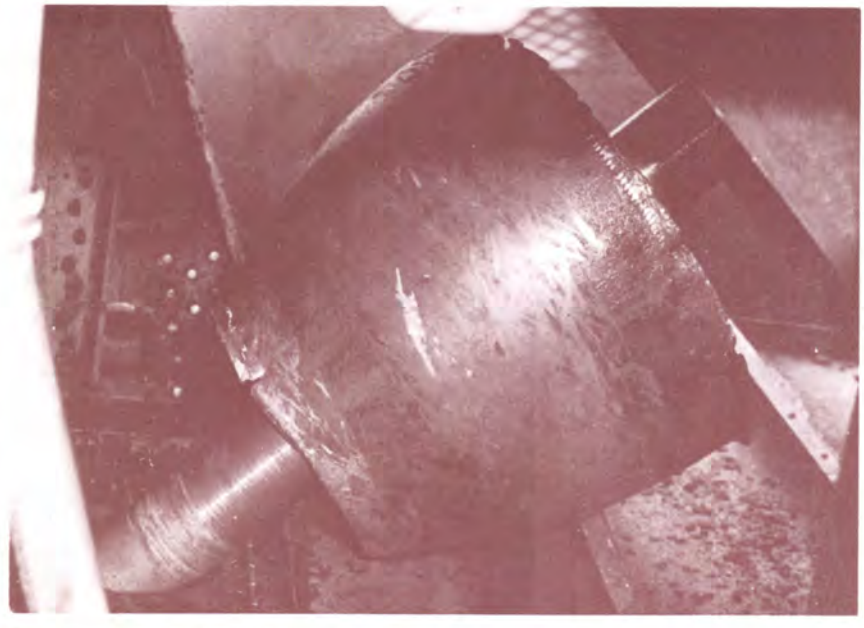
The guidance contained in FLIP General Planning 5-35A(1), Stage III Service, states, "USAF aircraft operating VFR must participate to the maximum extent possible." However, military aircraft of other services are merely encouraged to participate. It becomes apparent that participation is a necessity rather than a luxury. ■

Take a closer look!

During a recent preflight inspection of a CH-47, the crew detected scoring on the transmission oil cooler fan drive shaft. Closer inspection revealed that the fan assembly tail cone had separated from the fan assembly. The fan drive shaft was scored its entire length. The transmission oil cooler fan assembly, including the fan drive shaft, had to be replaced.

This area inside the aft pylon is not usually checked on daily and preflight inspections. A detailed inspection is not done until a phased maintenance inspection is due. Visual access to the oil cooler fan assembly is easily available on the right side of the aft pylon. So the next time you do a daily or preflight inspection, take an extra minute to check the transmission oil cooler fan assembly. Early detection of problems in this area could prevent in-flight occurrences. ■

—thanks to CW3 Robert Boccardi, ASO, 17th Aviation Group, Korea



Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap □ (H series)IP demonstrated simulated engine failure from a high hover. Aircraft was about 15 feet agl. Initial ground contact was normal. During the 100-foot ground run, IP applied additional collective to keep aircraft light on the ground, dropping rotor rpm below normal. During last one-third of ground run, aircraft started a fore and aft rocking motion and right skid came off the ground twice. IP applied aft cyclic, causing mast bumping due to low rotor rpm. Mast bumping exerted extreme forces on main transmission support case, breaking case. Transmission pivoted forward, releasing tail rotor drive quill centering spring and resulting in tail rotor failure. 8303

UH-1 Class C mishap □ (H series) Crew noticed rapid rise in engine oil temperature during flight. Approach was established to nearest open field. The pilots and crew chief discussed the problem and determined it to be a gauge malfunction. Engine oil pressure and transmission oil temperature were normal. Flight was then continued to destination airport about 5 minutes away. High engine oil temperature was caused by failure of bearing in engine oil cooler. Engine had to be replaced. **See front page article on failure to follow established procedures.**

UH-1 Class E mishaps □ (H series) Pilot smelled fuel fumes and landed. Fuel leak in transmission well was caused by clogged valve. □ (H series) Crew heard loud whistling sound. Vibration was felt in controls on touchdown. Caused by failure of patch on main rotor blade. □ (H series) Engine chip detector light came on about 2 minutes after takeoff. Caused by internal engine malfunction. □ (H series) Pilot noticed high engine oil temperature. Caused by stuck thermostat flow control. □ (H series) Master caution and hydraulic pressure lights came on. Caused by failure of hydraulic pressure switch. □ (V series) Aircraft yawed right and left several times, and engine and rotor tachometer fluctuated. Caused by sheared tachometer generator shaft.

UH-60 Class C mishap □ Aircraft landed hard during NVG training, cracking tail wheel landing gear shock and breaking actuator and angle bracket.

UH-60 Class E mishap □ Master caution and engine oil pressure lights came on. Engine oil had been serviced the day before and cap was not secured. IP did not check cap before flight.

Attack helicopters

AH-1 Class C mishap □ (S series) Postflight inspection revealed several large dents on inboard side of both tail rotor blades. Aircraft apparently descended too low during NOE flight.

AH-1 Class E mishaps □ (S series) Pilot's torque gauge read 6 percent higher than gunner's. Caused by malfunction of torquemeter transducer. □ (S series) Cyclic feedback occurred while aircraft was in 5-degree right bank. Cyclic then froze with aircraft 15 degrees nose up and in 20-degree right bank. Cyclic remained locked for about 5 seconds and then broke free. Aircraft rolled left 30 degrees and pitched nose down 26 degrees. Pilot regained control and landed. Cyclic servo lockup seal on servo valve piston rod end bearing housing had moved up into housing, causing control to lock up. □ (S series) Truck pulled in front of aircraft as aircraft was taking off. To avoid a collision, pilot pulled in power and reduced airspeed. Torque went to 103 percent.

Observation helicopters

OH-6 Class C mishaps □ Dent was found in leading edge of tail rotor blade during preventive maintenance daily. Left tail rotor drive shaft inspection panel was also missing. Panel probably came off in flight and hit tail rotor blade. □ ADF sense antenna broke in flight and was caught by main rotor blade. Antenna was pulled loose from engine fairing assembly.

OH-58 Class E mishaps □ (A series) Engine-out light and audio activated during runup. Caused by failure of engine-out sensor. □ (A series) Hole was found in bottom of aircraft on preflight. Pilot who flew the aircraft last had hovered in tall grass, checking for obstacles before landing. □ (C series) As aircraft was on final approach to tactical LZ in mountains, winds shifted and became gusty. Aircraft began to settle. Power was increased to 110 percent torque to prevent hard landing. □ (C series) Total electrical failure occurred after runup. Crew smelled and saw smoke coming from electrical compartment. Inspection revealed burned wiring around battery diode.

Fixed wing

C-7 Class E mishaps □ Left propeller reversing light came on during climb-

out. Caused by worn blade switches. ☐ Steering control was lost during taxi. Leak in nose gear area was caused by split in steering actuator hydraulic hose.

C-12 Class E mishap ☐ (A series) As power was reduced during climbout, No. 1 engine chip detector light came on. Caused by internal failure of engine power section.

OV-1 Class E mishap ☐ (RV-1D) Both hydraulic pressure gauges indicated zero during flight. Caused by cracked hydraulic line.

U-21 Class E mishap ☐ (A series) When approach flaps were selected, left inboard and outboard and right outboard flaps went past approach position, while right inboard only moved partially down. Flap switch was returned to up position and all flaps except right inboard returned to full up position. Splines to right inboard flap actuator head were stripped.

Maintenance

UH-1 Class C mishap ☐ (H series) When aircraft landed to pick up sling load, ground personnel noticed hole in tail rotor drive shaft cover. One-half of a sight gauge puller was found under tail rotor drive shaft cover and the other half had been picked up by the drive shaft and thrown through the drive shaft cover. Ninety-degree and 42-degree gearbox sight gauge had been recently replaced. Mechanic left sight gauge puller lying on deck in front of 42-degree gearbox.

UH-1 Class E mishap ☐ (H series) After shutdown, pilot smelled acid-type odor and noticed smoke and vapor coming from battery compartment and vents. Caused by incorrect servicing of battery.

AH-1 Class E mishaps ☐ (S series) No. 1 hydraulic light came on and crew heard hydraulic pump cavitating. Hole was chafed in pressure line from hydraulic pump to hydraulic filter module. ☐ (S series) Loud squealing sound was heard from transmission area. No. 2 hydraulic and master caution lights came on. Caused by loose hydraulic line fitting.

OH-58 Class E mishap ☐ (A series) Immediately after starter was engaged, TOT climbed to 1,000° C. Pilot confirmed that throttle was closed. Swedged fitting on throttle cable was loose, allowing fuel control to be open to 5 degrees with throttle fully closed.

C-7 Class E mishap ☐ Aircraft was on a planned 5 hour and 15-minute flight, with 6 hours of fuel. About 5 hours and 13 minutes into the flight, left fuel light came on, indicating 20 minutes of fuel remaining. Because of adverse winds, destination was still 15 minutes away. Fuel quantity indicated more than 200 pounds. Left engine quit aout 10 minutes later. Crossfeed was selected to feed left engine from right tank. Just before this selection, right fuel light came on. About 5 minutes later, left engine quit again, and crew decided to land. Main gear caught top strand of barbed wire fence during landing. Fuel gauges had been calibrated incorrectly, giving high reading.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	1-3 Nov	**0**	**0**
	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**2**	**0**

* Includes 1 ground accident
** Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Safety-of-flight maintenance mandatory message concerning one-time inspection of CH-47 engine fire extinguisher actuation cartridge (CH-47-82-13, 221430Z Oct 82). Summary: The Royal Air Force has identified a problem with the cartridges. Four new spares and three installed cartridges were found with loose terminal posts. These cartridges also failed the circuit continuity check. The vendor has advised Boeing-Vertol that the use of incorrect tooling during cartridge assembly in 1979 resulted in improper mating of the

(continued on back page)

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 84 □ 3 Nov 1982

Loss of tail rotor authority

In recent years, Army aviation has recorded far too many OH-58 accidents that were caused by loss of tail rotor authority. Some aviators know the condition as "tail rotor stall." However one cares to label it—"loss of tail rotor authority" or "tail rotor stall"—the result is generally a costly accident, occasionally involving fatalities.

The general impression among aviators is that this type accident involves aircraft that are operating at or above gross weight limitations. The facts do not support this impression. Most of the accidents involved aircraft that were well within their gross weight limits. The details of the accident summaries indicate other factors emerged that had an adverse effect on aircraft operation. NOE operation, low airspeed, high density altitude, change in wind direction/intensity, sudden gusts, rough control inputs, rigging, complacency, and inattention were some of the other factors. Acting singly or in concert, when added to the operating conditions and experience of the aviator, they produced a marginal, sometimes extreme, operating condition, and often one where recovery was not possible.

Since the OH-58A will continue to be part of Army aviation's inventory in its present configuration, measures to lessen its control deficiency should be of prime concern to the working aviator.

A partial solution to the tail rotor control deficiency would appear to entail avoidance, whenever possible, of the adverse conditions previously noted. The professional aviator is keenly aware of the limitations of the OH-58 tail rotor system, the ramifications of operating near gross weight limits, and the very small margin for error under this condition. Additionally, he knows that directional control margin charts assure directional control while at a stabilized hover (IGE) and during calm winds at 103% N_2 for the OH-58A, or 100% N_2 for the OH-58C. Furthermore, the aviator must always be aware that even though the aircraft is well within weight limits and operating in a favorable density altitude situation, the other factors previously noted can create conditions which adversely affect safe operating parameters.

Basically, the loss of tail rotor authority/tail rotor stall accident is the result of the aviator demanding more of the machine than the machine is capable of delivering. It is entirely possible to operate the OH-58 at a gross weight of 3,000 pounds. However, attempting to hover out-of-ground effect with a tailwind at a high density altitude and high gross weight too often will create an uncontrollable situation.

On the other hand, operation at relatively light gross weight and a favorable density altitude does not permit one the luxury of complacency and inattention. Add a little maneuvering, low airspeed, turning downwind with rough control inputs or overcontrolling and the result can be as distressing as the previous situation. A typical example involves the aviator performing a recon while maintaining a constant ground speed. A downwind turn will result in a loss of airspeed and a demand for more power—sometimes more than is available.

Although this article is centered on the loss of tail rotor authority/tail rotor stall phenomenon as it applies to the OH-58, the same condition can affect other Army helicopters. The OH-6, UH-1, and AH-1 have been involved in accidents where loss of tail rotor authority/tail rotor stall has occurred. Good performance planning, plus a commonsense approach to the mission, can eliminate the loss of tail rotor authority/tail rotor stall problem. ■

UH-60 operational limits

The UH-60 Operators Manual, figure 5-1, displays limits that have raised questions by many Army aviators. There is confusion in the meaning and use of the words "gage" and "actual" in the headings that explain operating limitations. The headings explain the difference between the gage markings and the actual limits. For example, the engine oil pressure gage indicates a yellow range from 25 to 45 psi. The gage markings cannot be changed to show the correct/actual yellow range from 20 to 40 psi. Figure 5-1 indicates the "actual" yellow range of 20 to 40 psi is to be observed rather than the "gage" yellow range of 25 to 45 psi. Change 16 to the UH-60 Dash 10 will display headings titled "Gage Marking" and "Actual Limits"— the latter being the aircraft operating limitations. ■

Procurement of pink filters for NVG users

Inquiries from field units indicate pink light filters for night vision goggle (NVG) training are very difficult, if not impossible, to obtain. Change 1 to MWO 55-1520-210-30-57 changes procurement procedures for the pink filter, making it a locally procured item. To obtain the pink filter, units should order the required number of filters from:

METAVAC Inc.
ATTN: Mr. Clifford Sisler
45-57 162d Street
Flushing, NY 11358

Correct pink filter nomenclature is filter, pink, diameter 5.740 inches ± .015 X .125 ± .015 inches thick pyrex substrate.

By using local procurement procedures, units should be able to obtain the necessary number of pink filters to supplement Night Hawk/NVG training. ■

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.

Mishap briefs

terminal stud in the insulator. Looseness of the stud can cause failure of the cartridge detonating wires. This message requires CH-47 operators to inspect their aircraft and spare cartridges for loose terminal posts and circuit continuity. Contact: Michael West, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of UH-60 yaw trim and roll trim servos for improved seal (UH-60A-82-19, 221430Z Oct 82). Summary: Investigation of a roll trim servo revealed rust/corrosion of the spring associated with the servo's output shaft seal. The vendor installed a carbon steel spring instead of a corrosion-resistant stainless steel spring in the garlock seal. This message requires inspection of the spring. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance advisory message concerning definitive handling and shipping instructions for emergency parachutes and related equipment (191700Z Oct 82).

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

Lightning—a striking matter

Recently, one of our fellow operator's employees was fatally injured when lightning struck the vertical stabilizer of the aircraft to which he was connected by headset. The discharge made its way to ground through the communications cord, headset, and the technician's body. Efforts by medical personnel to revive the injured employee failed.

We'd like to draw your attention to a maintenance bulletin that was published several years ago and goes as follows:

"Static charges built up during flight are of no direct danger when the headset is connected. At 50 percent relative humidity (a normal value), the presence of static charges on parked aircraft may be disregarded for all practical purposes.

"During thundery conditions in the vicinity of the airport, however, ruling standards are totally different. Large charges suddenly shifting through the atmosphere indicate that strong electrical fields are present. If an aircraft happens to be in such a field, it may very quickly take up or release a high charge. This is possible by a direct stroke of lightning, but a lightning discharge at some distance may cause the same effect. If someone outside the aircraft is standing on the ground (or on stairs), and is connected to the aircraft, the shift of charge will find a conductive path to earth via his body. Therefore, never plug in a headset (or have it plugged in) during thundery conditions in an aircraft which is not electrically grounded."

Though there's usually no reason to panic, the effects of a direct hit during thunderstorms should never be underestimated. Strict rules are hard to provide, however. Don't run away when thunder is still a distant rumble; on the other hand, avoid unnecessary risks.

A good dose of common sense usually turns out to be the best guideline. ■

—thanks to Frank Kervin, Northrop, Fort Rucker, for sending us this article written by an employee of the KLM Royal Dutch Airlines. The article was extracted from the National Safety Council Air Transport Newsletter.

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Accident sense and the FY 82 record

IV. Flight crew error: Inattention to tasks

This is the fourth in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. This week we will focus on inattention to tasks, one of five dominant flight crew errors involved in fiscal 82 Class A flight accidents. Accidents caused by inattention to tasks last year resulted in six fatalities and cost the Army almost $8 million.

• An OH-58A and an OH-58C on training missions took off at or near the same time from a stagefield, one from lane 2 in east traffic and one from lane 3 in west traffic. The IPs and student pilots aboard both helicopters were wearing night vision goggles. During climb, the aircraft drifted toward one another and collided about 600 meters south of the stagefield takeoff lanes. Result: two destroyed aircraft, four fatalities, and $1,065,000 in losses. The IP of the OH-58A had 1,704 rotary wing hours, with 383 in the OH-58A. His student pilot had 192 rotary wing hours, with 24 in the OH-58A. The IP of the OH-58C had 1,937 rotary wing hours, with 1,209 in the OH-58C. His student pilot had 258 rotary wing hours, with 21 in the OH-58C.

• An OH-58A pilot was told to hold his flight of six aircraft clear of an airfield runway. The pilot misinterpreted the tower instructions and told the copilot to cross the active runway. As the aircraft approached the runway at 30 to 40 knots, tower personnel told the pilot to hold short. The copilot applied excessive aft cyclic in an attempt to stop the aircraft. The main rotor blades struck and severed the tail boom, and the aircraft spun several times and landed hard. Result: destroyed aircraft and $144,000 in losses. The pilot had 425 rotary wing hours, with 364 in the OH-58A. The copilot had 201 rotary wing hours, with 19 in the OH-58A.

• A UH-60A IP and pilot had completed a PIC checkride and were en route to an airfield. It is suspected the crew decided to make an approach to a clearing. Either on approach or departure, the crew allowed the aircraft, at an estimated airspeed of 40 knots, to enter trees. Corrective action was either too late or ineffective in stopping the descent. The aircraft crashed inverted. Result: destroyed aircraft, two fatalities, and $2,942,000 in losses. The IP had 3,749 rotary wing hours, with 823 in the UH-60A. The pilot had 573 rotary wing hours, with 193 in the UH-60A.

• An OH-58A pilot landed in an open, muddy field to discharge a passenger. As the pilot tried to take off to a hover, the left skid broke loose from the mud first and the aircraft rolled onto its right side. The pilot did not compensate for a

(continued on next page)

Inattention to tasks

change in load configuration and induced dynamic rollover by applying excessive right cyclic control. Result: destroyed aircraft and $144,000 in losses. The pilot had 983 rotary wing hours, with 76 in the OH-58A.

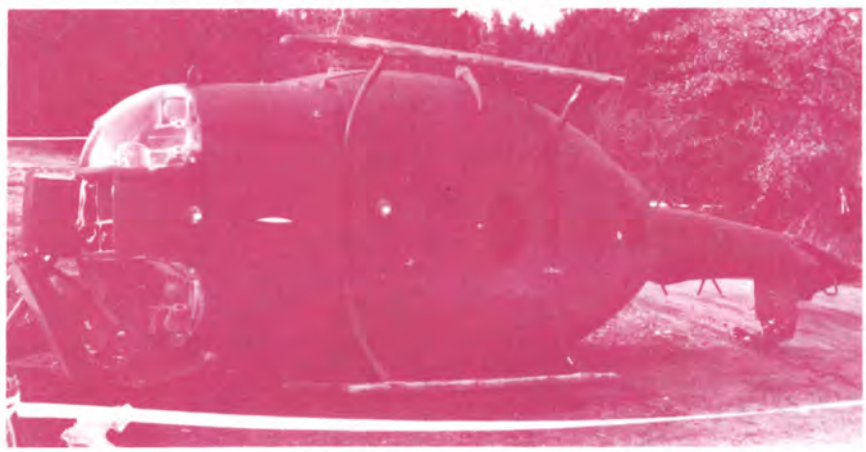
• An OH-58A pilot descended from 800 feet agl to a lower cruise flight level over a lake. As the pilot passed one of the boats on the lake, he waved to the occupants in the boat. He was looking to the right front of the aircraft and did not notice he was continuing to descend. The aircraft hit the water at an airspeed of about 90 knots. Result: destroyed aircraft, two major injuries, and $193,900 in losses. The pilot had 668 rotary wing hours, with 423 in the OH-58A.

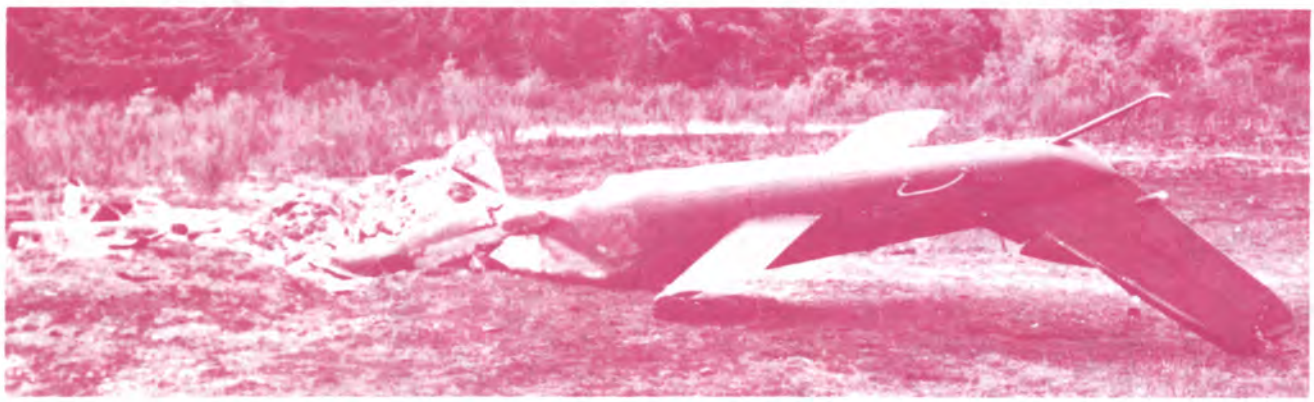
• A UH-1H IP and pilot were on an ATM training flight. After six approaches, the crew began to practice slope operations. The IP decided to demonstrate to the pilot a method of improving his control touch by hovering around a tree. As they were hovering around the tree, the pilot told the IP they were approaching higher terrain to the right of the aircraft. The IP increased collective pitch, but the right skid hit a dirt mound, and the aircraft rolled inverted. Result: destroyed aircraft and $922,700 in losses. The IP had 5,729 rotary wing hours, with 327 in the UH-1H. The pilot had 232 rotary wing hours, with 182 in the UH-1H.

• A UH-1H was landed on a 6-degree slope, with the left skid upslope. During takeoff from the slope, the copilot applied excessive collective pitch without applying sufficient left lateral cyclic into the slope to level the aircraft. The copilot did not reduce collective pitch when the upslope skid lifted off the ground first because he was concentrating on the close proximity of trees to his right front. The helicopter pivoted about the right skid and rolled onto its right side. Result: destroyed aircraft and $922,700 in losses. The pilot had 826 rotary wing hours, with 776 in the UH-1H. The copilot had 239 rotary wing hours, with 189 in the UH-1H.

• An AH-1S crew was participating in a night live fire exercise. Rockets and 20mm cannon were being fired from an OGE hover at an altitude of about 100 feet above 50-foot trees. The crew allowed the aircraft to descend into the trees and crash. Result: destroyed aircraft and $1,574,000 in losses. The pilot had 2,388 rotary wing hours, with 814 in the AH-1S. The copilot had 243 rotary wing hours, with 70 in the AH-1S.

Next week's article will focus on pilot-induced loss of control. ■





Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Aircraft was No. 2 in a flight of 6. Shortly after takeoff, downwind turn was made. Because of downwind condition, low airspeed, and rotor downwash from lead aircraft, No. 2 aircraft lost lift and began descending into trees. Pilot turned right to avoid a tree line and applied power to stop descent. Before descent was stopped, aircraft hit a tree. Chin bubble was broken.

UH-1 Class E mishaps □ (H series) Crew smelled fuel fumes after takeoff. Caused by deteriorated fuel line. □ (H series) Excessive fore and aft cyclic feedback during takeoff was caused by defective right servo cylinder assembly. □ (H series) Severe vertical vibration developed during takeoff. Six inches of blade skin on outboard end of main rotor blade separated from honeycomb. □ (H series) As pilot brought aircraft to a hover, binding was felt in tail rotor pedals. Caused by failure of tail rotor servo. □ (H series) Engine oil temperature rose to 110° C. Caused by failure of engine oil thermal bypass valve. □ (H series) Smoke in cockpit was caused by failure of main inverter. □ (H series) Transmission oil pressure fluctuated. Caused by failure of oil pressure gauge. □ (H series) Master caution and transmission oil pressure low lights came on. Caused by failure of main transmission external oil filter seal. □ (M series) Aircraft yawed and loud rumbling sound was heard from engine area. Deice valve had been inadvertently turned on. Gasket at customer bleed air tank was broken, allowing bleed air leak.

UH-1 aviation-related mishap □ Aircraft was being pulled from hangar by tug. Inexperienced tug operator steered the tug incorrectly, causing aircraft tail rotor to be placed close to hangar wall. Operator unhooked tug, realigned it, and then rehooked it to aircraft. On his second attempt to move the aircraft, operator placed his foot on the accelerator instead of the brake. The resultant jerk caused tail rotor to hit hangar wall, damaging 90-degree gearbox and tail boom.

UH-60 Class E mishap □ Oil was seen streaming along side of aircraft and tail boom. Oil was coming from main transmission. Main bearing mast seal failed.

Attack helicopters

AH-1 Class A mishap □ (S series) During autorotation, aircraft touched down about two-thirds the distance down a 2,200-foot runway. When IP saw aircraft was going to slide off runway, he initiated power recovery. Aircraft became airborne about 50 feet from end of runway, reached an altitude of 3 to 5 feet, and then settled onto sod overrun. At touchdown, aircraft rolled over on right side. 8304

AH-1 Class E mishaps □ (G series) Loud bang was heard during hover, aircraft yawed slightly, and egt rose. Caused by engine compressor stall. □ (S series) Engine oil pressure increased during flight. Caused by failure of oil pressure transducer.

AH-1 aviation-related mishap □ Tug operator was backing his tug between two aircraft. He was not using a ground guide. Tug hit tow missile launcher of the aircraft on the right.

Observation helicopters

OH-58 Class E mishaps □ (A series) As aircraft touched down, metal sign lying loose on runway blew up into main rotor blade, knocking small hole in blade. □ (A series) Rated student pilot accidentally reduced throttle and lowered collective about 2 feet above the runway. Right skid hit ground. IP took control and landed. □ (A series) Master caution and hydraulic pressure lights came on. Pilot felt loss of hydraulics in flight controls. Caused by failure of hydraulic pump.

OH-58 aviation-related mishaps □ Main rotor blade hit hangar door as aircraft was being pushed out of hangar. □ As aircraft was pushed through mud hole, left ground handling wheel sank into the mud. Skid heel dug into the ground and forced tail skid down onto the edge of the ramp matting. Tail boom, tail rotor drive shaft, and gearbox were damaged.

Training helicopters

TH-55 Class C mishap □ Student pilot noticed steady drop in rpm and increased throttle in an attempt to regain rpm. Pilot could not regain rpm and entered autorotation. Aircraft hit small trees and brush as student pilot pulled

initial pitch. Aircraft landed upright on the edge of a ditch. Chin bubble, tail skid, and left skid were broken, and three main rotor blades were destroyed. Suspect engine failure or partial power loss.

Fixed wing

C-12 Class E mishap □ (A series) Aircraft descended into light to moderate icing conditions. About one-fourth inch of clear ice was picked up in one minute. Crew heard loud popping sound. When aircraft was landed, HF antenna was found hanging across left wing. Antenna had broken at top vertical stabilizer attaching point.

T-42 Class E mishaps □ Flaps would not retract after landing. Caused by failure of flap motor. □ Gear failed to retract during simulated missed approach. Emergency gear extension procedure was followed and gear-safe light came on. Caused by failure of landing gear relay.

U-8 Class E mishap □ (F series) Right engine chip detector light came on after takeoff. Caused by loose keeper pin in gear reduction housing.

U-21 Class E mishap □ (RU-21A) Pilot placed flaps in approach position on downwind for landing. When pilot put flaps in full-down position, they remained in approach position. Caused by failure of flap motor.

U-21 aviation-related mishap □ As aircraft was being towed from hangar, right horizontal stabilizer hit hangar support beam.

Maintenance

UH-1 Class E mishaps □ (H series) Rapid drop in rpm during autorotation was caused by incorrectly adjusted pitch change links. □ (H series) Compressor stall occurred during hover. Caused by out-of-rig variable inlet guide vanes. □ (H series) Crew chief saw hydraulic fluid dripping from underneath aircraft during runup. Hydraulic filter preformed packing was incorrectly installed. □ (H series) IP felt severe vertical vibration and moderate lateral vibration. Postflight inspection revealed excessive play in collective flight controls. Collective lever bearings and liners were installed with retaining flange facing away from mast. This allowed bearings to move inward, causing excessive play and mast contact.

UH-60 Class E mishap □ Preflight inspection revealed that bolt attaching collective limiter bearing to longitudinal control rod did not pass through mixer link assembly rod end bearing. Bolt was secured in place with nut and cotter pin.

AH-1 Class E mishap □ (G series) Loud squealing sound was heard from transmission area, followed by stiffness in antitorque pedals and cyclic controls. Postflight inspection revealed elbow at cyclic accumulator was cross threaded.

OH-58 Class E mishaps □ (A series) When pilot decelerated, he found he could not pull the cyclic. He then pulled in power and tried forward cyclic, without success. Running landing was made at airfield. A water canteen belt clip was found by the mixing lever in aircraft center beam. Because of the dust on the clip, it had probably been in the console for several months. □ (A series) Idle speed was not reached until 39 seconds after engine start. Technical inspector saw fuel leaking around main fuel nozzle. Crew chief had just bled main fuel line and reinstalled nozzle. Nozzle was incorrectly torqued. □ (A series) Torque fluctuated during hover. Master caution and fuel filter lights came on after aircraft was landed. Lights then went out and pilot brought aircraft to a hover. Engine flamed out after 20 seconds. Fuel shutoff valve was incorrectly adjusted, allowing enough fuel to the engine to permit ground run but not

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	1-10 Nov	1	0
	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	3	0

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Shortfax

Recap of TSARCOM messages

Following is a list of AIG 8881 addressed messages transmitted by TSARCOM from 1 July through 30 September 1982.

UH-60A-82-08 Safety-of-flight maintenance mandatory message concerning recurring inspection of engine output shaft assembly

UH-60A-82-09 Safety-of-flight maintenance mandatory message concerning one-time inspection of engine mount elastomeric gimbal

UH-60A-82-10 Safety-of-flight maintenance mandatory message concerning service life for and return of main rotor blade tip cap

UH-60A-82-11 Safety-of-flight maintenance mandatory message concerning one-time inspection for main rotor servo screws

UH-60A-82-12 Safety-of-flight maintenance mandatory message concerning boost servos

UH-60A-82-13 Safety-of-flight emergency technical message concerning one-time inspection for main rotor servo input link bearings. This message was amended.

UH-60A-82-14 Safety-of-flight maintenance mandatory message concerning one-time inspection for tail rotor servos

UH-60A-82-15 Safety-of-flight maintenance mandatory message concerning daily inspection for primary servo input rods

UH-60A-82-16 Safety-of-flight technical message concerning one-time inspection for flight control mixer limiter bearings and mixer limiter roller

UH-60A-82-17 Safety-of-flight maintenance mandatory message concerning one-time inspection for tail rotor servos

UH-1-82-03 Safety-of-flight urgent technical message concerning one-time inspection for all UH-1B/H/V and EH-1H servo wire drive rod and wear limits for all UH-1B/C/M/H/V and EH-1H aircraft between the wire drive rod attachment to the lever

UH-1-82-04 Safety-of-flight technical message concerning one-time inspection of scissor and sleeve assemblies for possible defective bolt

CH-47-82-05 Safety-of-flight maintenance mandatory message notifying maintenance personnel of a change in forward and transmission filter inspection

CH-47-82-06 Safety-of-flight message concerning operation restrictions

CH-47-82-07 Safety-of-flight operational message concerning grounding of CH-47 aircraft

CH-47-82-08 Safety-of-flight operational message concerning continued grounding of CH-47 aircraft

CH-47-82-09 Safety-of-flight message on further information about continued grounding of CH-47 aircraft

CH-47-82-10 Safety-of-flight message concerning one-time inspection of CH-47C and D fiberglass rotor blade damper bracket

CH-47-82-11 Safety-of-flight message concerning performance of ground runup during grounding of CH-47 aircraft

CH-47-82-12 Safety-of-flight technical message concerning one-time inspection of CH-47 aircraft

OV-1-82-01 Safety-of-flight maintenance mandatory message concerning installation of ALQ-147 top hat and bracket assembly

T-42-82-01 Safety-of-flight maintenance mandatory message concerning one-time replacement of wing mounting bolts and inspection of fittings. This message was corrected.

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

Seven receive Broken Wing Award

The Broken Wing Award is given to aircraft crewmembers who demonstrate a high degree of professional aviation 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 1979.

Seven aviators received the Broken Wing Award from July through September 1982.

Broken Wing Award recipients

CW2 Chris R. Carlisle
B Company, 2d Aviation Battalion, 2d Infantry Division, APO SF 96224

CW3 Robbie L. Cryer
D Company, 229th Attack Helicopter Battalion, 101st Airborne Division, Fort Rucker

CW4 George A. Galo
80th Division, Aviation Flight Activity, Fort Eustis

CW2 Richard J. Karle
14th Company, DOFT, Fort Rucker

WOC Paul E. Madrid
62d Company, DOFT, Fort Rucker

CW3 Harold F. Nicely
Detachment 2, 107th Armored Cavalry, West Virginia Army National Guard

CW4 Douglas V. Peters
FORSCOM Flight Detachment, Atlanta, Georgia

Mishap briefs

enough to permit flight. Copilot was distracted during before-start procedures and incorrectly checked fuel valve handle.

C-12 Class E mishap □ (A series) Intense vibration developed during takeoff. Balance pad mounted inside nose gear tire was loose, causing out-of-balance condition.

U-21 Class E mishaps □ (A series) When gear was lowered for landing, right main gear light would not come on. Visual check by tower personnel revealed gear appeared to be down. Landing was made without incident. Gear safe switch was out of adjustment. □ (RU-21A) After level-off, pilot saw clear fluid coming from outboard left engine nacelle area. After aircraft was landed, fluid was determined to be water that was trapped in wing bolt retaining well. Drain in retaining well had been painted over with primer.

Messages received

• Safety-of-flight technical message concerning update status of actions to restore operational capability of the CH-47 fleet (CH-47-82-14, 232000Z Oct 82). Summary: This message apprises addressees of current actions underway to restore operational capability of the CH-47 fleet, provides update status of the investigation, furnishes pertinent guidance and instructions, and requests additional information.

• Safety-of-flight maintenance mandatory message concerning UH-60 main rotor spindle droop stop bearing inner race and droop stop bearing support (UH-60A-82-18, 272105Z Oct 82). Summary: Field units have reported instances of cracked droop stop bearing inner races and supports. Engineering analysis has determined that a single crack in either member is the result of stress corrosion and that secondary cracks may occur. These parts are not primary load-carrying structures and some degree of cracking is acceptable. This message prescribes permissible crack limits and imposes inspections required to assure these limits are not exceeded. A redesigned spindle assembly is being developed which will eliminate the cracking problem. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• OH-58/UH-1 maintenance information message concerning night hawk night vision modification work orders (MIM-82-OH-58-WK-01, MIM-82-UH-1-WK-01, 261845Z Oct 82).

• Maintenance information message concerning aft engine deck drainage hole configurations of the AH-1S (MIM-82-AH-1-MEA-05, 272045Z Oct 82).

• Maintenance information message concerning transmission main mount nut and bolt assembly on the AH-1S (MIM-82-AH-1-MEA-06, 272050Z Oct 82).

• Maintenance information message concerning inspection of hydraulic lines, electrical cables, and control tubes in the tail rotor controls installation (MIM-82-AH-1-MEA-07, 272055Z Oct 82).

• Maintenance information message concerning engine health indicator test baseline computation procedure changes for OH-58/OH-6 helicopters using the T63-A-700/720 turbine engine (MIM-82-T63-MEA-04, 272100Z Oct 82).

• Maintenance information message concerning UH-60 mixer assembly (MIM-82-UH-60A-MEA-05, 282045Z Oct 82).

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

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Accident sense and the FY 82 record

V. Flight crew error: Pilot-induced loss of control

This is the fifth in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. This week we will focus on pilot-induced loss of control, one of five dominant flight crew errors involved in fiscal 82 Class A flight accidents. Accidents caused by pilot-induced loss of control cost the Army more than $1.5 million.

• An OH-58A pilot was adjusting fire for an AH-1 fire team from an out-of-ground-effect hover of about 300 feet above 100-foot trees. Winds were strong and gusty. The pilot began a hovering turn to the right and was then unable to stop the turn with left pedal. The turn accelerated into a spin and the pilot lost control. The aircraft continued in a descending spin until it crashed. The cause of this accident was marginal tail rotor effectiveness of the OH-58A and the pilot's attempt to hover out-of-ground-effect in a downwind condition. Result: destroyed aircraft, one major injury, one minor injury, and $149,000 in losses. The pilot had 268 rotary wing hours, with 93 in the OH-58A.

• An OH-58A pilot was on a recon mission. The aircraft was brought to a 6- to 8-foot hover into a 15- to 20-knot headwind. As the pilot hovered to the right, he allowed the nose of the aircraft to turn to the right into a crosswind condition. The aircraft began a slow, uncommanded turn to the right. As the tail of the aircraft swung into the wind, the rate of turn accelerated. Aircraft control was lost during the first 360-degree spin. The pilot rapidly lowered collective pitch, and the aircraft landed hard and rolled onto its left side. Result: destroyed aircraft and $143,800 in losses. The pilot had 580 rotary wing hours, with 221 in the OH-58A. The copilot had 1,044 rotary wing hours, with 326 in the OH-58A.

• A UH-1H had nine people on board. The pilot was trying to mask the aircraft behind some high trees while at a hover. Engine and rotor rpm bled off, and the aircraft settled into the trees. The Huey was being operated at or near maximum allowable gross weight and density altitude was 3,200 feet. Winds were high and from the left front of the aircraft. Demand for power exceeded power available. Result: extensive damage and $203,000 in losses. The pilot had 618 rotary wing hours, with 550 in the UH-1H. The copilot had 222 rotary wing hours, with 150 in the UH-1H.

• An AH-1S pilot was hovering out-of-ground-effect in a downwind condition. Tail rotor effectiveness was lost, and the aircraft settled in a nose-low attitude into a sand dune. Power available was insufficient to hover out-of-ground-effect under existing environmental conditions. Result: extensive damage and $233,000 in losses. The pilot had 408 rotary wing hours, with 212 in the AH-1S.

• A UH-1H was part of a flight of 10 aircraft forming up for a tactical air assault. The aircraft had just been refueled and six passengers had boarded. As the pilot tried to take off, the aircraft climbed to about 10 feet and began an uncommanded, descending turn to the right. The turn continued for about 270 degrees before the aircraft crashed in a nose-low attitude. The takeoff was attempted in a downwind condition of 10 to 15 knots. Terrain elevation at the takeoff point was 6,000 feet msl. The temperature was 80° F. and aircraft gross weight was about 8,700 pounds. The pilot had insufficient antitorque capability for a downwind takeoff under these conditions. Result: destroyed aircraft, one minor injury, and $927,600 in losses. The pilot had 734 rotary wing hours, with 633 in the UH-1H. The copilot had 249 rotary wing hours, with 199 in the UH-1H.

Next week's article will focus on failure to provide adequate unit training. ■

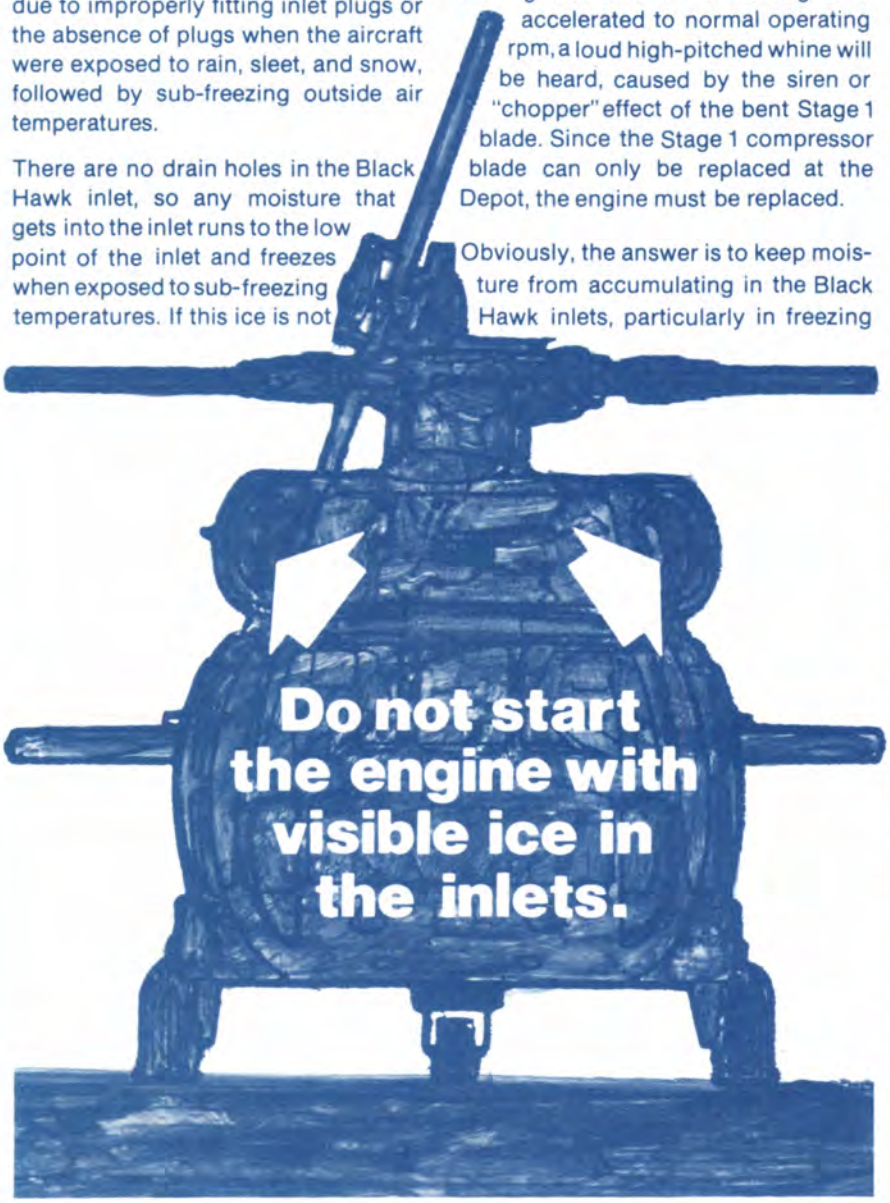
Prevent ice FOD on the Black Hawk

During the winter of 1980-81, there were at least eight cases of FOD on T700 engines in the UH-60A Black Hawk at one Army installation. This FOD was caused by the formation of solid ice at the low point in the aircrafts' engine inlets.

This problem resulted from moisture accumulation in the Black Hawk inlets due to improperly fitting inlet plugs or the absence of plugs when the aircraft were exposed to rain, sleet, and snow, followed by sub-freezing outside air temperatures.

There are no drain holes in the Black Hawk inlet, so any moisture that gets into the inlet runs to the low point of the inlet and freezes when exposed to sub-freezing temperatures. If this ice is not detected during the preflight inspection, the ice breaks loose during the engine start cycle or possibly at ground idle where the inlet particle separator blower efficiency is low. The ice chunk is ingested by the compressor and the first Stage 1 compressor blade to make contact with the ice chunk is bent severely while making crushed ice of the ingested chunk. As the engine is accelerated to normal operating rpm, a loud high-pitched whine will be heard, caused by the siren or "chopper" effect of the bent Stage 1 blade. Since the Stage 1 compressor blade can only be replaced at the Depot, the engine must be replaced.

Obviously, the answer is to keep moisture from accumulating in the Black Hawk inlets, particularly in freezing ambient conditions. In an effort to provide better inlet protection from the elements, maintenance personnel at the installation with the ice FOD designed and procured, through a local manufacturer, a fabric "shower cap" type inlet cover which wraps around the lip of the inlet, preventing rain, sleet, snow, etc., from getting in around the edges of an ill-fitting or damaged inlet plug.



It is strongly recommended that each using activity procure such inlet covers and use them. However, the most important factor in preventing ice FOD is a good preflight visual inspection of the inlet with particular emphasis on the low area of the engine inlet. A light should be used and preferably two sets of eyes. If ice is detected, it must be removed before starting the engine.

Many techniques have been suggested for removing ice in the inlet. These include the use of warm air from a personnel heater, use of anti-freeze solutions, chipping with a sharp instrument and, in some instances, removal of the engine inlet. Whatever means you use, care must be exercised so as not to damage the induct duct or allow foreign particles to be generated in the inlet. The important thing to remember is **do not start the engine with visible ice in the inlet.**

A great deal of emphasis was placed on this problem following the rash of engine removals in early 1981 and during the winter of 1981-82, not one incident of inlet ice FOD was reported on the Black Hawk. This shows that with proper awareness this type of FOD can be prevented. But it requires a constant vigilance on the part of all Black Hawk operational and maintenance personnel operating in environments where freezing moisture conditions prevail. ■

—thanks to Kenneth F. Koon
General Electric Company
Lynn, Massachusetts

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (H series) Transmission hot light came on and oil temperature gauge indicated 115 degrees. Caused by defective transmission thermostatic relief valve. □ (H series) Low rpm audio and light activated during landing. Caused by failure of tachometer generator. □ (H series) Master caution and hydraulic lights came on. Postflight inspection revealed hydraulic reservoir was empty. Caused by defective hydraulic pump. □ (H series) Rotor tachometer dropped to zero during descent. Low rpm audio and light activated. Caused by failure of rotor tachometer generator drive shaft. □ (H series) Pilots were told during landing that smoke was coming from right side of fuselage. Caused by failure of main generator. □ (H series) Tail rotor chip detector light came on during approach. Caused by defective 42-degree gearbox. □ (H series) Cyclic slammed violently to left rear during flight and then released. It slammed to left rear again and remained. Pilot turned hydraulic switch off and made running landing. Caused by failure of forward left irreversible valve. □ (V series) During emergency hover check, maintenance test pilot inadvertently placed governor switch in emergency position before reducing throttle to flight idle. N_2 decreased through 7300 rpm as pilot reduced throttle in an attempt to prevent overspeed. Outside air temperature was -14° C, and aircraft heater was inoperative. Pilot failed to follow established procedures. He tried to do the hover check from memory. He also violated the unit SOP by operating the aircraft with an inoperative heater when the temperature was below 5° C.

UH-60 Class C mishaps □ After flying over an open field, pilot began a climb to clear trees surrounding the field. Pilot misjudged clearance and lower part of aircraft hit a tree. □ Aircraft was

No. 3 in flight of 5. Approach speed of lead aircraft was faster than normal. No. 3 pilot decelerated abruptly on short final, and his stabilator hit the ground.

UH-60 Class E mishaps □ Engine oil temperature rose during flight. Caused by failure of input module. □ IP was demonstrating roll-on type landing. At touchdown, crew heard loud bang from right main gear area and aircraft leaned to right. Suspecting a blown tire, pilot brought aircraft to a semi-hover, keeping weight on left main gear. Crewmembers of another aircraft checked gear and confirmed that tire had blown. Aircraft was flown to airfield, where jack was inserted under right main gear area.

Attack helicopters

AH-1 Class E mishaps □ (S series) Vertical vibration during flight was caused by seizure of outboard red feather bearing. □ (S series) Roll SCAS hardover occurred during OGE hover check. Caused by failure of SCAS roll card. □ (S series) Transmission oil pressure dropped and temperature rose. Caused by failure of transducer. □ (S series) Master caution and No. 1 hydraulic lights came on. Caused by loose wire in hydraulic pressure switch cannon plug.

Cargo helicopters

CH-47 Class E mishap □ (C series) Crew chief told pilot there was smoke in aft transmission area. Utility hydraulic pressure decreased during descent. Caused by failure of utility hydraulic pump.

Observation helicopters

OH-58 Class E mishaps □ (A series) Hydraulic light flickered and hydraulics failed. Caused by cracked preformed packing on hydraulic line. □ (A series) Crew smelled fumes and windshield fogged over during takeoff. Caused by thermal runaway of battery. □ (A series) Master caution and engine oil bypass lights came on. Screw insert in accessory gearbox housing was worn, allowing oil leak. □ (A series) Master caution light came on and loud noise was heard. Caused by failure of fuel boost pump.

Fixed wing

C-12 Class E mishaps □ (A series) When power was applied, loud bang was heard and aircraft shuddered. Flames and debris were seen coming from exhaust stack of No. 2 engine. Engine was secured and aircraft landed. Caused by internal failure of No. 2 engine. □ (A series) No. 1 engine torque surged to 110 percent immediately after takeoff. Caused by failure of propeller governor.

U-21 Class E mishaps □ (A series) No. 1 engine surged and secondary low pitch stop light came on. Engine was secured and aircraft landed. Caused by failure of No. 1 primary governor low

pitch stop and secondary idle pitch stop. □ (F series) After intentional shutdown of No. 2 engine, smoke was seen coming from exhaust stacks. After propeller was feathered, smoke stopped and oil was seen coming from exhaust stacks. Caused by failure of O-ring in filter housing, allowing oil to be sucked out through exhaust. □ (H series) Oil was seen coming from engine nacelle after takeoff. Oil cap was not secured correctly. □ (RU-21H) Fuel pressure on No. 2 engine fluctuated and engine failed. Single-engine landing was made. Caused by contamination of finger screen fuel strainer.

Maintenance

UH-1 Class E mishaps □ (H series) Transmission oil hot light came on. Cause by loose cannon plug. □ (H series) Fuel starvation occurred during hover. Caused by inaccurate fuel indicating system and faulty boost pump operation. □ (H series) Crew smelled fuel fumes during approach. Leak was found at attachment of fuel hose to quick-disconnect fitting in outboard line from fuel filter. Nut was loose.

UH-60 Class E mishap □ Stabilator failed during flight. No. 1 lateral accelerometer was out of adjustment.

AH-1 Class E mishaps □ (S series) Aircraft would not start. Avionics personnel had been working on aircraft and drained battery power. □ (G series) Transmission oil bypass light came on and transmission oil temperature rose during hover. Crew chief had earlier disconnected oil line to transmission oil cooler at quick disconnect fitting to gain access to fuel cell probe. Crew chief did not record the work in the logbook. Pilot did not detect the fault during his preflight inspection. Pilot did a detailed preflight inspection the day before the crew chief worked on the fuel cell probe.

CH-47 Class E mishap □ (C series) No. 2 engine transmission oil pressure light came on. Loose plug in breather vent allowed loss of oil from engine transmission.

OH-58 Class E mishaps □ (C series) Engine and rotor rpm deteriorated during landing. Caused by loose P_1 air line. □ (A series) Master caution and transmission chip detector lights came on during hover. Caused by broken wire to chip detector. □ (A series) Hydraulic caution light came on and controls became stiff. Hydraulic quick disconnect fitting was not tightened correctly. □ (A series) Engine oil bypass light came on during landing. Caused by loose engine bearing oil line.

OV-1 Class E mishap □ (D series) Hydraulic failure occurred during practice missed approach. Gear would not retract fully during go-around. Pilot recycled gear and landed. Caused by chafed hydraulic line.

U-21 Class E mishap □ (RU-21H) Power on No. 1 engine would not decrease below 800 psi torque during descent. Engine was shut down and aircraft was landed. Caused by insufficient lubrication of rod end bearing on lower end of control rod.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	1-17 Nov	**2**	**2**
	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	**4**	**2**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Messages received

• Safety-of-flight maintenance mandatory message concerning UH-60A engine output shaft (UH-60A-82-20, 040730Z Nov 82). Summary: This message supersedes safety-of-flight messages UH-60A-82-01 and UH-60A-82-08. Various details are clarified and explained. Contact: Robert Lawyer, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning inspection and testing of outside air temperature gauge on UH-60A aircraft at 250-hour intervals (MIM-82-UH-60A-MEA-06, 040715Z Nov 82).

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

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL36362 □ STACOM 85 □ 17 Nov 1982

The aviator's role in aircraft maintenance

We all know that aviators often declare their intention to write up aircraft or system deficiencies during flight but then sign off the flight on the 2408-13 as OK. These aviators either forget or are in a hurry to get home and find it easier and quicker to be less critical and declare the flight OK. The result is that maintenance deficiencies remain to be rediscovered by another flight crew and timely corrective action is delayed. Furthermore, delayed corrective action generally requires more effort and resources, thereby compounding the maintenance problem.

Of equal impact on the state of aircraft maintenance is the aviator who accepts an aircraft for flight that should rightfully be grounded. Mission orientation should not be so pervasive within a unit as to compel an aviator to accept maintenance that he knows to be substandard. Mission, supervisory, or peer pressure should not be the motivating factor that compels an aviator to accept an aircraft with suspected excessive tolerances or similar deficiencies without having the condition checked by a technical inspector.

When acceptance of substandard performance becomes commonplace and unit aviators develop such a permissive attitude, it soon becomes known to the lowest element on the maintenance totem pole. At this point, it does not take a doctor of psychology to tell us that the individual "who takes his turn on the duty roster, meets a board or two, attends various meetings and lectures, takes his PT every day, and, when available for his primary duty, is often responsible for the maintenance of two aircraft" takes the path of least resistance and puts off necessary maintenance because he is pushed for time and knows that the aircraft will be accepted in its present condition. The hard-working maintenance supervisor is in a position to reverse the situation—and often does. However, what are his options when he is located at the tail end of the supply chain and is faced with an arbitrary or unrealistic aircraft-in-commission rate because of mission commitments? Faced with a maximum maintenance effort and a shortage of skilled personnel he, too, may succumb to the pressure and be drawn into this vicious cycle.

Who, then, can reverse this situation? You, Mr. Peter Pilot, by requiring equipment to be maintained by the book and up-to-book standards before accepting an aircraft for flight. In too many instances you have not been informed of your responsibilities to Army aviation and your authority in meeting those responsibilities.

In a nutshell, the maintenance you accept is the maintenance you are going to get. Since it is your mission to be above the best, why not be there with the best? ■

Transponder set AN/APX-72 or AN/APX-100 mode 4 operation

Transponder computer (KIT-1A) operates in conjunction with mode 4. A light on the caution panel, marked IFF, goes on when a malfunction occurs in mode 4 or the computer, which prevents a reply when interrogated. Codes A and B are mechanically inserted in KIT-1A by a code-changing key. The codes are mechanically held in the transponder computer, regardless of the position of the MASTER switch or the status of helicopter power, **only if the CODE switch has been held in the HOLD position for at least 15 seconds prior to removing power** from the set. On helicopters with skid-type landing gear, mode 4 codes will automatically zeroize any time the MASTER switch or electrical power is turned off, if the CODE switch has not been placed in the HOLD position for at least 15 seconds. Mode 4 codes can be zeroized any time the helicopter power is on and the MASTER switch is not in OFF, by turning the CODE switch to ZERO. Power to operate the transponder computer is provided automatically when the AN/APX-72 or AN/APX-100 is on. Transponder computer KIT-1A/TSEC operation is **classified.** ■

Information contained herein generally precedes the formal staffing and distribution of Department of the Army official policy. Subject information is provided to all commanders to enhance aviation operations and training support. Call AUTOVON 558-7174 during duty hours; 558-6487 after duty hours.

Guide to the elimination of ice, snow, or frost from parked aircraft

Type Deposit	Typical Weather Conditions	Prevention Method (other than hangaring)	Removal Procedures	Precautions
Dry snow	1. Overcast skies 2. Temperature below 30° F.	1. Protective covers 2. Frequent removal of snow prevents packing	1. Sweeping 2. Cloth strip 3. Ground run	1. Chemicals are wasteful in removing dry snow 2. Check all air intakes and openings for blown snow
Wet snow	1. Overcast skies 2. Temperature 30°-35° F.	1. Waterproof protective covers 2. Frequent removal more important 3. Do not remove aircraft from hangar during snowfall	1. Sweeping 2. Mopping 3. Cloth strip	1. Check all openings and moving parts where snow may collect and freeze 2. Dry surface after removal of snow
Frozen snow	1. Temperature drop after wet snowfall	1. Do not allow wet or dry snow to remain on surface and thaw 2. Do not remove aircraft from hangar during snowfall	1. Sweep to remove loose deposits 2. Apply chemicals by mop or spray 3. Use heat under cover as alternative method	1. Check surfaces for frozen snow after wet or dry snow has been removed
Ice	1. Uniformly overcast skies 2. Temperature 25°-32° F.	1. Frequent application of deicing fluid may prevent freezing 2. Remove water or slush that may freeze	1. Allow ice to melt off in hangar 2. Apply chemicals generously 3. Use heat under cover	1. Check all openings and movable parts 2. Check for runoff that has frozen between or on underside of surface 3. Avoid damage to surface when heating
Frost	1. Temperature near freezing 2. Clear skies—night 3. High relative humidity 4. Little or no wind	1. Protective covers 2. Application of deicing fluid (temporary protection only)	1. Chemicals, mop or spray 2. Cloth strip 3. Place aircraft in bright sun	1. Do not underestimate effect of frost. Remove from top and bottom of all flight surfaces and antennas
Frozen mud	Thawing conditions	1. Avoid taxiing through water or mud	1. Hot water, mop or spray 2. Use chemicals if temperature is below freezing	1. Check movable parts 2. Leave no water to freeze after cleaning 3. Check for frozen slush on underside of surfaces

Notes: (1) Use deicing chemicals specified in the maintenance instruction manual or other applicable directions.

(2) Closely check the following items during and after removal operations.

- Top and bottom of all flight surfaces
- Air intakes and vents
- Static vents
- Control surface gaps
- Hinge points
- All movable parts

Courtesy MECH

Complete procedures are contained in TM 55-1500-333-24.

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Accident sense and the FY 82 record

VI. Supervisory error: Failure to provide adequate unit training

This is the sixth in a series of articles on FY 82 Class A accidents involving flight crew and supervisory errors. This week we will focus on failure to provide adequate unit training, one of five dominant supervisory errors involved in fiscal 82 Class A flight accidents. Accidents caused by failure to provide adequate unit training resulted in one fatality and cost the Army almost $700,000.

• An OH-58A pilot, while performing a confined area takeoff with two passengers aboard, induced a loss of effective tail rotor control. When the aircraft yawed right, just as it cleared treetops, the pilot reacted with left pedal, forward cyclic, and increased collective pitch. The aircraft, near the critical limits of tail rotor control, immediately entered an uncontrollable right spin and crashed. The pilot was not properly trained in the OH-58A. His OH-58A transition gradeslips revealed that several significant mandatory task requirements were omitted. The pilot was involved in a similar OH-58 accident 12 days before this accident. The postaccident flight evaluation after the first accident was not conducted in accordance with TC 1-137. Result: destroyed aircraft, two major injuries, one minor injury, and $185,000 in losses. The pilot had 375 rotary wing hours, with 205 in the OH-58A.

• An OH-58 pilot picked up some passengers from a field site and climbed to about 85 to 90 feet agl. The speed of the aircraft was estimated to be faster than a hover and slower than normal cruise. The pilot made a tight right turn, and the aircraft began to spin to the right. After spinning about six times, the aircraft crashed into trees. This accident was caused by inadequate tail rotor thrust for flight conditions and gross weight and by the pilot performing a maneuver conducive to loss of tail rotor effectiveness. The loss of tail rotor effectiveness was not covered by the instructor pilot during the pilot's transition into the OH-58. The pilot had completed his OH-58 transition training just two weeks before this accident. Result: destroyed aircraft, one fatality, three major injuries, and $483,000 in losses. The pilot had 500 rotary wing hours, with 25 in the OH-58A.

Next week's article will focus on failure to correct actions of subordinates. ■

Unit training payoff

The following article is based on a presentation made by Colonel Joseph R. Koehler, commander of the Army Safety Center, at the Aviation Training Symposium and Policy Committee Meeting held at Fort Rucker 15 November 1982.

Safety Center analysis of all Class A, B, and C aircraft accidents over the past 5 fiscal years, FY 78 through 82, shows the two top system problems involved were substandard aircrew performance and inadequate unit training. Since aircrew performance and training go hand in glove, it is not surprising that inadequate unit training would rank second to performance errors.

It is a proven fact that wherever a well-run and closely supervised training program is in effect, the accident rate is low. Conversely, the opposite is also true. Where pilots are left to their own designs, they develop self-taught practices and procedures contrary to those in the operators manual and, sooner or later, this leads to trouble.

These are the top five unit training inadequacies involving ATM tasks.

- Emergency tasks
- Tactical and special tasks
- Approach and landing tasks
- Mission tasks
- Flight planning tasks

Aircrew errors in these tasks accounted for about 80 percent of all accidents involving inadequate unit training over the past 5 fiscal years. The following examples are typical.

Emergency tasks. The pilot of this AH-1 was on an NOE tactical training mission. The pilot did not consult the performance charts in the operators manual and his aircraft was over maximum gross weight for hovering out-of-ground effect. Eleven minutes after takeoff, the

pilot slowed his aircraft to a speed below translational lift while in a downwind condition. Full left pedal was not sufficient to maintain heading and the aircraft began to turn to the right, an action which the pilot misinterpreted as a tail rotor failure. The pilot applied an incorrect emergency procedure, and one main rotor blade hit the tail boom. The unit training program did not adequately train the pilot how to recognize and react to the characteristics and indications of the various types of tail rotor system failures and limitations. And it had not impressed upon the pilot the necessity of using performance charts before flight or of performing OGE hover checks. Result: $60,000 in damages.

Tactical and special tasks. The IP of this UH-1 had demonstrated two NOE deceleration maneuvers. The pilot had completed two slow decelerations (one satisfactorily) and was doing a faster third one. At a speed above effective translational lift, the pilot incorrectly applied abrupt aft cyclic and insufficient

collective pitch. The helicopter rotated about the mast and both tail rotor blades hit the ground. The aircraft rolled over on its left side. The pilot had not demonstrated that he was capable of performing the maneuver at a speed above effective translational lift after having done only one successfully at a speed below effective translational lift. The unit did not require aviators participating in NOE qualification to attend ground school or review technical tapes of NOE flying techniques before beginning their training. The IP had not been evaluated in NOE maneuvers for over 2 years and the unit made no effort to provide him refresher training. Result: destroyed aircraft - $618,055.

Approach and landing tasks. When the pilot of this UH-1 tried to take off from a slope, he applied excessive right cyclic. The aircraft entered dynamic rollover and came to rest on its right side. At least 8 years had elapsed since the pilot had demonstrated proficiency in slope operations. Unit standardization flights did not include slope operation proficiency checks. Result: $77,000 in damages.

Mission tasks. The PIC of the lead aircraft in a formation flight of three UH-1s, without warning the formation, rapidly decelerated and started a right turn immediately before landing. The pilot of the No. 2 aircraft was unable to maintain spacing and was forced to make a go-around. The lead aircraft PIC, fearing a midair, increased his deceleration. The tail rotor hit the ground, and the aircraft spun and landed hard. The flight commander, who was the PIC of the lead aircraft, was not familiar with the correct formation flying procedures and techniques. The flight facility did not have a training program to establish and maintain proficiency in formation flying techniques. Result: $70,000 in damages.

Flight planning tasks. The crew of this UH-1 tried to take off from a mountain landing site with the aircraft about 1,000 pounds over the allowable gross weight for the altitude and temperature. Engine rpm bled off during takeoff, and the helicopter settled. The main rotor blades hit a rock, and the aircraft tipped over and came to rest on its left side. The unit did not place sufficient emphasis on the use of flight planning, takeoff and landing data, or weight and balance information to assure acceptance and continuous use of the procedures and planning data provided in the operators manual. Result: destroyed aircraft, $618,055, and one minor injury.

Over the past 5 years, 71 percent of all Army Class A, B, and C aircraft accidents have involved human error. A breakout of the top five system problems causing the human errors shows that psychological factors affecting aircrew performance such as motivation, attention, judgment, and overconfidence accounted for 40 percent of the accidents. Inadequate unit training accounted for 13 percent. Inadequate written guidelines, equipment design, and maintenance accounted for the remaining 18 percent of the human error accidents.

What this really means is that more than half of the system problems causing our human error accidents are at a level which is directly influenced and controlled by the commander. The Safety Center can do something about system inadequacies, such as written guidelines, equipment design, and maintenance. But we must look to commanders for the correction of substandard aircrew performance and inadequate unit training.

A sound unit training program is one of the biggest guns in the Army's arsenal of weapons against crew error accidents. Neither the new aviator nor the seasoned aviator outgrows the need for unit training. The veteran aviator left to his own designs can develop a case of severe overconfidence to the point that he may disregard established procedures.

A new pilot fresh out of flight school has acquired the necessary knowledge and skills he needs to become a proficient aviator, and he is eager to excel. Nevertheless, he lacks experience. In gaining experience, the new pilot finds he must not only develop proficiency in handling his aircraft but also, and what may be even more important, in handling situations—making right decisions and coping with any problems that may arise. Without benefit of unit training, he may acquire this experience—along with all the wrong habits—on his own.

An effective unit training program surfaces an individual's strong points as well as his weak ones, and points them out not only to the pilot involved but also to his commander. Armed with this information, the commander can intelligently assign missions within the capabilities of his pilots and provide any necessary training.

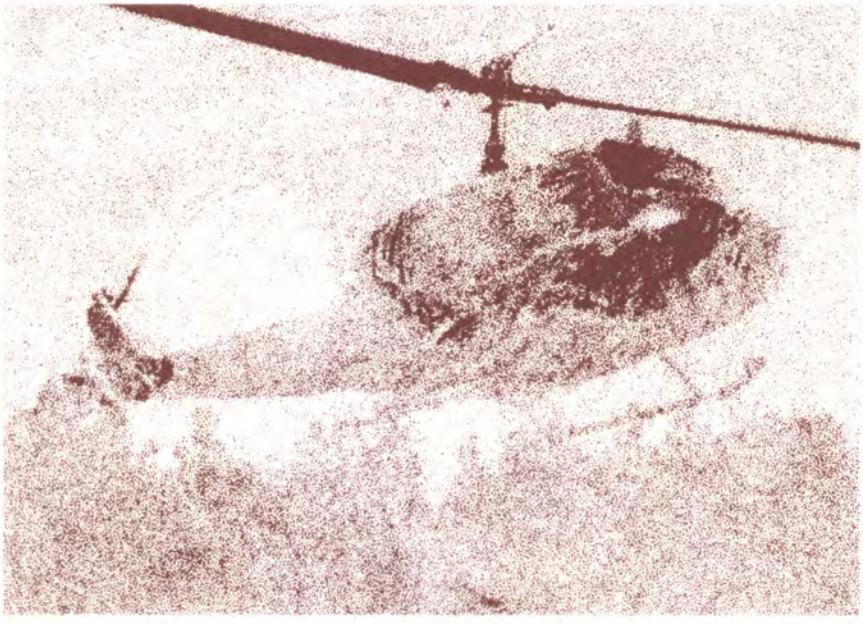
Numerous scenarios can be developed that incorporate ATM tasks and requirements in a logical sequence. These tasks should, of course, relate to the unit's tactical mission—the types of things their pilots would be called on to do during an ARTEP.

Improved safety is not the only payoff from a well-run unit training program. Other advantages include standardization of procedures, improved techniques in every area, successful mission accomplishment, increased self-confidence, higher morale, and top performance.

The end result is mission accomplishment with maximum safety. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps



Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft was No. 2 in a flight of three on short final for landing to an airport area cleared of snow. The runway and other nearby areas were covered with snow. A single aircraft had been cleared to land just ahead of the flight of three. The pilot of the single aircraft overshot his intended landing area and was hovering back toward the area as the flight of three was on short final. The hovering aircraft created a snow cloud, and the pilot of the No. 1 aircraft in the flight of three terminated his approach short of the cleared area, creating another snow cloud. The pilot of the No. 2 aircraft terminated his approach at a high hover behind the lead aircraft and lost outside visual reference because of the snow cloud. Aircraft drifted and rolled to right. Main rotor blades hit ground and aircraft came to rest inverted. 8305

UH-1 Class C mishap □ (H series) Main rotor blades hit white birch tree covered with snow as aircraft was landing to snow-covered field.

UH-1 Class E mishaps □ (H series) Rpm warning light came on, followed by decrease in N_2 rpm. Caused by failure of tachometer generator shaft. □ (H series) Master caution light came on during flight. Caused by failure of hydraulic pressure switch. □ (H series) Right fuel boost pump light came on during hover. Caused by failure of fuel pump. □ (H series) Loud whistling noise was heard during flight. Caused by failure of bearing in bleed air pump. □ (H series) Master caution light came on and controls were stiff during start. Loss of hydraulic fluid was caused by separation of hose from fitting.

Attack helicopters

AH-1 Class E mishaps □ (G series) Master caution and No. 1 hydraulic lights came on. Two minutes later, stiffness was felt in pedals. Caused by ruptured pressure line from No. 1 hydraulic pump to filter. □ (G series) When collective pitch was increased during flight, egt was excessive for power setting. Caused by failure of deice valve. □ (S series) Master caution and No. 2 hydraulic lights came on during approach. Caused by failure of pressure switch. □ (S series) High egt on takeoff was caused by worn bushing from bleed air line.

Cargo helicopters

CH-47 Class E mishap □ (C series) No. 2 engine transmission oil pressure decreased during flight. Postlanding inspection revealed excessive oil leak between engine and engine transmission.

Observation helicopters

OH-58 Class C mishap □ (A series) AH-1 hovered close to tied-down OH-58. Rotorwash caused copilot's door to separate and break chin bubble.

OH-58 Class E mishaps □ (A series) Pilot felt cyclic pull to left during engine start. Tiedown was still attached to main rotor blade. Crew chief gave pilot clear and untied signal. Pilot did not clear blades left and right. □ (A series) When IP increased collective during demonstration of NOE quick stop maneuver, N_2 dropped to 80 percent and rotor rpm to 300. Caused by malfunction of fuel control.

Training helicopters

TH-55 Class C mishaps □ Student pilot (SP) hovered to parking area and parked with tail boom into the wind. SP reduced throttle to 1850 rpm, frictioned the controls, and then increased throttle to 2900 rpm, performing required mag check. At this point, SP, intending to close throttle, rolled it the wrong way and increased it to full open. Aircraft spun violently to right and drifted off pad. SP tried to bring aircraft to a hover to regain control. Tail stinger hit pad, and aircraft rolled onto its right side.

(continued on next page)

Mishap briefs

□ SP heard popping sound and smelled smoke. He hovered to a parking pad and turned aircraft so the wind was 135 degrees from the nose. Mechanic checked aircraft while it was running, found nothing wrong, and released it for flight. SP picked aircraft up to a hover without turning back into the wind. Aircraft began to oscillate and SP inadvertently activated antioverspeed device. He then heard a grinding noise and dropped the collective. Aircraft hit hard and came to rest upright.

Fixed wing

C-12 Class C mishap □ (C series) Aircraft was flying at 16,000 feet msl in light to moderate turbulence, light rain, snow, and light ice. Crew suspected aircraft was struck by lightning. Post-flight check confirmed lightning strike.

OV-1 Class C mishap □ (D series) Left wing of aircraft hit large bird during night flight.

OV-1 Class E mishap □ (RV-1D) Loud popping sound was heard after power levers were pushed to takeoff power from low cruise power setting. No. 2 engine egt exceeded 760° C. Caused by failure of fuel control.

U-21 Class E mishap □ (A series) Nose wheel steering was ineffective during taxi. Caused by excessively worn steering link assembly.

Maintenance

UH-1 Class E mishaps □ (H series) Crew smelled something burning and saw smoke coming from above radio pedestal. Electrical systems were turned off and aircraft was landed. Caused by overheated battery. Voltage regulator was set too high. □ (V series) Crew smelled strong fuel odor during final approach for landing. O-ring was not installed in auxiliary fuel pump discharge outlet. □ (V series) Crew aborted start when main rotor blades were not in motion at 15% N_1. Further inspection revealed grinding and binding in engine when main drive shaft was rotated by hand. Incorrect shimming caused N_2 turbine wheel to rub on second-stage nozzle.

UH-60 Class E mishap □ Master caution and airspeed failure lights came on during takeoff. Pilot's airspeed indicator would not exceed 20 knots, while copilot's indicated 100 knots. Caused by failure to reinstall pitot static drains after pitot static check.

AH-1 Class E mishaps □ (S series) Pilot's airspeed indicator did not work during takeoff. Caused by damaged pitot static line. □ (S series) Engine oil pressure light came on during start. Oil sump bottle cap was found in engine oil reservoir, restricting oil flow to engine oil pump. □ (S series) Engine quit during runup. Primary fuel line had been disconnected and not completely reconnected. No logbook entries were made.

OH-58 Class E mishap □ (A series) N_1 would not go above 50 percent during engine start. Pneumatic air lines from power turbine governor to gas producer fuel control were not secured properly, permitting air leakage.

U-21 Class E mishap □ (RU-21H) Crew discovered during fuel management check that right nacelle tank was reading 80 pounds and left nacelle tank was full. Right transfer switch was activated. Five minutes later, right nacelle tank indicated 50 pounds. Crew used transfer pump, with negative results. Right engine then failed. After aircraft was landed, transfer pump was changed. Small piece of plastic was found in inboard wing tank, possibly causing partial fuel flow restriction.

(continued on back page)

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	2	0
	November	2	0	1-24 Nov	2	2
	December	4	6	December		
2nd Qtr	January	4	1	January		
	February	3	2	February		
	March	5	3	March		
3rd Qtr	April	7	6	April		
	May	6	2	May		
	June	2	3	June		
4th Qtr	July	2	2	July		
	August	8	5	August		
	September	10	13	September		
	Total for Year	59*	46**	Total to Date	4	2

*Includes 1 ground accident

**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

Messages received

• Safety-of-flight maintenance mandatory message concerning one-time inspection of collective sleeve bearings and main mast assembly for all AH-1 series and UH-1C/M aircraft (540 rotor system) (AH-1-82-13, UH-1-82-07, 101435Z Nov 82). Summary: Manufacturing specifications require that the bearing housing be marked with the word "top" to aid in proper installation. Some bearings have been inadvertently marked with the word "top" on the side position rather than the top position. If these improperly marked bearings are installed in accordance with the appropriate TM instructions, damage to the mast can occur. Quality Deficiency Reports received from the field indicate incorrectly marked bearings have been installed on aircraft. Contact: Jim Simon, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of UH-60A dragbeam/axle assembly (UH-60A-82-21, 101440Z Nov 82). Summary: Fracture of the dragbeam/axle assembly of a UH-60 occurred while the aircraft was parked on the flight line. Water had accumulated in the base of the dragbeam, causing severe corrosion, which led to eventual failure of the part. Those dragbeams with imminent cracking problems should be changed out. Contact: Lyell Myers, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning CH-47C block modification application (MIM 82-47-08, 052040Z Nov 82).

• Maintenance information message concerning AH-1 gunners' and pilots' shoulder harness webbing adjusters (MIM-82-AH-1-MEA-08, 091500Z Nov 82).

• Maintenance information message concerning a revision to the 10KVA alternator emergency procedures in the operators manual (MIM-82-AH-1-MEA-09, 101430Z Nov 82).

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

Survival kit inspection intervals

Have you received your copy of interim change 101, dated 22 Oct 1982, to AR 40-61? If you have, we direct your attention to the statement in parentheses (every 90 days) in paragraph 1a, line 4. This time interval should be changed to **120 days.** This change is made to standardize inspection intervals for **all** Army survival kits.

This action has been coordinated with Department of the Army Surgeon General's Office and will be posted in change 1 to AR 40-61. ■

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The snow scene

Snow. It can turn ugly cities into winter wonderlands. It's necessary for white Christmases, and it's indispensable for building snowmen. What's not so nice about it is the havoc it can create for pilots who must fly over snow-covered areas.

Although most areas of the world in which Army pilots fly do not yet have snow, it's time to review specialized techniques for winter flying . . . before the first snow falls and the first helicopter crashes.

Most snow-related mishaps happen because of whiteout. Whiteout has been described as a phenomenon which occurs when light from snow on the ground and snow-laden clouds exactly match. The whiteout we'll discuss here is that induced by blowing snow and helicopter rotors. When an aircraft is flown over loose snow, the movement of the air picks the snow up and circulates it, forming a snow cloud. Visibility is reduced to zero as the aircraft descends or climbs out through a snow cloud.

Whiteout mishaps

• The pilot of an OH-58A, while hovering his aircraft 2 to 3 feet over a snow-covered field, lost visual reference because of blowing snow. The aircraft drifted to the left, the left skid hit the ground, and the aircraft rolled onto its side. Following is a paraphrased version of the pilot's account of the mishap:

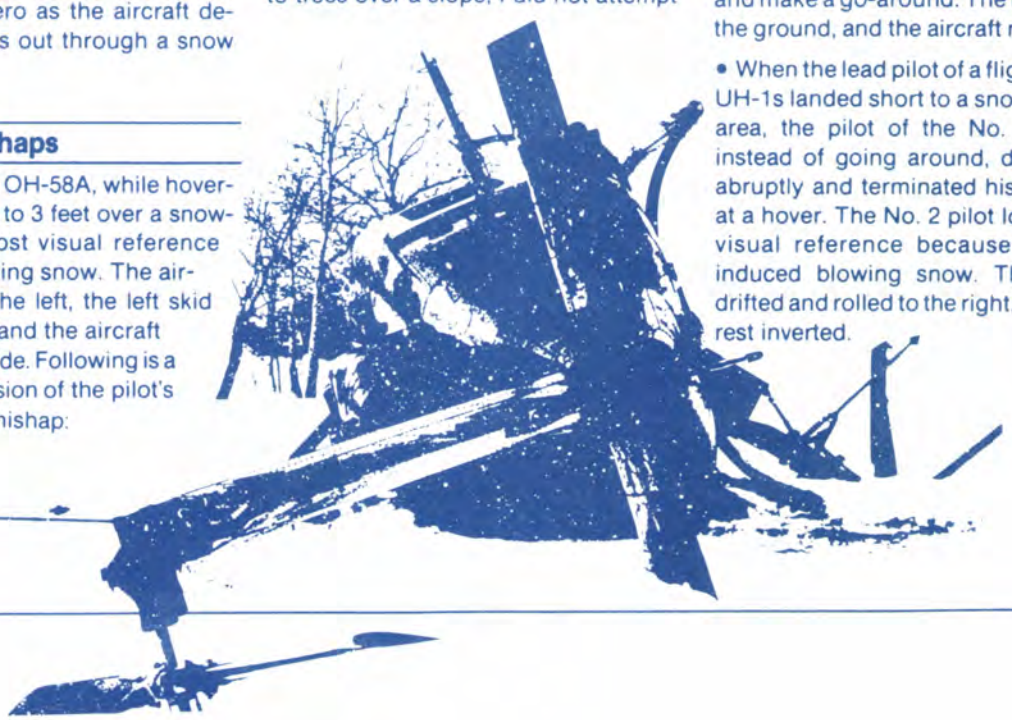
"I picked up the aircraft and turned it 90 degrees. There was no difficulty maintaining ground reference. The furrows of the plowed field showed as brown rows, and we were parallel to and about 10 meters from a treeline which was plainly visible. Overall visibility was at least ½ mile. We could see a distant treeline. I told the copilot that I wanted to reposition the aircraft about 20 meters forward.

"I picked the aircraft up to a low hover and began to move forward. We went maybe 15 meters and were well able to maintain visual contact, both with the treeline to the near left and with the ground. Suddenly, blowing snow engulfed my side of the cockpit and I lost all visual references. I tried to regain visual contact with the ground and then with the treeline to my immediate left. Since conditions had permitted me to hover that far for possibly 15 to 20 seconds, and since I knew I was close to trees over a slope, I did not attempt an instrument takeoff. I felt the helicopter was moving slowly forward and that I would be able to see the ground again any instant. I told the copilot that I couldn't see the ground. He replied that we were drifting left and down. At that instant, we tipped left and the aircraft rolled."

This mishap points out the relative ease with which any pilot can be trapped into a whiteout situation. The pilot, who was well qualified and highly experienced, was not new to winter operations. This was the third year he had flown in a snow environment.

• The crew of another OH-58 landed because of deteriorating weather and darkness. They spent the night with the aircraft and the next morning proceeded with the mission. Less than an hour after takeoff, they flew into marginal weather conditions. As the copilot tried to land, he became disoriented in blowing snow. The pilot did not take control and make a go-around. The left skid hit the ground, and the aircraft rolled over.

• When the lead pilot of a flight of three UH-1s landed short to a snow-covered area, the pilot of the No. 2 aircraft, instead of going around, decelerated abruptly and terminated his approach at a hover. The No. 2 pilot lost outside visual reference because of rotor-induced blowing snow. The aircraft drifted and rolled to the right, coming to rest inverted.



The snow scene

The helicopter produces the greatest amount of rotorwash when hovering. So when making an approach to a snow-covered terrain, do not terminate to a hover. Disorientation will most likely occur in the blowing snow. There are certain things you must do to make a safe landing or takeoff over snow.

Taking off

The techniques used for taking off from snow will certainly vary depending on the type of aircraft being flown. But the principle for this type of takeoff is common to all helicopters. The following takeoff techniques are recommended:

- Insure skids are free from obstructions.
- If the snow is only a few inches thick, apply pitch to the blades before takeoff to blow away the snow. This will reduce the density of snow that will be lifted on takeoff.
- After completing the above, stabilize the helicopter on the ground until the snow cloud dissipates.
- Position the cyclic for takeoff. If there are no obstructions along the takeoff route, the cyclic should be positioned to achieve a maximum performance takeoff attitude. If the takeoff is to be made over an obstacle, a near vertical ascent should be made.
- The aircraft should have no forward movement until it is clear of the ground. Apply sufficient torque for a positive rate of climb.
- As the helicopter begins to climb, blowing snow will increase and ground reference may be temporarily lost. Maintain heading and flight attitude.
- When clear of the snow cloud, adjust flight attitude and torque so as to achieve normal climb airspeed and rate of climb.

OH-58 pilot lost visual reference while hovering over snow-covered field.

Landing

- Before beginning an approach, you should learn all you can about the touchdown area; for example, the condition of the snow, the slope of the area, and the location of obstacles. If you are landing to an improved landing site, some forward airspeed on touchdown may be desirable. If you are landing to an unfamiliar tactical site, however, forward speed should be dissipated upon touchdown. Plan your approach so that only minimum power is required to terminate the approach. A shallow approach is recommended if there are no obstacles along the approach path. If an approach is required to get into a confined area, it is profitable to terminate the approach out-of-ground effect above the touchdown point and hover vertically downward. The rate of descent will depend on the condition of the snow. In loose snow, a slow descent will blow the snow away, allowing visual reference with the ground.
- The initial position of an approach to the snow is the same as any other approach. The main difference is in the last 50 feet. Instead of making the normal deceleration below effective translational lift airspeed, you should maintain this airspeed until just before touchdown. This allows you to keep the helicopter in front of the snow cloud until touchdown, after which it will become engulfed in the snow cloud. The approach angle of the last 50 feet deviates from the standard constant angle of descent. A slight leveling off is required to maintain airspeed. Forward cyclic must be applied to maintain speed. As the aircraft descends to an in-ground-effect altitude, blowing snow will develop to the rear of the aircraft. At this point, begin a deceleration. After the aircraft has begun to decelerate, it should be positioned in a landing attitude. Once ground contact is made, reduce torque until the aircraft is firmly on the ground.
- Another technique for landing in snow is using a shallow approach. Plan the approach to arrive at the predetermined touchdown area with minimum or no ground run and the aircraft on a landing attitude. This is accomplished by progressively establishing a landing attitude during the approach. By obtaining this attitude and properly applying collective pitch, airspeed should be dissipated so as to arrive at the touchdown area with little or no ground run.

FM 1-202, Environmental Flight, goes into more detail on the preceding techniques and contains other excellent information on cold weather flying. If you will be operating an aircraft this winter in areas where there is snow, now is the time to get a copy of FM 1-202. Among other things, it tells you how to determine the condition of the snow, how to improve depth perception, and the effects of rotor and propeller wash on snow. You should also be familiar with FM 1-51 and appropriate training and operators manuals.

Commanders of units operating in cold weather areas are responsible for seeing that their aviators are thoroughly trained in the correct techniques for snow takeoffs and landings. Winter with all its hazards will soon be with us. You can make it a mishap-free one if you act now. ■

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 1 Sep 82 issue (8278) □ Pilot and IP were on a mission in a desert environment. During an approach to a hover in a valley, the aircraft, at an altitude of 50 feet agl and airspeed slightly below effective translational lift, began to settle with power. Pilot applied collective pitch control, which aggravated the situation by causing the vertical sink rate to increase. IP, who had been using the radio and not monitoring the approach, joined the pilot on the controls and they both applied remaining collective pitch about 3 feet above the ground. Aircraft landed hard, bounced, and came to rest upright. Pilot had limited recent experience in a desert environment. He did not coordinate the application of power and airspeed for a smooth approach to the landing site. When an excessive sink rate was encountered, he did not increase power and apply forward cyclic to gain airspeed which could have helped him to fly out of the settling with power conditions. IP was late with corrective action because he was overconfident in the pilot's ability and in his own ability to recover the aircraft from any situation encountered.

8314

UH-1 Class A mishap in 24 Nov 82 issue (8305) □ Pilot of the lead UH-1 of a flight of three landed 3,600 feet short of the area to which he had been cleared to land. Another aircraft had landed just moments before. The UH-1 pilot was unfamiliar with the airfield and thought the other aircraft had landed to the same area to which he was cleared. The pilot of the second aircraft in the flight had to unexpectedly steepen his approach to remain in formation when his flight leader landed short, and he lost visual reference to the ground when engulfed by blowing snow. The right skid hit the ground, and the aircraft rolled onto its right side. Instead of continuing his approach, the pilot of the second aircraft should have made a go-around.

UH-1 Class B mishap in 6 Apr 83 issue (8314) □ Aircraft was on support mission in the hills. Weather conditions began to deteriorate. As aircraft entered a valley, the weather was zero visibility and zero ceiling. Pilot turned aircraft around and flew out of the valley. A few minutes later, aircraft entered zero-zero conditions, and crew lost ground contact. Pilot started a climb and noted his airspeed at less than 20 knots. Copilot saw they were rapidly approaching a mountain, pulled back on the cyclic, and increased collective pitch. Aircraft climbed parallel to the mountain until it hit a tree. Copilot then found a clearing in the forest and landed. The weather briefing provided to the crew, forecasting 3,000-foot ceilings and 2 miles visibility, was incorrect.

8305

Attack helicopters

AH-1 Class B mishap in 13 Apr 83 issue (8316) □ Pilot, wearing night vision goggles with daylight filters, misjudged his altitude above the ground during final phase of low-level autorotation. Pilot failed to attain proper decelerative attitude, apply sufficient initial collective pitch, and maintain lane alignment. IP did not take control, and aircraft touched down with a right yaw and greater than normal groundspeed. Aircraft rocked from side to side as it slid down the runway. Transmission case failed and tail boom was severed by main rotor blade.

Observation helicopters

OH-58 Class B mishap in 2 Feb 83 issue (8309) □ As pilot hovered about 5 to 10 feet above 50- to 60-foot trees, aircraft began to drift and yaw to right. Pilot had applied full left pedal before the start of the right turn. Pilot misinterpreted the cause of the drift and yaw to be a loss of tail rotor effectiveness. In his attempt to stop the yaw, pilot aggravated the condition by reducing left pedal and maintaining his power setting, which accelerated the yaw. After about 60-

degree turn, pilot reduced left pedal again and aircraft spun 360 degrees to right. Autorotation was initiated to a small clear area. Aircraft descended into the clearing, striking trees with tail rotor and main rotor blades and coming to rest on left side. Pilot had constantly been made aware of loss of tail rotor effectiveness and its effects on the OH-58 through publications and briefings, but he had never been trained to positively identify this emergency.

OH-58 Class B mishap in 2 Feb 83 issue (8310) □ Crew landed aircraft because of deteriorating weather and darkness. They spent the night with the aircraft and the next morning proceeded with the mission. Less than an hour after takeoff, they flew into marginal weather conditions. As copilot tried to land, he became disoriented in blowing snow. Pilot did not take control and make a go-around. Left skid hit the ground and aircraft rolled over.

OH-58 Class B mishap in 2 Feb 83 issue (8311) □ Pilot, while hovering 2 to 3 feet over snow-covered field, lost visual reference because of blowing snow. Aircraft drifted to left, and left skid hit the ground. Aircraft then rolled onto left side. Pilot failed to follow procedures for hovering over snow and failed to use proper recovery procedures.

Training helicopters

TH-55 Class B mishap in 26 Jan 83 issue (8308) □ Student pilot, on his first unsupervised solo flight, was in the traffic pattern. He heard the tower controller advise that a wind shift was occurring at the airfield. Controller did not issue instructions for a change in landing direction at that time. The student was concentrating on flying the helicopter, executing his second approach, and the pending change in landing direction. He became confused and misinterpreted the advisory for instructions to change landing direction. Student decided to make a 180-degree turn. He allowed his airspeed to zero out, causing the helicopter to settle with power. Student pilot could not recover, and aircraft crashed.

Fixed wing

OV-1 Class A mishap in 1 Dec 82 issue (8306) □ Aircraft was on test flight to determine static single-engine velocity for minimum control airspeeds (V_{mc}). Aircraft was being operated at maximum gross weight and about 4,000 feet agl with gear down and 45 degrees of flaps. Pilot reduced power on left engine to idle and set power on right engine at approximately 80 percent. Aircraft was then allowed to slow until control buffeting occurred and left wing dropped. V_{mc} was reached at 78 knots, and pilot announced that he was initiating a recovery. Pilot did not follow the recovery procedures outlined in TC 1-144. He tried to recover by advancing power on the idling engine and rapidly reducing right rudder control instead of reducing power on the operative engine and gradually reducing rudder control as forward airspeed increased. These control inputs increased the torque effect of the operating engines, causing the aircraft to yaw and roll violently to the left. Pilot could not recover and aircraft crashed. ■

Aviation mishap prevention forum

Questions for aviation personnel

1. What are the safety goals of the U.S. Army? **Reference: AR 385-10, The Army Safety Program**

2. Survival time when a person is immersed in cold water will decrease with a steady decline in water temperature. Death from hypothermia will result if rescue does not occur promptly. If you are immersed in 32.5° F. water, what is your likely survival time? **Reference: FM 1-202, Environmental Flight**

3. What is hypothermia? **Reference: FM 1-202, Environmental Flight**

4. Aircraft shall not be serviced with oxygen when what conditions prevail? **Reference: TM 55-1500-204-25/1, General Aircraft Maintenance Manual**

5. A combustible liquid is one with a flashpoint at or below 100° F. (37.8° C.). True or false? **Reference: FM 1-300, Flight Operations and Airfield Management**

Answers to last week's questions

1. What is the purpose of the Operational Hazard Report (DA Form 2696)? DA Form 2696 will be used to notify commanders and safety councils of anything affecting the safety of Army aircraft or related personnel and equipment. **AR 95-1, page 2-6, par. 2-13**

2. What AR provides instructions for completing the Operational Hazard Report? AR 385-95. **AR 95-1, page 2-6, par. 2-13**

3. A flammable liquid is one with a flashpoint below 100° F. (37.8° C.) and a vapor pressure not above 40 pounds per square inch (psi) (absolute) at 100° F. True or false? True. **FM 1-300, page 4-7, par. 4-5** ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) One-quarter-ton trailer was dropped unintentionally during slingload operations from 40 feet. Suspect that when pilot pushed his cyclic intercom button to talk, he inadvertently pushed or brushed cargo release button.

UH-1 Class E mishaps □ (V series) During takeoff, at about 100 feet agl, crew chief saw kite string go by cargo door window. Pilot landed and string was found wrapped around swashplate and control tubes. □ (V series) Engine oil pressure fluctuated during approach. Caused by faulty oil pressure gauge. □ (H series) As aircraft was on base leg for landing, bird hit and broke pilot's chin bubble. Bird came to rest under pilot's seat.

UH-60 Class E mishaps □ Master caution and No. 1 engine oil pressure lights came on. Caused by failure of signal data converter. □ Whining noise was heard from engines after takeoff. After aircraft was landed, No. 2 engine quit. Inspection revealed one blade had come off inlet particle separator, causing vibration which resulted in P3 line breaking. This caused engine to fail because of improper fuel control.

Attack helicopters

AH-1 Class B mishap □ (S series) Leak had developed around a valve in engine oil drain line. Aircraft was inspected and circle red X status was applied for one-time flight to maintenance facility. Engine oil bypass light came on after 5 minutes of flight. Engine oil temperature reached and exceeded maximum after 11 minutes of flight. Pilot continued flight to an airfield. Engine oil temperature reached 155° C. Oil leaked out of engine oil system through crack in ball valve. 8356

AH-1 Class E mishaps □ (S series) No. 2 hydraulic light came on during flight. Caused by failure of pressure switch. □ (S series) Aircraft was No. 5 in flight of 6. During takeoff, brownout caused loss of ground reference. Pilot increased power, and overtorque light came on. Aircraft was landed without further incident.

Cargo helicopters

CH-47 Class C mishap □ (B series) As gun crew was unloading howitzer, they dropped the gun on the ramp, punching hole in center floor panel.

CH-47 Class E mishaps □ (B series) No. 2 engine failed during power recovery from autorotation. Caused by failure of No. 3 bearing. □ (B series) As pilots were taxiing out of parking area, they noticed that power steering was not functioning. Flight engineer checked swivel locks and told pilots that locks were not locked and aft landing gear was out of phase. Pilot brought aircraft to a hover to lock the swivels. Rotorwash caused damage to three unsecured tunnel covers of parked aircraft. Suspect improper towing procedures were used in leaving aft gear 180 degrees out of phase.

Observation helicopters

OH-58 Class A mishap □ (A series) Lead aircraft departed field site about 1 minute before No. 2 aircraft. Pilot of No. 2 aircraft tried to catch up with the lead aircraft because he had an inoperative radio magnetic indicator. Weather conditions were 1,000 feet overcast with 3 miles visibility in light rain. As the second aircraft caught up to the lead, the pilot was having visibility problems because of the rain and fogging on the inside of the windscreen. No. 2 aircraft approached the lead aircraft from the right rear at a slightly lower altitude (450 to 500 feet agl). As No. 2 pilot tried to climb into formation position on right side, he lost sight of the lead aircraft.

FY 83 Class A Accident Countdown

	Month	FY 82 Class A Accidents	FY 82 Army Fatalities	Month	FY 83 Class A Accidents	FY 83 Army Fatalities
1st Qtr	October	6	3	October	**2**	**0**
	November	2	0	November	**2**	**2**
	December	4	6	December	**0**	**0**
2nd Qtr	January	4	1	January	**1**	**0**
	February	3	2	February	**0**	**0**
	March	5	3	March	**2**	**5**
3rd Qtr	April	7	6	April	**6**	**0**
	May	6	2	May	**8**	**1**
	June	2	3	June	**4**	**5**
4th Qtr	July	2	2	July	**5**	**7**
	August	8	5	August	**4**	**3**
	September	10	13	1-28 Sep	**5**	**0**
	Total for Year	59*	46**	Total to Date	**39**	**23**

*Includes 1 ground accident
**Army personnel only. Total number of fatalities in Army aircraft accidents was 86.

Mishap briefs

Passenger in lead aircraft saw second aircraft climbing toward them and warned the pilot, who immediately turned his aircraft to the left. Main rotor of No. 2 aircraft hit front right skid of lead aircraft. Pilot of No. 2 aircraft lost control, and aircraft descended in nose-low attitude. Aircraft crashed through trees and came to rest on right side. Pilot of lead aircraft landed without incident. Three injuries. 8357

OH-58 Class E mishaps □ (A series) Pilot felt excessive vibration through tail rotor pedals. No. 4 tail rotor hanger bearing was slipping on bearing collar, causing hanger assembly to touch support. □ (A series) Engine oil bypass light came on. Caused by failure of oil bypass float switch

Fixed wing

U-21 Class E mishaps □ (A series) No. 1 engine was shut down and prop feathered as part of prephase test flight. Engine was restarted, but attempts to unfeather prop were unsuccessful. Single-engine landing was made. Caused by faulty propeller governor. □ (A series) Flaps went to 20 percent during landing and would not extend further or retract. Flap setting was left in approach position and aircraft was landed. Caused by failure of flap motor.

Maintenance

UH-1 Class E mishaps □ (M series) Master caution and transmission oil hot lights came on. Internal prongs on temperature transmitter were twisted and porcelain on thermostatic switch was cracked because of excessive torque. □ (H series) Pilot noticed decrease of rotor and N_2 rpm with application of collective during climbout. Washer was not correctly aligned on droop compensator.

OH-58 Class E mishaps □ (C series) Aircraft began slow, uncommanded turn to right. Copilot slightly increased collective. Pilot got on the controls as aircraft was 180 degrees through first turn. As controls were transferred, some left pedal input was removed. Pilot reduced collective and applied full left pedal. Spin stopped and aircraft was landed. Tail rotor flapping angle was determined to be 1 degree greater than specifications allowed because of improper maintenance procedures and quality assurance. □ (C series) High frequency vibration was felt during landing. Caused by loose No. 1 tail rotor drive shaft hanger bearing mount.

U-21 Class E mishaps □ (A series) Oil was added to No. 1 engine after runup. Crew chief secured cowling but did not secure oil cap. During flight, liquid was seen flowing along outside of cowling. Four quarts of oil were lost from engine. □ (A series) About 2 minutes after cockpit lights were turned on, electrical smoke was seen coming from behind overhead light control panel. Electrical arcing was also visible through screw holes in panel. Caused by incorrect installation of light. Short from light caused arc to printed circuit board. Circuit breaker did not activate.

Messages received

- AH-1 maintenance information message on possible electrical wiring chafing problems (MIM-AH-1-MEA-83-04, 151430Z Sep 83).
- Message concerning interim changes to OH-58 operator's manual (122000Z Sep 83).

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

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