Army aircraft mishap prevention data

Published by the
United States Army Safety Center
Fort Rucker, Alabama 36362

Volume 10
Number 10
2 December 1981

Flightfax

US Army Aviation Training Library
Fort Rucker, Alabama 36360

Pilot knowledge and proper flying techniques can prevent dynamic rollover mishaps

Dynamic rollover

Dynamic rollovers are always a result of pilot error. Knowledge and proper flying techniques can prevent these needless mishaps. They are not unique to the military, as 6 percent of civilian rotorcraft mishaps have also been attributed to rollover.

During nomal or slope takeoffs and landings with some bank angle or side drift and with one skid on the ground, the bank angle or side drift can cause the helicopter to get into the situation where it is pivoting about a skid (or wheel). When this happens, lateral cyclic control response is more sluggish and less effective than for the free hovering helicopter. Consequently, if the bank angle (the angle between the helicopter and the horizon) is allowed to build up past 15 degrees, the helicopter will enter a rolling maneuver that cannot be corrected with full cyclic and will roll over on its side. In addition, as the roll rate and acceleration of the rolling motion increases, the angle at which recovery is still possible is significantly reduced. The critical rollover angle is also reduced for a right-skid-down condition, crosswinds, lateral center of gravity offset, and left pedal inputs. For cases where these items are all in their most critical condition, and for high gross weight at high altitude, hot day conditions, hovering on the right skid with thrust (lift) approximately equal to the weight is probably uncontrollable for any bank angle.

Avoidance procedures

When performing maneuvers with one skid on the ground, care must be taken to **keep the helicopter trimmed**, especially laterally. For example, if a slow takeoff is attempted and the tail rotor thrust contribution to rolling moment is not trimmed out with cyclic, the critical recovery angle will be exceeded in less than 2 seconds.

Control can be maintained if the pilot maintains trim, does not allow helicopter rates to become large, and keeps the bank angle from getting too large. The pilot must fly the helicopter into the air smoothly, keeping excursions in pitch, roll and yaw low, and not allowing any untrimmed moments.

When performing normal takeoffs and landings on **relatively level ground** with one skid on the ground and thrust (lift) approximately equal to the weight, carefully maintain the helicopter position relative to the ground with the flight controls. Perform maneuvers smoothly and keep the helicopter trimmed so that no helicopter rates build up, especially roll

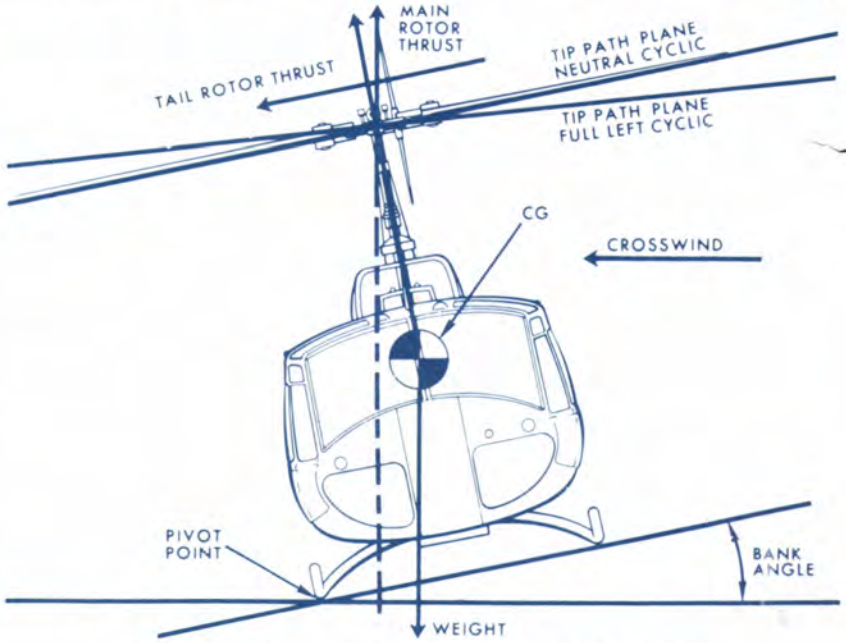

FIGURE 1.—Example of Forces Acting on a Helicopter With Right Skid on the Ground (Level Ground)

During normal takeoffs to a hover and landings from a hover, cross slope takeoffs and landings, and takeoffs from level ground with bank angle or side drift, a situation can exist where the helicopter will pivot about the skid/wheel which remains on the ground and enter a rolling motion that cannot be corrected with full lateral cyclic input.

rate. If the bank angle starts to increase to a large angle (5 to 8 degrees) and full corrective cyclic does not reduce the angle, reduce collective to reduce the unstable rolling moment from the thrust (lift) vector.

When performing **slope takeoff and landing maneuvers**, follow the published procedures, being careful to keep roll rates small. Slowly raise the downslope skid to bring the helicopter level and then lift off. (If landing, land on one skid and slowly lower the downslope skid.) If the helicopter rolls to the upslope side (5 to 8 degrees), reduce collective to correct the bank angle and return to level attitude and then start the takeoff procedure again.

ective is much more effective in controlling the rolling motion than lateral cyclic because it reduces main rotor thrust (lift). A smooth, moderate collective reduction of less than approximately 40 percent (at a rate less than approximately full up to full down in 2 seconds) is adequate to stop the rolling motion with about 2 degrees bank angle overshoot from where down collective is applied.

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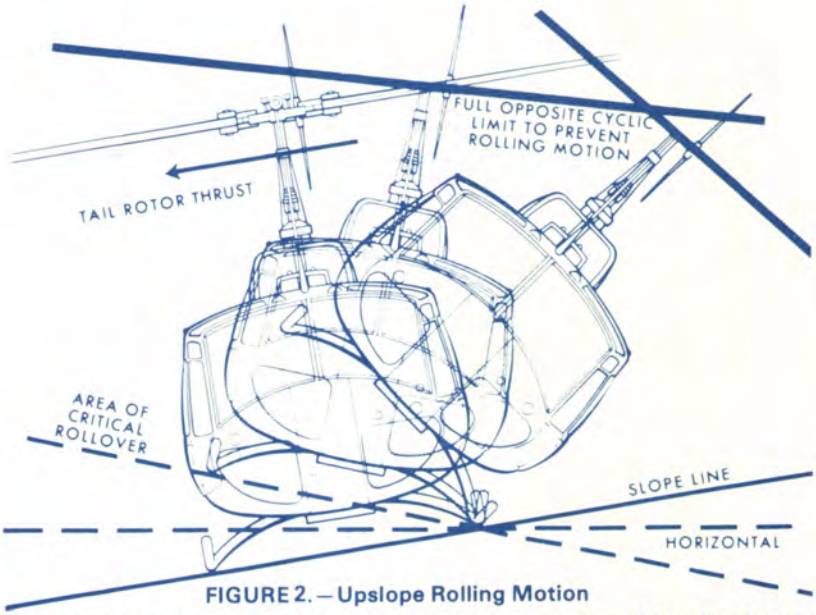


FIGURE 2. — Upslope Rolling Motion

Excessive application of cyclic into the slope, in coordination with collective pitch application. During landings or takeoffs, this condition results in the downslope skid rising sufficiently to exceed lateral cyclic control limits and an upslope rolling motion occurs.

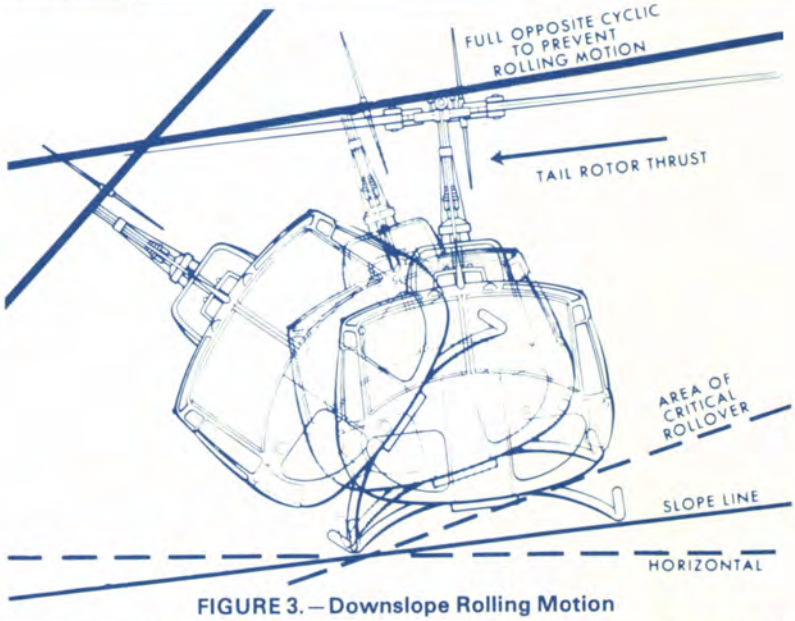


FIGURE 3. — Downslope Rolling Motion

Excessive application of collective pitch in coordination with cyclic application into the slope. When the downslope skid is on the slope, excessive application of collective may result in the upslope skid rising sufficiently to exceed lateral cyclic limits and induce a downslope rolling motion.

Dynamic rollover

Care must be taken to not lower collective at too high a rate as to cause fuselage-rotor blade contact. Additionally, if the helicopter is on a slope and the roll starts to the upslope side, reducing collective too fast creates a high roll rate in the opposite direction. When the downslope skid hits the ground, the dynamics of the motion can cause the helicopter to bounce off the upslope skid and the inertia can cause the helicopter to roll about the downslope skid and over on its side. Do not pull collective suddenly to get airborne as a large and abrupt rolling moment in the opposite direction will result. This moment may be uncontrollable.

Warning

If the helicopter develops a roll rate with one skid on the ground and thrust (lift) approximately equal to the weight, the helicopter can roll over on its side.

Caution

When landing or taking off, with thrust (lift) approximately equal to the weight and one skid on the ground, keep the helicopter trimmed and do not allow helicopter roll rates to build up. Fly the helicopter **smoothly** off (or onto) the ground, **carefully** maintaining trim.

The following information applies to UH-1 series helicopters and is basically the same for all single-rotor helicopters. However, the area of critical rollover will vary for other series helicopters depending on vertical and lateral c.g., landing gear configuration, tail rotor thrust moment, etc.

UH-1 slope landing techniques

Techniques for slope landings and takeoffs are the same for all series of the UH-1. The following precautions must be considered during slope operations.

1. Less lateral cyclic control will be available during crosswind operations with the wind coming from the upslope side.

2. Slope operations should be avoided with tailwind conditions.

3. Less lateral cyclic will be available for left skid into slope operations due to the translating tendency of the tail rotor.

4. If passengers or additional crewmembers are picked up or offloaded after landing, the lateral cyclic requirement will change and must be reevaluated prior to pickup.

5. The interconnecting fuel line between tanks can cause unbalanced loading laterally due to fuel slosh or gravitational flow of fuel to the downslope tank. This shift of c.g. varies depending on fuel load, slope gradient and length of time the helicopter has been laterally inclined.

A slope of 5 degrees to 8 degrees can be accommodated safely without encountering mast bumping or reaching lateral cyclic limits. During slope landing, consideration must be given to the combined effects of slope gradient, wind, load position, and soil stability.

If cyclic limits are reached during slope operations, further lowering of the collective may induce mast bumping. Therefore, if the cyclic control contacts the stop, before the downslope skid is resting firmly on the ground, return to a hover and select a position with a lesser degree of slope.

If, during takeoff from a slope, the upslope skid starts to leave the ground before the downslope skid, smoothly lower the collective and check to see if the downslope skid is "stuck" or "caught" on some object. Make the helicopter do what you want it to do before it becomes uncontrollable. Accept nothing less than a vertical ascent.

The dangers of dynamic rollover are not restricted to slope operations. Rollover mishaps have occurred on level surfaces. The fact that a skid gets caught on PSP or stuck in soft asphalt doesn't necessarily mean that helicopter rollover is inevitable. The end result depends on the person at the controls and how quickly and accurately he analyzes the problem and initiates corrective action. Improper control application can intensify the rolling motion and place the helicopter in an unrecoverable attitude. ■

Mishap review

Synopsis

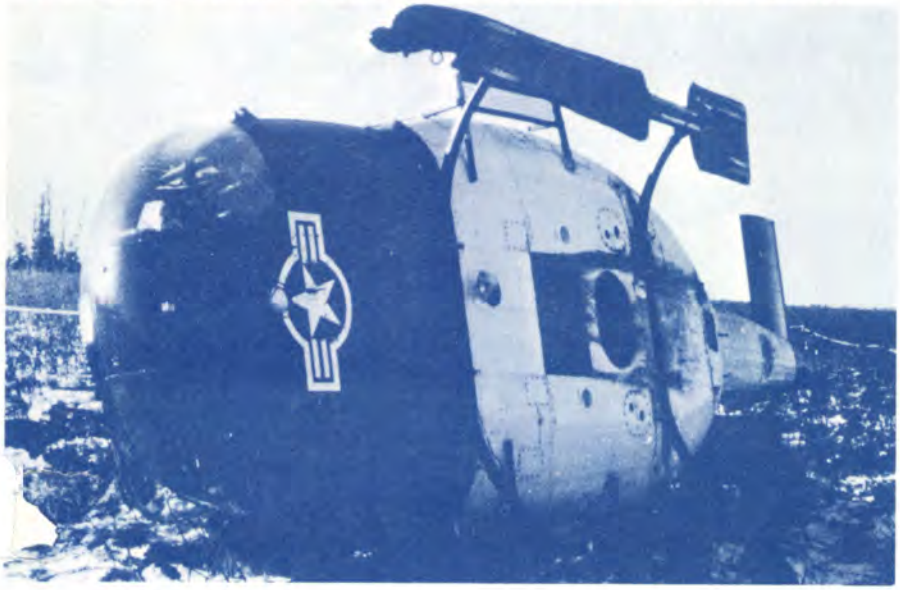
A UH-1H on a service support mission encountered dynamic rollover when the copilot tried to take off to a hover from level frozen tundra. As the copilot increased collective pitch, the left skid/ski lifted off the ground while the right side remained on the ground. The aircraft rolled about the longitudinal axis of the right skid to a point where the main rotor blades hit the ground. The aircraft continued to roll and came to rest on its right side. All occupants exited uninjured.

History of flight

A UH-1H was assigned to provide support for cleanup operations following a major joint readiness exercise. The aircraft was preflighted and departed the airfield for a 1-hour flight to a field site. After shutdown, the copilot performed a postflight inspection and made a walk-around inspection of the landing area, paying particular attention to the position of the skis in relationship to the tussock (mounds of frozen earth and grass measuring approximately 9 inches high and 12 to 18 inches in diameter).

After about 15 minutes, the crew again started the aircraft, completed a normal runup, and attempted to depart. The copilot began a normal takeoff to a hover while the PIC was crosschecking instruments, placing the checklist on the center console and observing the area to the left front. During the takeoff to a hover, the copilot inadvertently applied excessive right lateral cyclic as he increased collective pitch. The left skid/ski lifted off the ground while the right skid/ski remained on the ground, resulting in the aircraft pivoting about the longitudinal axis of the right skid/ski assembly. The copilot failed to detect the rolling motion of the aircraft because his attention was diverted, possibly to the aft cabin area or the instrument panel. When the PIC and copilot detected the rolling motion they both attempted corrective action but it was too late and the aircraft did not respond. The main rotor blades hit the ground and as the aircraft continued to roll the transmission was torn from the aircraft because of impact forces.

After exiting the aircraft, the crew tried to no avail to use their survival radios to make radio contact with other aircraft in the vicinity. The crew had been operating on a local VFR flight plan in a large local flying area and had not been transmitting position reports. The aircraft was located after 1 hour and 25 minutes by an aircraft on a local orientation flight. An emergency locator transmitter had been installed on the aircraft and was manually activated. However, it was not received.



Crewmember experience

The 27-year-old PIC had about 700 hours of rotary wing flight time and more than 1,000 hours total time. The 32-year-old copilot had more than 850 rotary wing flight hours.

Commentary

After the copilot inadvertently applied excessive right cyclic while taking off to a hover, the aircraft encountered dynamic rollover. The copilot diverted his attention (possibly from the aft cabin to the instrument panel) and did not maintain visual cues with the horizon perpendicular to the aircraft. As a result, the rolling motion of the aircraft was not detected until it was too late to apply corrective action.

The Army continues to have a significant number of dynamic rollover mishaps. This is the second such mishap during the past year associated with a joint readiness exercise. All aviators should be aware of the characteristics of dynamic rollover. It is a fact that if an aircraft reaches 15 degrees of bank angle with one skid on the ground and thrust (lift) approximately equals weight, it will roll over on its side and corrective control inputs normally will not stop it. ■

Selected mishap briefs

uh1 **Class A mishap** ☐ (H series) Aircraft, sitting on the ground at operating rpm, rolled over. Blade strike occurred, and transmission separated from aircraft. 8210

Class E mishaps ☐ (H series) Master caution light flickered on and off. Caused by failure of master caution panel. ☐ (H series) Popping sound was heard during flight. Main rotor blade skin had separated 3 inches at tip. ☐ (H series) Main rotor blades hit tree during terrain flight. ☐ (H series) Squealing sound was heard from transmission, followed by illumination of hydraulic pressure light, master caution light, and loss of hydraulic pressure. Caused by ruptured collective servo pressure hose. ☐ (H series) Grinding noise was heard and pedal vibration was felt during approach to OGE hover. Caused by malfunction of tail rotor servo.

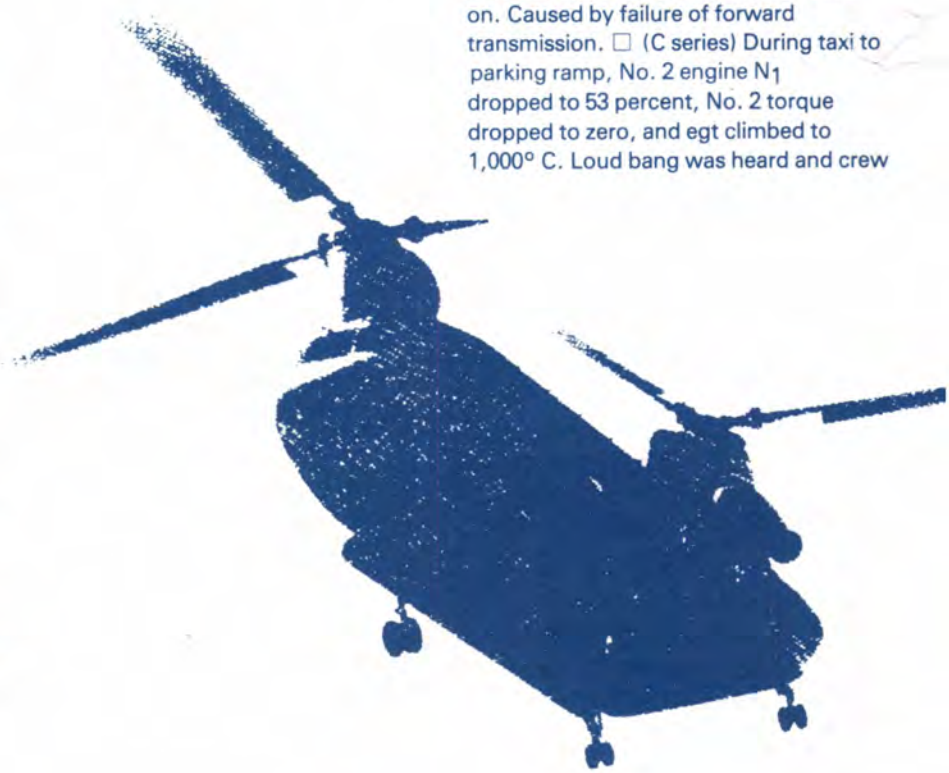
uh60 **Class C mishaps** ☐ As aircraft was ground taxiing to confined area parking spot, long branch of evergreen tree flexed down, hitting three blade tip caps. Crew engineer inside aircraft was used to guide aircraft. External ground guide was not used. ☐ Copilot's window assembly blew out during flight. All windows and doors were in closed position.

ah1 **Class A mishap** ☐ (TAH-1S) During termination of standard autorotation, aircraft hit lane in tail/left-skid-low attitude. IP attempted power recovery, resulting in 360-degree spin. Both main rotor blades hit lane, then severed tail boom. Aircraft came to rest upright. 8211

Class E mishaps ☐ (S series) N_2 droop during takeoff was caused by malfunction of fuel control. ☐ (S series) Pedals stopped moving short of left pedal stop during hover. As aircraft continued to turn right, left pedal broke loose and pilot landed. Caused by failure of tail rotor servo.

ch47 **Class D mishap** ☐ (B series) SM boarded aircraft to insure all passengers had properly secured their seatbelts. He felt aircraft vibrate and noticed ramp was being moved up. He motioned to the crew chief that he was going to exit aircraft and then vaulted over ramp, fell 25 to 30 feet to the ground, and was injured. SM interpreted vibration as ramp moving up when, in reality, maximum performance takeoff was being made. SM jumped over ramp thinking aircraft was still on the ground. Pilot started his takeoff without being properly cleared by flight engineer or crew chief.

Class E mishaps ☐ (B series) Excessive hydraulic leak on utility hydraulic pump was caused by deteriorated O-ring. ☐ (C series) Crew chief noticed mist of oil coming from top of aft transmission in flight. Preformed packing in aft transmission housing had developed a leak. ☐ (C series) Master caution and transmission chip detector lights came on. Caused by failure of forward transmission. ☐ (C series) During taxi to parking ramp, No. 2 engine N_1 dropped to 53 percent, No. 2 torque dropped to zero, and egt climbed to 1,000° C. Loud bang was heard and crew



chief saw pieces coming from engine tail cone. Caused by failure of No. 2 engine. ☐ (C series) Hydraulic fluid pressure was lost during flight. Caused by separated utility pump. Particles from pump ruptured hydraulic pressure line on No. 1 flight boost system.

oh6 **Class E mishap** ☐ Aircraft fell through 3 to 4 feet during straight-in autorotation at night. Tail boom was broken. 8212

oh58 **Class A mishap** ☐ (A series) Pilot heard loud bang from rear of aircraft during flight. Aircraft yawed right and then began to spin to right. Aircraft was autorotated into trees, hitting the ground in nose-low attitude. Ninety-degree gearbox, with one blade attached, was located along the flight path. Shredded flight jacket was also found. Unsecured flight jacket probably flew out of aircraft into tail rotor. 8213

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**3**	**0**
	December	1	1	1-2 Dec	**0**	**0**
2nd Qtr	January		4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**9**	**3**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

Class E mishaps ☐ (A series) Postflight inspection revealed tow wire wrapped around control tubes. Range area was known to contain more than 50 strands of tow wire. ☐ (A series) Cyclic binding in all quadrants during hover/taxi was caused by failure of magnetic brake. ☐ (C series) Smoke in cockpit during climbout was caused by thermal runaway of battery.

c12 **Class E mishaps** ☐ (C series) About 5 minutes after takeoff, No. 1 engine oil pressure gauge indicated 150 psi and then continued to show an increase until it reached 200 psi. Caused by malfunction of oil pressure transmitter. ☐ (A series) No. 2 engine oil pressure indicator went to maximum during climb. Caused by stuck oil pressure relief valve.

t42 **Class E mishaps** ☐ Nose gear wheel started binding during taxi. Caused by failure of nose wheel bearing. ☐ Crew received unsafe indications on all three gear during landing. Gear were manually lowered. Caused by failure of landing gear motor.

u21 **Class E mishaps** ☐ (RU-21H) During climbout after takeoff, pilot noticed that avionics access door was open. Copilot had sheared cotter pin in handle of access door while securing it during preflight. ☐ (A series) Fuel was seen siphoning from left nacelle fuel cap during level-off. Pilot had not correctly reseated cap during preflight.

(continued on next page)

Mishap briefs

Maintenance

uh1 **Class E mishap** ☐ (H series) Crew chief noticed fuel leak during start. Caused by incorrectly installed O-ring on fuel filter.

uh60 **Class E mishap** ☐ Battery fault light came on. Sparks were seen flying from area of right relay panel, and stabilator horn sounded. Three wires from No. 2 junction box leading to No. 2 converter had chafed on aircraft structure.

ah1 **Class E mishaps** ☐ (G series) Postflight inspection revealed oil on tail boom and vertical fin. Magnetic plug for 90-degree gearbox had failed and allowed oil to seep out. Plug was incorrectly installed. ☐ (S series) Low rpm light came on and audio sounded on short final. Tgt rose to 850 degrees and rpm bled off. Caused by clogged engine inlet screens.

ch47 **Class E mishaps** ☐ (B series) During takeoff, flight engineer noticed bolt on right lord mount on No. 7 and No. 8 drive shaft rotating. Caused by incorrect torque on bolt. ☐ (C series) Oil would not stop draining from No. 1 engine overflow. On preflight, pilot told crew chief to add one quart of oil as engine oil appeared low in sight gauge. Crew chief added five quarts of oil to bring oil level up to full mark on gauge. Engine oil overflowed. Operators manual states that if engine has not been run up in the last 24 hours, engine should be run up before engine oil level is checked.

oh58 **Class E mishaps** ☐ (A series) Hydraulic failure occurred during landing. Loose nut caused loss of hydraulic fluid. ☐ (A series) Pilot noticed unusual vibration and engine surged to 105 percent during runup. Aft drive shaft coupling bolt failed, causing severe out-of-balance condition which, in turn, caused remaining two bolts to fail. This allowed complete disconnect between engine and transmission. Connecting bolt and nut were improperly torqued.

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. 10, No. 11 □ 9 Dec 1981

No one ever said it was gonna be easy

It's not going to be easy to take off this green suit the end of December. And as I count down the last days of my 34 plus years of service, many thoughts come to mind about Army aviation. Thoughts conditioned by men and machines in battle: H-13 helicopters airlifting our wounded on litters strapped to the skids in Korea; L-19 Bird Dogs directing artillery fire; soldiers going to battle in Chinooks in Southeast Asia; scout helicopters flying at treetop level on tactical recon missions over dense jungle; bone-weary mechanics working around the clock to put mission-ready aircraft on the flight line; the devastating fire power of "snakes" in combat.

These reflections emphasize the great progress and increased combat capability of our Army. . . . They also emphasize the complexity of today's equipment and operations and underline the deadly serious demands placed on aviation commanders and aircrews for safe mission accomplishment.

I have always been a get-the-mission-done guy. I take pride in that. I have always been a get-the-mission-done-safely guy and I'm proud of that, too. I never had a formal safety management position until I became the commander of the Safety Center, but I've been a rifle company commander, a battery commander and a troop commander, a light and medium helicopter company commander, and a battalion and aviation group commander. In each of these jobs, **I was the safety manager because safety is a basic function of every commander.**

Aviation safety depends on commanders. If our Army is to make further significant safety gains in aviation, the reduction of crew-error mishaps must become the constant objective of those in command jobs.

I firmly believe that our Army has the best pilots in the world. They make mistakes and some of those mistakes are fatal because most of our flying is done in an environment that will not tolerate a mistake. These are not "dumb accidents."

Somebody selects these pilots, somebody trains them, somebody designs the mission tactics, and somebody commits and schedules the pilots to fly the missions.

Responsible, dedicated, and determined safety leadership by those "somebodies" can prevent the human errors that kill aircrews and destroy equipment.

Execute your missions with integrity and make the words professionalism and discipline permanent parts of your vocabulary and thought processes. The commitment you make to flight safety will be returned many times over in the continued readiness and progress of Army aviation.

No one said it would be easy. Working to be the best never is. ■

Edward E. Waldron II

Colonel Edward E. Waldron II
Commander, U.S. Army Safety Center

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 11 Mar 81 issue (8125) ☐ Aircraft was No. 2 in formation of five on night support mission. Five minutes after takeoff, aircraft entered descending left turn from about 100 feet agl and crashed. The three occupants were killed. Pilot became spatially disoriented because of a combination of the following factors: loss of night vision caused by flying near a lighted village, loss of visual reference to lead aircraft due to poor visibility, lack of recent experience on instruments, and possibly some preoccupation with personal problems. IP did not detect the impending mishap situation in time to take corrective action.

UH-1 Class A mishap in 27 May 81 issue (8137) ☐ During descent for night landing, aircraft suddenly pitched up and rolled to left. Partial control was regained. About 75 feet agl, aircraft pitched up again, rolled left, and then crashed. Teardown analysis failed to disclose the source or cause of the malfunction. Momentary contamination may have resulted in hydraulic control malfunction.

UH-1 Class A mishap in 3 Jun 81 issue (8140) ☐ Engine power was lost while aircraft was on NOE training mission. Aircraft descended through trees, crashed, and burned, killing all four occupants. Cause of power failure is unknown.

UH-1 Class A mishap in 8 Jul 81 issue (8147) ☐ Student pilot touched down with excessive ground speed during night vision goggle training mission, and aircraft slid off stagefield lane and rolled over. IP did not recognize a delayed initial entry into low-level autorotation, an excessive entry airspeed, and an inadequate deceleration. IP had apparent psychological/physiological problems associated with the use of night vision goggles.

UH-1 Class A mishap in 15 Jul 81 issue (8149) ☐ During night approach under marginal weather conditions, pilot concentrated his attention outside the aircraft and allowed the aircraft to descend too low for obstacle clearance. Pilot tried to go around and entered fog layer. Aircraft hit a fence surrounding the heliport, crashed, and burned.

8137

8149

Attack helicopters

AH-1 Class A mishap in 8 Apr 81 issue (8130) ☐ Aircraft descended uncontrollably from 750 feet agl and crashed. Loss of control of the rotor system was caused by in-flight fatigue failure of the white pitch link tube. The fatigue originated in the internal thread roots. Pitting which was within specification tolerances was present on the tube walls and in the threaded sections adjacent to the fatigue origin. Fatigue fracturing progressed approximately 80 percent through the tube's cross section before final failure.

Cargo helicopters

CH-47 Class A mishap in 27 May 81 issue (8138) ☐ As aircraft was being hovered over a ridge, No. 1 engine beep trim increased engine rpm to the point that rotor rpm increased to about 242. Beep trim decrease was not effective. Rpm then decreased below 214. Pilot began left turn toward a clear area. Aircraft touched down, rotor rpm surged again, and aircraft bounced. Rotor blade hit and killed a soldier on the ground. No. 1 engine beep trim system malfunctioned because of incorrectly installed pilot's beep trim switch. Aircraft was not placed on a red X during switch replacement, and neither a technical inspection nor maintenance operational check was made.

CH-47 Class A mishap in 15 Jul 81 issue (8151) ☐ During refueling stop at civilian airport, pilot allowed civilian ground guide to direct him to maneuver within 35 feet of obstacles. As pilot was taxiing to depart, aft rotor system hit a 28-foot pole. A crew chief was positioned in the aft left part of the cabin/cargo compartment to provide obstacle clearance information to the pilot. Pilot did not use a taxi director and blade walker as required by TM 55-1520-209-10 when operating within 75 feet of obstacles.

8130

8151

Observation helicopters

OH-6 Class A mishap in 1 Jul 81 issue (8145) ☐ Pilot on night VFR tactical training mission lost outside visual reference after liftoff to a hover because of blowing dust. Pilot turned landing light on and off instead of immediately landing or performing a maximum performance takeoff. Aircraft drifted into tree and crashed, coming to rest on left side. Factors present included fatigue, excessive motivation, overconfidence, an extremely dusty LZ, and a dirty windshield.

OH-58 Class A mishap in 3 Jun 81 issue (8141) ☐ Aircraft hit power cables while en route to landing area after completing convoy cover mission. Aircraft then rolled almost inverted and crashed. Both occupants sustained major injuries. Pilot did not maintain adequate obstacle clearance for single-pilot missions in accordance with command regulation and unit policy. He was not aware of the location of the cables which were shown on his and his passenger's maps because he did not do a map reconnaissance of the intended route.

8141

Fixed wing

U-21 Class B mishap in 27 May 81 issue (8139) ☐ Right main landing gear did not retract during climbout. Repeated attempts by crew failed to correct the problem, and aircraft was landed with gear unlocked. On rollout after landing, right gear collapsed and aircraft was damaged. Right actuator assembly failed to fully extend gear to locked position, possibly because of a bent nut and tube assembly. IP did not use the backup manual gear lowering system as required by the operators manual. Also, he did not apply light braking force to the right main landing gear after touchdown. Application of either or both of these procedures might have locked the unsafe gear. ■

8139

Selected mishap briefs

Utility helicopters

UH-1 Class E mishaps ☐ (H series) Transmission oil light and master caution light came on. Caused by malfunction of master caution panel assembly. ☐ (H series) As aircraft was repositioning for takeoff from LZ, parachute lying in 5-foot grass inflated and hit main rotor blades. ☐ (H series) Crew noticed low frequency lateral vibration during flight. Skin on main rotor blade had separated 6 inches from blade tip. ☐ (H series) Pilot and IP were on training flight. On final approach, 10-degree out-of-trim condition was established by IP. When aircraft was about 2 feet above the touchdown point and effective translational lift was being lost, aircraft turned 10 to 15 degrees left. Pilot inadvertently applied aft cyclic to reduce the slight forward airspeed still remaining. Tail stinger hit ground. IP took control and terminated the maneuver at a hover. Aircraft was checked for control response and flown another 30 minutes. Bent tail stinger was noticed by crewmembers as aircraft was being hangared. ☐ (H series) During simulated forced landing power recovery, IP increased throttle too fast and engine rpm reached 7000 for 2 seconds with 14 psi torque and needles joined. ☐ (H series) Master caution and left fuel boost lights came on during landing. Caused by failure of left fuel boost pump.

UH-60 Class C mishap ☐ Aircraft was landed in LZ to load troops. Copilot opened door and held it open about 1 foot. Gust of wind jerked door out of his hand. Door slammed forward, broke upper hinge assembly, twisted bottom hinge assembly, and pivoted into chin bubble. Lever on doorstop assembly was not attached to door.

UH-60 Class E mishap ☐ Windshield cracked as aircraft was being taxied to refueling point. Windshield had been cleared of heavy frost just before engine start. Glass was extremely cold when anti-ice system was turned on. Anti-ice system shorted out due to moisture making contact with heating elements, causing system to produce excessive amount of heat.

FY 82 Class A Mishap Countdown

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	March	4	1	March		
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	May	5	5	May		
	June	6	3	June		
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	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**11**	**3**

Attack helicopters

AH-1 Class A mishap ☐ (S series) Aircraft crashed into trees during infantry escort operation. 8214

AH-1 Class E mishaps ☐ (S series) Pilot placed aircraft in downwind condition and wind gust pitched aircraft nose down. Pilot increased collective. Rpm audio sounded and torque was seen at 103 percent for 1 second. ☐ (G series) Engine oil temperature rose rapidly during takeoff. Caused by defective temperature indicator. ☐ (G series) Noise was heard from transmission area during approach for landing. Caused by failure of quill assembly.

Cargo helicopters

CH-47 Class E mishaps ☐ (A series) No. 2 engine fire light came on during hover. Caused by failure of sensing element. ☐ (B series) No. 2 engine dumped fuel overboard during runup. Caused by failure of engine-driven fuel pump.

Observation helicopters

OH-6 Class E mishap ☐ Engine oil pressure suddenly went from 85 psi to 150 psi during flight. Caused by broken wire from oil temperature gauge to engine oil pressure transmitter.

OH-58 Class C mishap ☐ (A series) During tactical training mission, pilot hovered aircraft into an opening between two tree-covered hills. Opening was sparsely vegetated with small scrub trees. Area was too small to turn around in, so pilot decided to hover backwards. Tail rotor blades hit scrub bush during backward hover.

OH-58 Class E mishaps ☐ (A series) IP allowed aircraft to touch down in ➤

Mishap briefs

excessive nose-high attitude during autorotation. Tail skid hit ground and caused nose to pitch down. ☐ (A series) Pilot noticed slight surge in N_2 during flight. Caused by malfunction of double check valve.

Training helicopters

TH-55 Class C mishap ☐ As student pilot applied forward cyclic and added power to ground taxi to parking spot, loud noise was heard and aircraft shuddered. IP looked back and saw that tail rotor assembly was missing. Failure of tail rotor blade probably resulted in unbalanced condition, causing tail rotor assembly to be torn from aircraft.

Fixed wing

C-12 Class E mishap ☐ (A series) When power was applied on takeoff roll, No. 1 engine did not develop minimum required power for takeoff and tgt was higher than normal. Caused by hole in diaphragm in high bleed air valve.

OV-1 Class E mishap ☐ (C series) No. 1 hydraulic gauge fluctuated, and hydraulic fluid was seen streaming out of engine. Hydraulic pressure line had separated at collar fitting.

Maintenance

AH-1 Class E mishap ☐ (S series) Main inverter power fluctuated, resulting in loss of SCAS power. Inverter light and master caution light came on and turret oscillated rapidly. Caused by loose electrical cable to main inverter power relay.

OH-58 Class E mishap ☐ (A series) Loud noise was heard from transmission area during landing, followed by master caution light and control stiffness. Hydraulic pressure relief valve T fitting jam nut had backed off, causing loss of hydraulic pressure.

U-21 Class E mishap ☐ (RU-21H) Left fuel gauge indicated rapid loss of fuel from left wing tanks. Activation of transfer pump switch did not indicate any transfer of fuel from outboard to nacelle tanks. Caused by loose cannon plug on fuel gauge.

Messages received

• Safety-of-flight operational message for UH-60 flight in icing conditions (UH-60A-81-29, 231330Z Nov 81). Summary: Restrictions for flight in icing conditions have been revised. This message provides UH-60 using activities with the most current information for use during the coming winter season. Contact: Douglas Danforth, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning one-time inspection of UH-60 deswirl duct (UH-60A-81-30, 231845Z Nov 81). Summary: This message changes certain paragraphs of UH-60A-81-28 safety-of-flight message. Contact: Douglas Danforth, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance message concerning T53 cleaning procedures (UH-1-81-12, AH-1-81-36, and OV/RV-1-81-05, 241830Z Nov 81). Message emphasizes the need for effective T53 engine compressor washing and specifies the cleaning procedures to be followed.

• Safety-of-flight maintenance message notifying maintenance personnel not to remove pilot and copilot jettisonable doors on CH-47 aircraft (CH-47-81-16, 242145Z Nov 81).

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. 10, No. 12 □ 16 Dec 1981

Mishap review: maintenance error

Synopsis

The CH-47C was hovering with a sling-load over a landing zone. Immediately after the load was released, rotor rpm began rising and then decreasing. The copilot at the controls began a left descending turn to a relatively clear and level area. The helicopter touched down momentarily and then began to bounce. A forward rotor blade hit and killed a soldier on the ground. During coast-down, the forward blades hit the fuselage three times.

History of flight

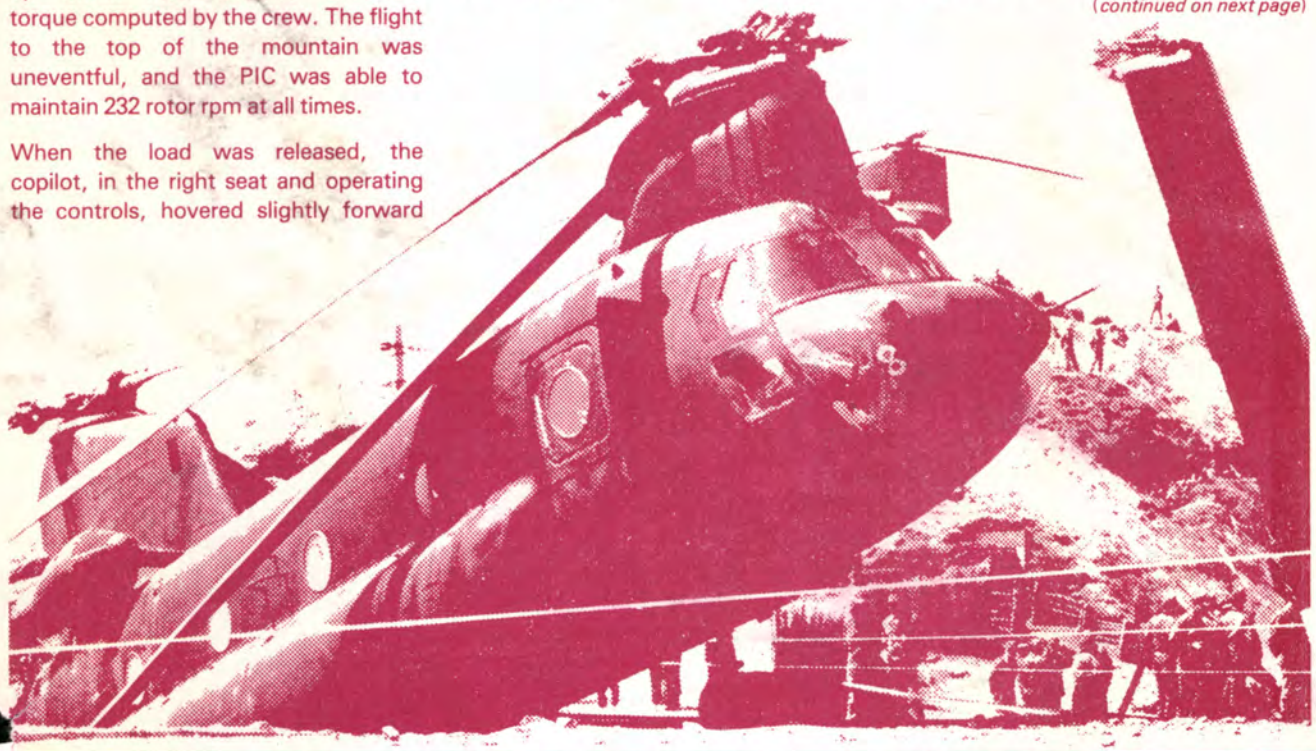
The Chinook was ferrying slingloads of rock, gravel, sand, and other construction material to a landing zone on top of a mountain. The third load was picked up within the maximum allowable torque computed by the crew. The flight to the top of the mountain was uneventful, and the PIC was able to maintain 232 rotor rpm at all times.

When the load was released, the copilot, in the right seat and operating the controls, hovered slightly forward and stabilized the aircraft about 20 feet agl to check for empty slings and nets. While hovering, the copilot felt and heard rotor rpm increase. He checked the N_2 tachometer, saw an approximate reading of 250, and began to add thrust to control rpm and begin a takeoff. The PIC had noticed the rotor rpm was climbing through 242 and tried to control the overspeed with normal No. 1 and 2 engine trim. No. 2 engine torque decreased, but No. 1 did not.

As the copilot added thrust to begin the takeoff, rotor rpm began to decrease. The copilot assumed the PIC had the rpm under control, aborted the takeoff, and once again stabilized the aircraft at a hover. With No. 2 engine torque low, the No. 1 engine could not maintain rotor rpm, and the aircraft began to settle. As rotor rpm was at 214 and decreasing, the copilot initiated a left pedal turn toward a clear and relatively level area. The PIC tried to increase engine power through use of the emergency engine trim for the No. 1 and No. 2 engines even though the copilot saw the No. 1 engine was producing about 1,000 pounds of torque.

The PIC cleared the copilot to the left as the turn was started and announced the engines would not respond to emergency beep. As rpm continued to decay, the annunciator segment lights came on. As the aft landing gear touched down and the rotors were unloading, rotor rpm increased again. The No. 1 engine was at 1,000 pounds of torque, No. 2 engine was at 200 to 250 pounds of torque, and rotor rpm

(*continued on next page*)



Maintenance error

was at 250. The PIC tried to regain control of rotor rpm with both the normal and emergency engine beep trim systems, with no response.

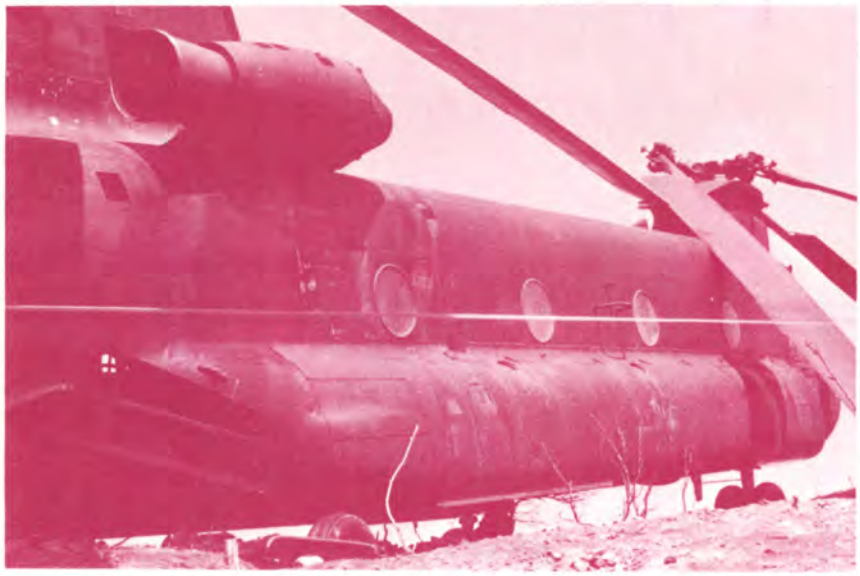
When the rotor unloaded and rpm accelerated upon touchdown, the CH-47 became airborne again and pitched nose down. The chin bubble area hit the ground. A soldier on the ground was hit and killed by a forward rotor blade. The blade folded upward, and the imbalance of lift and damage to the blade induced severe vibration in the aircraft, which began to bounce and slide aft and right. The Chinook came to rest when the right front and rear landing gear sank into soft earth and gravel. During coastdown, the forward rotor blades hit the fuselage three times.

Crewmember experience

The 29-year-old PIC had more than 2,000 rotary wing flight hours, with almost 250 in CH-47Cs. The 29-year-old copilot had almost 3,000 rotary wing hours, with almost 200 in CH-47Cs.

Commentary

Unit maintenance personnel replaced the pilot's No. 1 normal engine trim system switch 1.8 flight hours before the mishap. During replacement of the switch, the aircraft was not placed on a red X status, and after the job was completed, neither a technical inspection nor a maintenance operational check was done. Results of Corpus Christi Army Depot analysis indicated evidence of arcing on the increase circuit terminals of the switch. This arcing was caused by incorrect maintenance techniques, resulting in twisted terminals, cold solder joints, and twisted wiring. The switch was also installed in the thrust lever incorrectly. The cover plate securing the switch was loose and one screw was missing, allowing the switch to shift and enhance the possibility of the increase circuit terminals shorting out.



During preflight, the crew chief and flight engineer performed the periodic maintenance daily inspection without using the PMD checklist. A fuel sample was not taken before the flight.

When the increase circuit terminals of the pilot's No. 1 normal engine trim switch shorted, the No. 1 engine went to full increase trim in less than 2 seconds. This determination was based on operating conditions at the mishap site and aircraft weight and configuration. The No. 1 N_2 control box then probably continued into an overprogrammed engine trim condition. When the No. 1 engine went to full increase, the No. 2 engine, sensing No. 1 picking up the load, dropped off line and remained off line until the engines were shut down.

The copilot's initial reaction of applying thrust for a perceived high side engine trim failure was correct. The PIC, performing copilot duties, did not follow the emegency procedure outlined in the operators manual. He did not try to regain control of rotor rpm using emergency engine trim and then disable the normal engine trim.

The bleedoff in rotor rpm was a result of overtaxing the No. 1 engine through the initial application of thrust. Once the N_1 of the No. 1 engine began to decay, even though indicated torque remained at or near 1,000 pounds, required power exceeded available power to maintain rotor rpm and flight.

Laboratory tests revealed traces of tetrahydrocannabinol (THC) in the urine of two aviation support personnel and phenobarbital in the urine and blood of another. THC indicates use of marijuana, and phenobarbital is a barbiturate. Ingestion of either of these is a medically grounding condition. ■

Selected mishap briefs

Utility helicopters

UH-1 Class E mishaps ☐ (H series) Hydraulic power was lost and hydraulic light came on. Caused by leaking hydraulic valve. ☐ (H series) Transmission oil pressure fluctuated and then dropped to zero. Loss of transmission oil was caused by failure of input quill seal. ☐ (H series) As rotor rpm reached about 170 during runup, rpm needle dropped to zero. Caused by sheared rotor tachometer generator shaft. ☐ (M series) No. 1 hydraulic and master caution lights came on, and pedals became stiff. Caused by failure of preformed packing. ☐ (H series) Vapor was seen coming from top battery vent during approach. Caused by failure of battery.

UH-1 aviation-related mishaps ☐ As aircraft was being jacked to a level flight position, aft jacking crossbar slipped from jack, causing aft section of aircraft to fall on extended jack. ☐ SM allowed one end of tow bar to hit and break chin bubble. ☐ While moving aircraft from hangar to parking ramp, tug driver turned sharply to right before aircraft had cleared hangar door. Tail boom hit door frame.

Attack helicopters

AH-1 Class E mishaps ☐ (S series) Crew heard low whining sound during flight. Caused by failure of O-ring in hydraulic line to SCAS actuators. ☐ (S series) Aircraft was last in flight of 12. Flight lead changed LZs at the last minute and began approach to a field. As No. 12 aircraft was landing, turret housing hit and severed wire. ☐ (S series) Aircraft began to pitch violently to forward left and right rear during hover check. Caused by pitch SCAS hardover.

Cargo helicopters

CH-47 Class E mishaps ☐ (B series) [illegible]y hydraulic cooler fan blades

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	1-16 Dec	**3**	**6**
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**11**	**9**

separated from shaft during takeoff. Caused by fatigue failure. □ (C series) Flight engineer noticed high frequency vibration in No. 2 engine area during runup. As aircraft was being shut down, fuel leak was seen on No. 2 engine. □ (JCH-47C) Transmission chip detector light came on. Caused by defective forward transmission.

Observation helicopters

OH-6 Class B mishaps □ Aircraft crashed while on short final to field site. Tail boom was cut off and main rotor blades and strut were damaged. Engine may have failed. 8215 □ Low fuel light came on and pilot landed at small airport. There were no fuel services available at the airport. Pilot called local gas station operator and arranged to have 10 gallons of gas delivered to aircraft. Five minutes after takeoff, engine flamed out. Aircraft went into trees and then landed hard. 8216

OH-58 Class C mishap □ (C series) IP gave student simulated forced landing from hover during transition checkride. Aircraft was moving forward slowly and when IP closed throttle, aircraft settled nose low. Student felt toes of skids touch the ground, thought aircraft was on the ground, and lowered collective too fast. This caused spike knock and pylon whirl. IP quickly reduced power, preventing further damage. Aft cross tube and transmission mount were broken.

OH-58 Class E mishaps □ (A series) Engine failed during approach. Hovering autorotation was made. Top fuel hose located inside fuel cell was cracked through in two places. Inspection of five other aircraft revealed cracks in two hoses. □ (C series) As collective pitch was reduced, collective became progressively stiffer. Teflon coating on pivot sleeve in swashplate was chipped.

OH-58 aviation-related mishap □ SM was told to refuel three OH-58 aircraft. He decided to drive an M49A2C tank truck even though he was not licensed to operate the vehicle. He misjudged the distance between a drainage ditch and one of the helicopters, and the truck hit the helicopter's left horizontal stabilizer.

Fixed wing

C-12 Class E mishaps □ (A series) During power application on takeoff, No. 1 engine would not develop minimum takeoff power and engine temperature was higher than normal. Caused by hole in high pressure bleed valve diaphragm. □ (A series) At 6,000 feet agl, cabin altimeter indicated 4,000 feet below sea level and differential pressure 6.1 psi. Caused by failure of pressure controller.

OV-1 Class E mishap □ (D series) During rollout, pilot noticed that aircraft had a tendency to yaw right. Vibration was felt at 20 knots. Tire went flat after landing. Wheel assembly was damaged.

U-8 Class E mishap □ (F series) When pilot reduced throttle to cruise power, No. 1 engine started backfiring and running rough. Caused by failure of injector pump.

U-21 Class E mishaps □ (A series) When flap operational check was initiated at 173 knots, right inboard flap went to only 10 percent down, causing severe control problem. Caused by internal failure of flap actuator. □ (RU-21H) No. 1 engine oil temperature indicated high during flight. Caused by failure of oil temperature transmitter.

U-21 aviation-related mishap □ As aircraft was being towed to corner of hangar, it had to cross over an old grease pit. Pit opening was covered by two layers of boards and steel plates. Covering could not support weight of aircraft, and right landing gear fell into pit. Boards were rotten.

(continued on back page)

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 75 □ 16 Dec 1981

Resolutions

This will be the last STACOM of 1981, and the holiday season will soon be upon us. New Year's resolutions are customarily a part of the holiday scene; generally well intentioned, they are soon forgotten. One that DES would like to see embraced and not forgotten by aviation personnel is a resolve to strive for standardization and professionalism in all activities. This resolve should not be cast aside later on by returning to individualized procedures and shortcuts in the name of expediency or efficiency. Such actions produce slipshod methods and acceptance of substandard performance by the maintenance community, and inattention to duty, complacency, and acceptance of undisciplined performance by operational aviators and their supervisors.

This is amply illustrated by STACOM 73, 21 Oct 81, which made note of four maintenance mishaps caused by tools being left in drive shaft areas. Inattention to "by the book" procedures resulted in extensive damage. FLIGHTFAX, 18 Nov 81, makes note of two more of the same type mishaps.

Then there was the UH-1H IP who temporarily forgot, or was distracted from, his instructional responsibilities while his student attempted to bring the aircraft to a hover. Improper control inputs resulted in dynamic rollover and extensive damage to the aircraft. The same type mishap occurred a few months earlier.

Standardization and professionalism offer the key to efforts aimed at eliminating pilot-error mishaps and maintenance deficiencies which lately have been the plague of Army aviation. ■

UH-1 D/H control check

Change 11 to the UH-1D/H Operators Manual, TM 55-1520-210-10, outlines the procedure for a ground check of the fuel control (step 17.1, paragraph 8-24). This check is necessary only if the engine is equipped with the old fuel control (P/N 84200A7A). If the new fuel control is installed (P/N 100770A4), step 17.1 may be disregarded. ■

EH-1H and EH-1X qualification

Questions have been raised concerning qualification and currency requirements for EH-1H and EH-1X helicopters.

AR 95-1, when revised, will stipulate that currency in UH-1B, D, H, or V applies to EH-1H and EH-1X aircraft also. Additionally, TC 1-134 will require only mission equipment familiarization for transition from the above listed types to EH-1H or EH-1X helicopters. ■

Questions and answers

Question: May the preflight walk-around inspection of an aircraft be split between crewmembers?

Answer: When sufficient checklists are available, the walk-around preflight check may be performed by two or more qualified crewmembers. One crewmember checks a part of the aircraft while the others check the remainder—each using a checklist. CH-47 crews have consistently used this procedure to expedite the preflight and for better use of qualified personnel.

Question: Some pilots/instructor pilots state that an action shall not be accomplished before the checklist is read, i.e., lowering the landing gear on downwind. Is this correct?

Answer: Normal pilot actions may be taken when required to include the accomplishment of tasks out of sequence, so long as the check is verified later with the checklist. As an example, most UH-1 pilots check the fuel level upon arrival at the aircraft to expedite fueling if required. ■

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

Maintenance

UH-1 Class E mishaps ☐ (H series) During start, N_1 read 25 percent and egt was 610° C. and 14 volts at 40 seconds. Start was aborted: Caused by incorrectly charged battery. ☐ (H series) Engine tachometer went to zero during crosscheck. Caused by loose cannon plug.

OH-58 Class E mishaps ☐ (C series) Loud noise was heard during approach for landing, and copilot's door was seen to be loose at bottom hinge. Crew chief held door while pilot continued approach to ground. Door was not installed correctly. Discrepancy was not detected during preflight. ☐ (A series) Transmission oil pressure light came on. Caused by loose wire on transmission pressure transmitter.

AH-1 Class E mishap ☐ (S series) Transmission oil bypass light came on. Rubber nipple installed on pressure switch was too small, allowing external oil seepage to run down into nipple and short out hot wire attached to switch.

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

Fire hazard

Naval Safety Center Advisory 7-81 warns of the hazard of wearing shoes made of poromeric (synthetic corfam-type material) in locations where open flame, slag, or sparks are present. Flame testing of poromeric footwear indicates the material will melt and burn when it comes in contact with a flame. At least one individual has suffered severe foot burns while wearing poromeric footwear.

Footwear made of this material should not be worn around welding, brazing, cutting, or burning operations. ■

Last FLIGHTFAX this year

This is the last issue of FLIGHTFAX you will receive this year. The next issue will be dated 13 January 1982 and will include briefs for the period 4-31 December 1981. The personnel of the Army Safety Center wish you a Merry Christmas and a Safe and Happy New Year.

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Mishap review: ground taxi error

Synopsis

As the CH-47A pilot was ground taxiing at a civilian airport, the aft rotor system hit a pole. A crew chief was stationed at a window on the aft left side of the aft cargo compartment.

History of flight

The Chinook was on a service mission. The crew landed at a civilian airport for fuel. The helicopter was taxied onto the ramp and a left turn was made toward a larger open area in front of the terminal. The pilot was told that the area had to be left clear for an incoming flight and to follow the taxi directions of the civilian ground guide who was located on the fixed base operator (FBO) portion of the ramp. The pilot then alerted the crew that the aircraft would be taxied straight ahead to the FBO ramp.

The ground guide motioned the pilot to move forward. As the aircraft approached the FBO ramp, the pilot stopped, set the brakes, and signaled to the ground guide that he did not want to taxi any further forward. The ground guide approached the crew chief and asked if the aircraft could be taxied a few feet further forward. The pilot and copilot agreed the aircraft could be moved forward a few feet and did so. The aircraft was shut down and refueled.

Start procedures were begun for the second leg of the flight. The pilot planned to taxi forward, with a slight right turn, to increase the distance between his aircraft and obstructions located about 38 feet left of the aircraft. The crew was told the aircraft would ground taxi forward and turn right, away from the obstacles. One of the crew chiefs was stationed in the forward part of the cargo compartment, clearing the right side of the aircraft. The other crew chief

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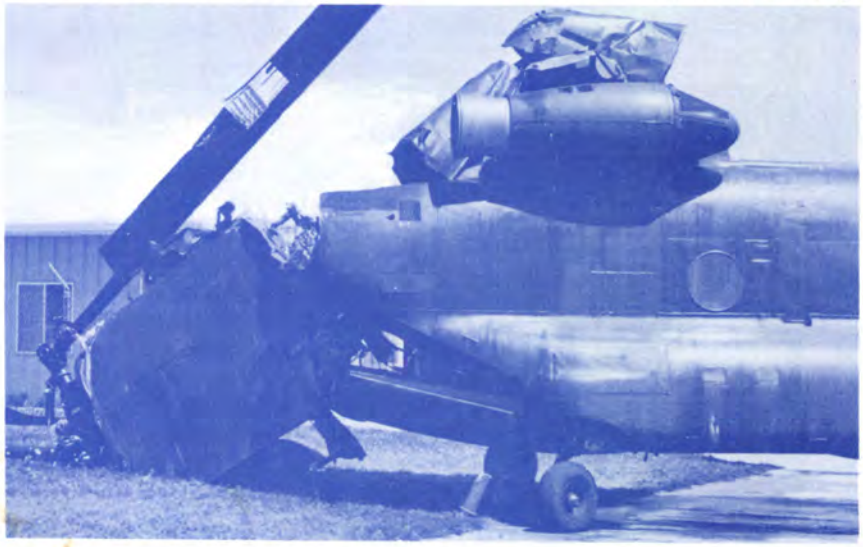

Ground taxi error

was positioned at the left aft window in the cargo compartment. He was told to provide clearance information to the pilot during the taxi maneuvers. The pilot, who was seated in the left seat, was operating the brakes and power steering controls.

The aircraft taxied forward and right about 10 feet and was stopped as the pilot visually checked clearance between the forward rotor tip path plane and a 28-foot-tall wooden utility pole located about 35 feet left of and abeam the cockpit. The crew chief at the left aft window was again told to provide clearance information on the aft rotor system and the obstacles. He asked the pilot if he wanted him to get out and ground guide the aircraft out of the parking spot. The pilot told him to stay inside the aircraft.

The pilot taxied straight ahead, stopped, and asked if the aft rotor was clear of obstacles. He was told the aircraft was clear. He continued to taxi forward. The crew chief estimated the aft rotor tip path plane to be about 2 feet from the pole at this point. The pilot said he was going to begin a right turn. As the turn began, the aft part of the aircraft swung left, and the aft rotor blades hit the wooden utility pole. The damaged blades hit the fuselage as the back of the aircraft bounded into the air. The rotor systems dephased and meshed, and the aft pylon collapsed.

Crewmember experience

The 34-year-old pilot had almost 2,000 rotary wing flight hours, with more than 300 in CH-47s. The 31-year-old copilot had almost 2,500 rotary wing hours, with more than 700 in CH-47s.

Commentary

The crew was fully aware of the hazards present near the parking area and of the dangers associated with aircraft operations in proximity to the hazards. The presence of the hazards near the parking area was not in violation of applicable FAA directives or regulations. The pilot parked the aircraft close to obvious hazards when other parking options were available. He allowed a civilian ground guide who was not familiar with CH-47 operating operations to influence his decision to park near the obstacles.

A taxi director and blade watcher were not used while operating an aircraft within 75 feet of known obstacles as required by TM 55-1520-227-10. As a result, the pilot was not aware of the critical situation which developed as he tried to maneuver the aircraft away from the parking area. Had the crew been used correctly, the pilot would have received specific information which would have insured aircraft clearance. A taxi director, who should have been positioned in front of the aircraft in view of the pilot, would have controlled and directed the amount and speed of the turn, therefore stopping the turn before impact. A blade watcher would have provided the pilot with data to insure proper aircraft positioning.

As the taxi maneuver progressed, the pilot relied on information given him by the crew chief inside the aircraft. Although the crew chief was providing the requested clearance information, a lack of understanding existed. The queries made by the pilot and copilot pertaining to aircraft clearance did not indicate the direction of intended aircraft movement nor was specific clearance dimensional information requested. This caused the crew chief to anticipate the direction of aircraft movement when providing the requested clearance information. When last questioned about aircraft clearance, the crew chief told the copilot the aircraft was clear because the blade tips were about 2 feet from the pole. The crew chief assumed that the aircraft was to be taxied forward before continuation of the right turn. Had the maneuver progressed as anticipated by the crew chief, the blades would have cleared the pole. The pilot assumed that the crew chief's statement that the blades were clear indicated that he could continue the right turn without pulling forward. ■

Selected mishap briefs

Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft vibrated during flight. Power-on approach to open area was begun. Power was lost at 50 feet agl, and aircraft hit trees and skidded about 40 yards before coming to a stop. Tail boom and vertical fin were severed, and landing gear was crushed. 8217

UH-1 Class C mishaps □ (H series) Aircraft vibrated severely during climb-out. White main rotor blade skin had separated at bonding between skin and leading edge. □ (H series) Pilot applied initial collective pitch too low during night autorotational landing, allowing tail stinger to strike runway. Aircraft bounced and then landed hard. □ (H series) Student pilot rapidly increased throttle while operating in emergency governor mode. Engine oversped to 7200 before IP could respond.

UH-1 Class E mishaps □ (H series) Crew noticed tail rotor drive shaft cover was open. Aircraft was landed and cover secured. □ (H series) Crew of trailing aircraft saw something fall from UH-1. Postflight inspection revealed collective sleeve mast boot was missing. □ (H series) During landing, pilot allowed aircraft to begin settling into trees at edge of LZ. IP took control and overtorqued aircraft to clear trees. □ (H series) During cross country flight, co-pilot, who was navigating, became mis-oriented. Aircraft was then landed because of low fuel. □ (H series) Low fuel light came on 35 minutes into flight with 1,000 pounds indicated on fuel gauge. Caused by failure of word panel assembly.

UH-60 Class C mishap □ Copilot was at the controls when aircraft arrived at LZ. PIC released 105 Howitzer while copilot was still hovering over A22 bag. Howitzer fell on top of bag and was damaged. Communication between crewmembers was not adequate.

Attack helicopters

AH-1 Class A mishap □ (S series) Crew of second aircraft in flight reported that No. 1 aircraft began to roll to right and then to left at angles of about 30 degrees while simultaneously yawing. This occurred two or three times in rapid succession. Aircraft then rolled to right past 90-degree point. Rotor system unloaded, mast bumping occurred, mast snapped, and main rotor blades struck cockpit. Aircraft exploded on impact with ground and was consumed by postcrash fire. Two fatalities. 8218

AH-1 Class C mishaps □ (S series) As pilot was hovering to parking area, piece of sheet metal, caught up in rotorwash, hit main rotor blade. Sheet metal was used to cover FARRP sumps and drains and was not secure. □ (G series) Pilot, rated in AH-1G, was in rear seat and instrument flight examiner, not rated in AH-1G, was in front seat. A few minutes into instrument evaluation flight, low rpm audio sounded, rpm warning light came on, and pilot noticed N_2 and rotor tachometer passing through 6100 rpm and 300 rpm simultaneously. Pilot was under the hood and thought it was a simulated engine failure. He lowered collective and entered autorotation. IFE told pilot emergency was real. Pilot discarded hood and IFE pointed out an open field. Pilot decided he was having an under-speeding governor problem, placed governor switch in emergency position, and took manual control of throttle. Engine ran rough for a few seconds, then N_1, N_2, and rotor tachometer started decreasing again. Aircraft touched down with no ground run. VOR antenna and aft cross tube were bent during landing. Fuel control unit has been submitted for teardown analysis.

AH-1 Class E mishaps □ (S series) Pilot noticed unusual cyclic movement at high gross weight. Caused by failure of feather bearing. Aircraft had been flown in desert environment, and sand and

(continued on next page)

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	1-13 Jan	**1**	**0**
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**12**	**9**

Mishap briefs

dust accumulation had scored feather bearing. □ (S series) Transmission oil pressure fluctuated during takeoff. Caused by failure of electrical connector to transmission oil pressure transducer.

Cargo helicopters

CH-47 Class C mishaps □ (C series) As 105 Howitzer was being offloaded, gun tube rotated into side of aircraft, causing sheet metal damage. □ (B series) During hot refueling operation, crew chief noticed that aft pylon workstand/access panel had opened in flight. Workstand was damaged beyond repair, and there was minor skin damage to aft pylon of aircraft. □ (C series) No. 1 engine would not accelerate past 35 percent during MOC ground run. No. 2 engine was started and No. 1 engine was shut down. Loud bang was heard and No. 1 engine transmission exploded.

CH-47 Class E mishaps □ (C series) Flight engineer noticed fuel coming from left main tank around refueling cap. Bolts attaching fuel cell fitting had vibrated loose, allowing fuel to leak out. □ (B series) APU motor pump ruptured during start and fluid sprayed into crew chief's eyes.

Observation helicopters

OH-58 Class A mishaps □ (A series) Skids were embedded in mud. During takeoff, right side broke loose from mud, and aircraft rolled on left side. 8219 □ (A and C series) Midair collision occurred during night vision goggle training. Four fatalities. 8220

OH-58 Class C mishaps □ (A series) Aircraft was landed after simulated anti-torque failure. Pilot inadvertently increased throttle from flight idle to full open, causing engine overspeed. □ (A series) Pilot made three approaches and landings to snow-covered fields with no difficulty. At fourth landing site, pilot applied collective for takeoff and aircraft started to roll right with right skid on the ground. Pilot applied left cyclic to stop right roll, and aircraft lifted off ground in right turn. Pilot suspected loss of tail rotor effectiveness and reduced throttle. Aircraft hit ground with slight forward motion and rocked forward, breaking right chin bubble. Right skid may have stuck in snow and mud.

OH-58 Class E mishaps □ (A series) During final portion of autorotation, pilot applied too much pitch, causing aircraft to balloon to about 3 feet. IP took control just before aircraft touched down on heel of skids and rocked forward. □ (A series) As pilot tried to follow tracks during NOE search mission, loose debris blew up into rotor blades, slightly damaging blades. □ (A series) Pilot heard popping sound, saw sparks in front of his feet, and heard defog motor cut off and on. Caused by malfunction of electrical connection to defog motor. □ (A series) Pilot was trying to orient his student on the map and was dividing his attention between the inside and outside of the cockpit. Aircraft drifted to right into cedar tree. □ (A series) Thirty gallons of JP4 from hot refueling point were added to aircraft fuel tank. Pilot noticed fuel needle going over 600 pounds, fuel failure light came on, and engine failed. POL personnel allowed water to accumulate in fuel.

Training helicopters

TH-55 Class C mishaps □ Student pilot inadvertently activated antioverspeed device. Aircraft yawed left, hit the ground in a near level attitude, and came to rest on side. □ Student pilot lost directional control during approach. Aircraft began slow spin to left while descending almost vertically, hit the ground hard, and came to rest on right side. □ Student pilot lost control of aircraft during takeoff. Aircraft hit the ground in a right-skid-low attitude.

Fixed wing

C-12 Class E mishaps □ (A series) Rudder pedals locked during takeoff roll. Caused by failure of servo. □ (D series) Fuel fumes in cockpit were caused by failure of fuel filter housing packing.

OV-1 Class E mishaps □ (D series) No. 2 engine chip detector light came on. Five minutes later, No. 2 hydraulic gauge went to zero. Caused by sheared gearbox accessory drive shaft. □ (D series) Right engine chip detector light came on. Caused by bearing failure. □ (D series) Aircraft was test flown following change of start fuel solenoid. Engine was shut down and attempt to restart was unsuccessful. Caused by failure of dropout relay.

U-8 Class E mishap □ Left engine backfired and manifold pressure fluctuated. Caused by broken No. 3 cylinder outer intake valve spring.

U-21 Class E mishaps □ (A series) Left engine surged during flight. Caused by failure of fuel control. □ (RU-21H) Pilot's valve in aircraft oxygen connector failed during flight, making it difficult to breathe.

Maintenance

UH-1 Class E mishaps □ (H series) Tail rotor chip detector light came on during flight. Caused by two frayed wires at 42-degree chip detector. □ (H series) Hydraulic switch was turned off during runup. When switch was turned on, hydraulics were not restored. Caused by chafed hose. □ (H series) Sling load was lost during climbout. Cargo suspension system was not adjusted correctly following installation. □ (H series) During hot refueling operation, crew chief noticed oil dripping from underside of aircraft. Inspection revealed oil leak was from transmission external oil filter. Preformed packing had not been installed with kit during phase inspection.

UH-60 Class E mishaps □ Low rotor audio activated and rpm dropped to 70 percent. Low rotor rpm light then came on and power-on landing was made. Caused by chafed main rotor speed sensor wiring harness, which grounded on airfame. □ Left brake locked and wheel would not turn during taxi. Brake line was bled incorrectly. □ Ground guide noticed fluid running down side of aircraft during taxi. Fluid was leaking from No. 1 accessory module hydraulic pump drive pad. Two O-rings were cut during installation.

AH-1 Class E mishap □ (S series) Roll channel SCAS started to motor during climbout. Caused by out-of-adjustment SCAS.

CH-47 Class E mishaps □ (C series) During HIT check, No. 1 engine transmission oil hot light came on. Piece of metal was found on engine transmission chip detector plug. Transmission chip detector did not illuminate because wires to transmission were reversed. □ (B series) No. 2 flight boost system dropped to zero during hover. Caused by chafed hydraulic line. □ (C series) During takeoff, crew chief noticed hydraulic leak in vicinity of aft transmission. Locally manufactured hydraulic line fitting was cracked. □ (C series) No. 1 and No. 2 generator caution lights came on during flight. Drive shaft tunnel cover brace at station 400 was touching main electrical wiring bundle. Brace chafed wire bundle, causing short circuit of a.c. electrical system and resulting in both generators going off line. Reference TSARCOM message 061300Z Dec 78, subject: Safety-of-Flight Technical Message (CH-47-78-9), "Incorporation of Antichafing Protection on Wiring in Tunnel," and FLIGHTFAX, Vol. 7, No. 10, 6 Dec 78, "Check CH-47s for Chafing Wire Bundles."

OH-58 Class E mishaps □ (A series) Aircraft had already flown 4.9 hours and was being run up for sixth flight of the day. Fuel boost and master caution lights remained on after runup. Caused by loose wire at cannon plug. □ (A series) During engine start and runup, N_2 tachometer remained at zero. Caused by oil inside of N_2 tachometer generator cannon plug. □ (A series) N_2 bled off during takeoff. Caused by loose jam nut on bleed air line. Nut was incorrectly torqued.

OV-1 Class E mishap □ (D series) Pilot noticed No. 1 engine oil temperature fluctuating up to 95° C. Engine was 2½ quarts low. Because of an oil stain on sight gauge, pilot thought he saw the correct level during preflight.

U-8 Class E mishap □ (F series) Left engine faltered during level-off and then surged several times. Postlanding inspection revealed that capacitor wire which goes to the points in the magneto was attached by only two wires.

Messages received

• Safety-of-flight emergency message concerning one-time inspection of pylon lever assembly on UH-1H, UH-1V, EH-1H, and EH-1X helicopters (UH-1-81-13, 102115Z Dec 81). Summary: A Category I EIR reported a cracked collective lever at the bearing lug location. The report also indicated a shim was missing. If shim is missing, it is possible for a side load to be induced in collective lower arm, causing fatigue failure. Such a failure will result in complete loss of collective control. Contact: Rich Dickman, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight technical message concerning grounding of all UH-1/AH-1 aircraft with specific T53-L-13BA/703 engine fuel control units installed (UH-1-81-14, AH-1-81-37, 141930Z Dec 81). Summary: Message grounds all UH-1/AH-1 aircraft until 123 fuel controls listed by serial number in the message are located and removed from service. Fuel controls will be shipped to CCAD for inspection for defective diaphragms. Contact: Steve Lloyd, TSARCOM, AUTOVON 693-3738, commercial 314-263-3738.

• Maintenance mandatory message concerning clarification and changes to inspection criteria of pylon lever assembly (UH-1-81-15, 151900Z Dec 81).

• OH-58 information message concerning OH-58 power limitations program update (291830Z Dec 81).

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

Changes to TMs

The following changes to TMs have been published:

• Change 8, 16 Nov 81, to TM 55-1520-228-PM, for OH-58A/C.

• Change 16, 18 Nov 81, to TM 55-1520-228-10, for OH-58A. ■

CY 81 FLIGHTFAX index

A look at FY 81 and the months ahead (Class A mishaps) - 28 Oct
ALSE bits and pieces (ALSE school, NBC gear, LPU-2/P life preservers, SPH-4 helmet) - 8 Jul
ALSE bits and pieces (disposition of helmets and requisition of MK-896A headset) - 29 Jul
ALSE bits and pieces (L-275 flares, OV-1 ejection seat, water purification tablets) - 19 Aug
ALSE school update (course to be taught at Transportation School) - 29 Apr
A realistic approach to realistic training (put safety in training) - 18 Mar
AR on protective clothing and equipment (new AR) - 18 Feb
AR 385-40 (interpretation of) - 18 Mar
Blade tracking, the Vibrex, and you (use Vibrex for all Army helicopters) - 15 Apr
Broken Wing Award, five receive (recipients for April through June 1981) - 29 Jul
Broken Wing Award, nine receive (recipients for October through December 1980) - 4 Feb
Broken Wing Award, nine receive (recipients for January through March 1981) - 13 May
Broken Wing Award, seven receive (recipients for July through September 1981) - 28 Oct
Butane lighter explodes (on dash of car) - 11 Nov
Chalk one up for the ELT (wreckage located by ELT) - 11 Mar
Checklists (use them) - 19 Aug
CH-47 cockpit doors (recurring problems) - 25 Nov
CH-47 wire bundles (check for correct installation) - 22 Jul
Choppers--not choppers (remove dentures before flying) - 13 May
Clarification (on summer training exercises article) - 17 Jun
Class C mishap reporting change (test of revised criteria) - 20 May
Cobra damaged by simulator (simulator tossed under aircraft) - 10 Jun
COI to be developed for ALSE (resident course to be established) - 4 Feb
Compass problems? (submit QDR) - 8 Apr
Conversion of UH-1D to UH-1V - 18 Feb
Cooling the gas turbine engine (use approved procedures) - 22 Jul
Costly violations (Class A mishaps) - 22 Jul
Could this be me? (photo showing refueling discrepancies) - 28 Jan
Crewmembers involved in mishaps may be tested for marijuana usage (disqualifying conditions) - 28 Oct
Crew rest (unit policies on crew rest) - 1 Apr
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Density altitude (facts about DA and weight and balance) - 17 Jun
Desert training tips (for safe operation) - 1 Jul
Disposition of unreliable 3-inch refueling hoses (disposition instructions) - 10 Jun
Does the shoe fit? (PRAMs on Class C mishaps not sufficient) - 11 Nov
Don't separate fuel controls and governors (when sent for teardown and analysis) - 10 Jun
Do something (prevent an accident) - 7 Oct
Dynamic rollover (avoidance procedures) - 2 Dec
ELTs (forward requests for ELTs to TSARCOM) - 4 Nov and 25 Nov
Enforcing the be-noes (enforce discipline) - 26 Aug
Films (new films on survival kits) - 8 Apr
Fire hazard (poromeric shoes) - 16 Dec
First aid kits issued (old kits issued) - 3 Jun
Fixed facts of life (weight and balance and density altitude) - 17 Jun
Flares suspended (MK 13-MOD O) - 10 Jun
Flight operations over snow (snow mishaps) - 2 Sep
FOD is picking up (how to prevent FOD) - 21 Jan
FOD not the issue (incorrect maintenance practices) - 18 Feb
FOD walks—how to do (do's and don'ts) - 7 Oct
Followups (of mishaps previously reported) - 25 Feb, 29 Apr, 10 Jun, 29 Jul, 7 Oct, 9 Dec

From National Transportation Safety Board (misuse of navigational aids) - 19 Aug
From National Transportation Safety Board (SA-226 Metro accident) - 6 May
From National Transportation Safety Board (wake turbulence accident) - 4 Mar
Fungus among us (spots on M24 protective mask) - 11 Mar
FY 82 USASC safety courses (list and schedule) - 28 Oct
Ground wires for safety (use yellow wires) - 29 Apr
Guard against fuel contamination (take samples and check fuel) - 3 Jun
Hazardous load (incorrectly prepared for air shipment) - 7 Oct
Helmet chin strap modification (add washer to cloth retention harness) - 4 Nov
How to crack your clevis fitting (by vibration) - 10 Jun
I am your fuel control (functions of fuel control) - 20 May
If it can happen, it will (flight continued with inoperative generator) - 21 Oct
Improving safety in summer training exercises (summer operation hazards) - 27 May
Inspect, mark, and record (lifting devices) - 3 Jun
Interest in ELTs growing (forward requests for ELTs to TSARCOM) - 4 Nov and 25 Nov
Is PRAM required for weather delay? (criteria for PRAM submission) - 15 Jul
Let's stop hitting the trees (tips for prevention) - 9 Sep
Life of products extended (water purification tablets and amyl nitrite inhalants) - 21 Oct
Lost anything lately? (make tool inventories) - 5 Aug
Maintenance tip (for wire cutters) - 11 Feb
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MAST pilot placed on hold (by weather forecaster) - 11 Mar
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Mohawk—friend or foe? (synopsis of mishaps) - 8 Apr
New address for shipping exhibits (to CCAD) - 1 Apr
Nicad battery inspection (inspection intervals are being exceeded) - 22 Apr
No fire (UH-1 crashworthy fuel system) - 11 Mar
No one ever said it was gonna be easy (reflections by COL Waldron on his retirement) - 9 Dec
No one outgrows the need (unit training) - 15 Jul
No place for shyness (speak up at first sign of trouble in cockpit) - 14 Oct
OHR (use the OHR program) - 8 Apr
Oil cooler shield inspection requirement (200-hour inspection interval) - 15 Apr
On crashing and burning (problems of escaping a burning aircraft) - 16 Sep
Pen flares deficient (L110 flares suspended from use) - 21 Oct
Possible safety hazard (350 gpm pumping assemblies) - 13 May
Power to prevent mishaps (personal influence of commanders) - 4 Nov
PRAM info needed (submit materiel failure info) - 14 Oct
PRAM paperwork payoff (importance of submitting PRAMs on Class D and E mishaps) - 29 Apr
Procedures for requisitioning publications changed (ADP support now in Baltimore) - 11 Feb
Pyrotechnics, status of (lot numbers and status) - 28 Jan
Recap of TSARCOM and AVRADCOM messages (from 1 October through 31 December 1980) - 28 Jan
Recap of TSARCOM and AVRADCOM messages (from 1 January through 31 March 1981) - 6 May
Remove iodine from first aid kits - 4 Feb
Runway just ahead (short field landings) - 24 Jun
Safety courses (list of FY 82 USASC courses) - 28 Oct
Safety-of-flight messages
- AH-1S with Kaman main rotor blades - 19 Aug
- AH-1 T53-L-703 engine - 18 Mar
- CH-47 chip detector circuits - 14 Jan
- CH-47 engine mechanical transmission - 19 Aug
- CH-47 engine mechanical transmission chip detector circuits - 1 Apr
- CH-47 forward and aft pitch link assemblies - 22 Jul
- CH-47 forward transmission lubrication hose assemblies - 17 Jun
- OH-6 controls support bracket assembly - 10 Jun
- OV-1 fuel system contamination - 15 Apr
- OV-1 mechanical trim actuator - 1 Apr
- RU-21H incorrect wiring of fuel level transmitters - 28 Jan
- T55-L-11ASA engine variable inlet guide vanes - 28 Jan
- UH-60 axial fan - 22 Apr
- UH-60 axial fan and shaft assembly - 27 May
- UH-60 deswirl duct - 9 Dec
- UH-60 electrical connector - 23 Sep
- UH-60 engine output shaft assembly - 27 May and 21 Oct
- UH-60 flight in icing conditions - 9 Dec
- UH-60 gearbox assembly - 22 Apr, 29 Apr, and 5 Aug
- UH-60 life limited components - 14 Jan
- UH-60 main module gearbox assembly and inspection criteria for outer shaft - 2 Sep
- UH-60 main rotor blade assembly - 26 Aug
- UH-60 main rotor head swashplate assembly - 17 Jun
- UH-60 main rotor hub assembly damper installation - 14 Jan
- UH-60 NVG dimming mode - 12 Aug
- UH-60 tail rotor pivot assembly - 21 Jan
- UH-60 troop/cargo door lower stop - 22 Apr
- UH-60 troop/cargo door stops - 25 Mar

FLIGHTFAX index

■ U-21 and U-8 lower forward wing attachment bolt - 18 Nov
Safety on the ground (maintenance mishaps) - 8 Jul
Small rock makes big hit (FOD to engines) - 25 Nov
Something to think about (dangling tail cone) - 5 Aug
So you're a PIC (mishaps involving PICs) - 25 Mar
STACOM - 21 Jan, 18 Feb, 18 Mar, 15 Apr, 13 May, 24 Jun, 22 Jul, 12 Aug, 23 Sep, 21 Oct, 11 Nov, 16 Dec
Status of pyrotechnics (lot numbers and status) - 28 Jan
Submit QDRs (on materiel failures) - 7 Oct
Summer fallout (secure gear) - 13 May
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Survival vest zippers available (zippers can be requisitioned) - 11 Mar
Technique or lack of knowledge? (overgross conditions) - 23 Sep
Temperature—life to a gas turbine engine (tips on proper engine care) - 22 Apr
The buck stops here (PIC must correct mistakes of others) - 7 Oct
The huddle (importance of team effort) - 26 Aug
The invisible wire (wire strike mishap) - 5 Aug
The season for the common cold (don't fly with cold) - 14 Oct
The three-quarter mark and the months ahead (Class A statistics) - 15 Jul
The whys and hows of crew rest (crew rest policies) - 1 Apr
There I was (C-130 near miss) - 26 Aug
They're not just numbers (aircraft mishap fatalities) - 12 Aug
Three strikes and you're out (pilot hit by main rotor blade) - 30 Sep
"T" is for thunderstorms (avoidance is best policy) - 6 May
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Tree strike drain (data on tree strike mishaps) - 11 Feb
Tree strikes (tips for prevention) - 9 Sep
T63 air leaks a problem (problems with air lines) - 10 Jun
20/20 hindsight (August and September mishaps for 5 years) - 29 Jul
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UH-1 ground handling wheel assembly (wheels coming off) - 17 Jun
UH-1 ground handling wheel assembly (correction to 17 Jun issue) - 5 Aug
UH-1 indicator disks (correct disks for 90° and 42° gearboxes) - 22 Apr
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UH-1 pitch horn assemblies (loose assemblies found) - 12 Aug
UH-1 trunnion installed wrong (found after 6 flight hours) - 22 Apr
Use your TM (UH-60 wheel assembly explosion) - 23 Sep
U-21 warning decals (weather radar) - 17 Jun
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Wedding ring causes loss of finger (hand caught by engine drive shaft) - 4 Feb
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Wire strikes are no fun (wire strike data and seven-point prevention program) - 30 Sep
You can't legislate safety (guidelines for ASOs) - 11 Nov ■

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The life you save may be just about anybody's

Back in the days of the war in Korea, an aviation unit adopted as its slogan: "We fly when the ducks are grounded."

Stout chaps, those. The kind who are always ready to tell you they can get any job done . . . no matter what.

On the other hand, who ever heard of an off-course, disoriented duck running head-on into a mountain during a monsoon? When a duck reaches the sensible conclusion that things are considerably more hairy than he can handle, he looks around for the nearest pond on which he can paddle around until it is safe to take off again.

There is another tired old slogan you see on people's desks: "The difficult we do immediately. The impossible takes a little longer." Considerably longer.

Few people ever undertake what is clearly impossible provided they stop to give it some hard-nosed, mature thought in advance. It may turn out, too, that a problem which looks impossible at first glance can be cracked if you think about it long enough. After all, Mount Everest finally was climbed. Men have walked on the moon.

That's the bright side. There's a dark one. For every glowing triumph there have been dismal failures because people undertook some task they either didn't understand, failed to prepare for, or weren't able to do in the first place.

As often as not it wasn't their fault. They were asked or ordered into waters so far over their heads they sank without a trace.

If it's worth doing . . .

. . . It's worth doing in bang-up style, right? Take the case of Army aviation missions. Anything—repeat, **anything**—can be fouled up by just one person doing the wrong things in the wrong place at the wrong time. It doesn't matter whether he is the top person on the totem pole or the guy at the bottom holding everybody else up. If he is unequal to his assigned task, fails to give it the attention and planning it demands, isn't properly briefed as to what the mission is all about, or allows haste and distraction to interfere with proper execution, the result is almost certain to be a can of worms which could best be given the code name Operation Total Loss.

But let's take it as a matter of faith that professional pride makes every aviator anxious to do his job well and also that everybody is responsible enough to want to see it through to a safe, successful conclusion. No argument, there. At the same time, let's face the fact that not every mission comes up smelling like roses. Things go wrong which, by rights, shouldn't. How come?

One easy answer given in Vietnam—but not always the correct one, by any means—was that in combat, aviators, like everyone else, sometimes were forced to undertake assignments with considerably less than the comfortable safety margins normal prudence called for. In the heat of battle, extraordinary risks had to be assumed. There were times when the gamble failed to pay off. It is also true that in 'Nam, as in every war, overaggressive commanders on occasion made sitting ducks out of aviators in their attempt to carry out missions of dubious value which probably shouldn't have been attempted in the first place.

This isn't the sort of thing which happened every day. It serves to demonstrate, however, that if there is a gap in communications or understanding anywhere along the line in mission conception or planning, the operation can be in deep trouble from the start.

That's one important side of mission planning. Another pitfall in the same

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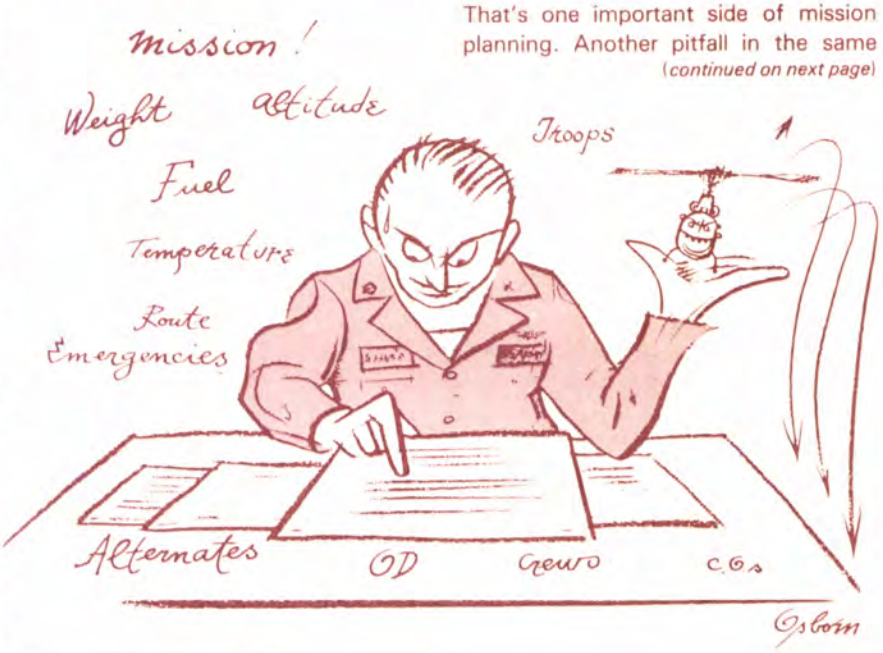

The life you save

area comes as a result of what expert marketing managers call "impulse buying"—the kind of shopping binge which can fill a grocery basket with unneeded items and shoot a month's budget to shreds in a matter of minutes. Impulse missions are a good deal worse. A typical one took place on a dark and stormy night when two aviators of limited experience were ordered on a medevac mission to pick up two injured soldiers in the hills. You probably won't be surprised to learn that on the way back they flew into a hill and nobody aboard ever returned to base. The ironic fact was that one of the men they picked up had a broken arm and the other was suffering from a minor cut. Both could have waited until daylight—and survived.

Needless losses of this sort stand as tragic testimony to the fact that **a failed mission is worse than no mission at all.** Sometimes much, much worse.

How can you guarantee the success of any mission? You can't, of course. In any operation in which a number of fallible human beings are involved, so many things can go wrong nobody would want to bet there won't be some sort of monumental snarl before the day is out.

But what the heck, just about everything involves an element of risk. People manage to break their necks just by taking a shower in their own bathroom.

Just the same, risks can be cut down to the bare bone, and where Army aviation missions are concerned, the place to start the whittling process is at the command planning level. In fact, mission planning and supervision are essential parts of a sound management program. An aviation unit can no more do without these professional tools than Jack Nicklaus could his golf clubs.

What goes into sound planning will differ in detail and volume depending on the mission, but planning is planning. You cover all the bases.

Aside from the painstaking blueprinting for the mission's execution, there is the matter of analyzing the mission itself. Is it really necessary or even worthwhile? Have alternate courses of action been considered? Has everything that could be done to identify and evaluate the hazards involved been done? Has everything that can be done to reduce and control the risks been done? Does everyone have a thorough understanding of the mission and the risks involved?

If all systems are go at this point, the next hurdle comes with the business of carrying out the mission, which is a little like saying that once you have read the simple instructions all you have to do is to fit the pieces together to build yourself a Rolls Royce in your basement.

The truth is that once the whistle blows, the risks start coming at an aviator like a gang of downfield tacklers zeroing in on a punt returner. If he doesn't handle the ball with professional slickness, he knows he will end up face down on the turf under a half ton or so of enemy linemen. If an aviator falls down on the job there's a good chance he may find himself under a couple of tons or so of thoroughly junked helicopter.

Sic 'em tiger

Everybody who has been in the Army long enough to draw his first paycheck knows that enthusiasm for flying is part of every successful aviator's makeup. He takes pride in his job and he wants to do it well. Nobody is going to argue with this healthy attitude.

As long as it stays healthy, that is. It starts getting a little green around the gills when it is carried the one fatal step into overconfidence, to the point where a person's professional pride is transformed into his desire to demonstrate to anybody around—and sometimes himself—how good he really is.

Any aviator who manages to slide into this dangerous state is a large package of **real** bad medicine. Mishap prone? He's loaded for bear so far as mishaps are concerned, that's for sure, and unless he is disciplined or grounded, he will wind up a short but thrill-packed career.

There is something equally capable of gumming up the works of any mission and that's pressure, or stress, or tension or whatever you want to call it. Every worthwhile enterprise has some sort of goal, and a person working toward a goal with only a fixed (and not always as much as he wants) time to do it in is a person working under pressure.

If an aviator is carrying an overload of pressure, he is a good deal more likely to make a big mistake than the carefree soul who has nothing to do and all day long to do it in.

Heat of battle

A fair amount of enthusiasm, and the excitement which simulated combat or other types of missions induce, is not only unavoidable but is desirable. Even a simple undertaking such as a cross-country training flight is more likely to have a happier ending if it is approached by an aviator who has an enthusiastic rather than a ho-hum attitude. The point is to adjust the enthusiasm to the point where it constitutes a blessing rather than a burden.

Here's where a good management and supervisory program comes back into the picture. Planning a unit mission is management's job, but before the blades begin turning, the razor-sharp execution required to reach the assigned goals becomes management's principal concern.

Mission possible sense

Basically, it comes down to rigid insistence on strict by-the-book procedures plus constant supervision designed to spot and correct the aviator who is about to be swept off his feet by his own emotions the way Romeo was the first time he laid eyes on the fair Juliet.

At the heart of every worthwhile management program is the realization that the ultimate goal is the successful completion of missions. That's pretty much what military aviation is all about—whether it is the deadly business of combat, rescuing stranded people in flooded disaster areas, ferrying aircraft, or countless other tasks an Army aviator can expect to be called on to perform. Nobody knows what the call will be tomorrow, but it's good sense to be prepared for anything.

No easy task, that. Mission impossible, you might say. Not at all. Sure, you could worry yourself into premature old age by trying to put down in black and white everything the future holds, but the kind of horsesense most of us are born with keeps us from such idiocy. Instead, we prepare ourselves by learning well, and sticking by accepted, established procedures which have stood the test of time in and out of the heat of battle.

And that's what a mission-conscious management program's training is built around. Good training makes for good flying habits.

Lone eagle

Once the blades start going around, every Army aircrew is a team functioning on its own to a marked and critical extent. A coach can't take the field with his team. The best management and supervision in the world can go only so far. After that, the success of a mission depends on the self-discipline, skills, and judgment of the people in the aircraft.

Out in the field, pilots are likely to have a total leeway in the matter of exercising their judgment about whether to go or not to go and what to do or not do in a particular situation. If their training has been thorough and if they are safety-conscious and disciplined enough not to allow overconfidence, misplaced enthusiasm, tension, or simple fatigue to override their skills, they'll come through with flying colors. One lapse in any direction can set off a chain of events which will bring their well-planned mission to a dismal end.

Take the matter of fuel management. A simple matter, to be sure. Yet you might be surprised to know how many missions failed because the fuel tanks went dry at the worst time, the way a motorist who should know better always manages to run out of gas 5 miles from the nearest filling station.

Or the missions which come to grief simply because a weary crew, taking honest pride in a long day's work well done, failed to remember that no flight is at an end until the aircraft is safely on the ground and the engine is shut down. A person who is looking forward to an evening of rest and relaxation involving a thick steak and perhaps a few short beers is ripe for a last-moment letdown which will make his evening turn out a good deal differently from what he had hoped.

All in the family

Every Army aircraft mission involves the skilled services of a considerable number of people. The fact that most missions are successfully completed is testimony to the generally high level of management programs, supervision, unit training, and individual responsibility of crewmembers and maintenance personnel. That's just the way things should be.

The silver lining, you could say Less shiny is the fact that missions sometimes do fail and the cause can be traced to an error somewhere along the line committed by men trained to know better. Commanders or subordinates, senior pilots or young aviators just out of flight school—statistics prove that nobody carries a gold-plated card guaranteeing he won't be the one who will bring the next mission to an untimely end.

It's something to think about. Think about it while you are planning your next mission.

Think Mission all the way.

It's almost a fulltime job. If you do it well, the life you save may be just about anybody's. ■

Selected mishap briefs

Utility helicopters

UH-1 Class E mishaps □ (H series) Reading on egt gauge dropped to zero during hover check. Caused by failure of temperature thermocouple indicator. □ (H series) Transmission oil pressure gauge dropped to zero during takeoff. Caused by failure of oil pressure gauge. □ (H series) Fuel filter and master caution lights flickered several times during landing. Caused by malfunction of master caution panel. □ (H series) Master caution and hydraulic lights came on during flight. Caused by failure of hydraulic pressure switch.

Attack helicopters

AH-1 Class C mishap □ (S series) Main rotor blade hit tree during NOE flight. Tip cap separated from blade.

AH-1 Class E mishaps □ (TAH-1S) Aft fuel boost pump light came on during landing. Caused by failure of boost pump. □ (S series) Engine oil pressure light came on during landing. Caused by failure of pressure switch.

Cargo helicopters

CH-47 Class E mishaps □ (A series) No. 1 engine transmission oil pressure light came on and oil pressure dropped to 17 psi during takeoff. Caused by failure of No. 1 engine transmission transducer. □ (C series) Right gear hit rock during landing in snow, breaking lower link assembly.

Observation helicopters

OH-58 Class E mishaps □ (A series) Binding was felt in cyclic in fore and aft positions during flight. Caused by failure of right cyclic servo actuator. □ (A series) Pilot noticed pressure bleedoff and hydraulic warning light, followed by smell of hydraulic fluid and total hydraulic failure. Caused by failure of jam nut on collective servo pressure line, allowing fluid to escape.

Fixed wing

U-8 Class E mishap □ (F series) No. 1 engine ran rough during flight. Caused by failure of altitude compensating solenoid.

U-21 Class E mishap □ (RU-21H) Mission was aborted when cabin heater failed. Temperature was -32° C. Caused by failure of igniter plug.

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

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
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	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**13**	**9**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

Headphones pose safety hazard

Some aircraft maintenance personnel have been seen listening to radios and tape players with headphones while doing their jobs. This is a potential safety hazard because of the distraction and general lack of awareness on the part of the individuals using the headphones. TB Med 501, Hearing Conservation, states that "Sound levels from such radio earphones may pose a potential auditory hazard and pose a safety hazard since warning signal(s) may not be heard."

Commanders should make sure their personnel do not use headphones for listening to radios and tape players or earmuffs with built-in radios while on duty. Personnel should also be told of the safety hazards involved when using this equipment off duty. ■

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 76 □ 20 Jan 1982

FY 81 and pilot errors

Army aviators flew 1,632,790 hours and recorded 26 fatalities in FY 81. The Class A mishap rate for the year was 2.63, an increase over the previous fiscal year's 2.41.

Pilot errors accounted for a majority of the Class A mishaps. In some of the more notable mishaps, aircraft collided with wires, trees, poles, and fences. There were several tail rotor stalls and dynamic rollovers. The dynamic rollovers occurred on level ground. Restrictions to visibility continue to present problems for our young aviators. IMC on takeoff resulted in one fatal Class A mishap, and another aviator could not handle a whiteout condition during landing.

Unfortunately, some aviators remain disciplinary problems despite all efforts of the mishap prevention program. What else can be said of the aviator who hot rods as close to the deck as possible, buzzing and scaring the wits out of people on the ground. One mistake and he becomes a big fatal Class A – he made it!

The Army's instructor pilot force also contributed significantly to the Class A mishap total. For example, some of their autorotational mishaps involved hovering, sod touchdown, overshoot, and undershoot. One mishap occurred in a fixed wing aircraft and another in a rotary wing aircraft while the IPs were conducting simulated single-engine training. Other IPs were involved in a midair collision, improperly performed a deceleration maneuver, and couldn't handle a whiteout condition during landing.

Finally, there's the IP who mistook a tach generator failure for the real thing and did not realize his error until recovery was not possible. We wonder if he remembers the January 1981 AVIATION DIGEST, where the "DES Report to the Field" quoted from the dash 10 the following warning: "Do not close the throttle. Do not respond to the rpm audio and/or warning light illumination without first confirming engine failure by one or more of the other indications."

In summary, pilot and instructor pilot errors accounted for 79 percent of all Class A mishaps. Every one of these mishaps could have been prevented if the aviators had given sufficient attention to the task at hand. Ours is a profession that allows for very few mistakes – sometimes we get only one opportunity.

You, the aviator, are the final authority for the successful completion of your mission. There is no one else to whom you can delegate the authority. ■

CY 81 STACOM index

STACOM 64, 21 Jan - Operators Manual and Checklist Update

STACOM 65, 18 Feb - Midairs, VHIRP, Compressawhat?
Read the Question Carefully

STACOM 66, 18 Mar - FY 80 - A very Good Year
UH-1 Weight and Balance

STACOM 67, 15 Apr - Operators Manual and Checklist Update

STACOM 68, 13 May - Prepare for a Hot Summer
Night Hawk/Night Vision Goggle SIP Requirements

STACOM 69, 24 Jun - Landing Short of Long Runways
Radius of Action
UH-1C/M Dash 10 Correction

STACOM 70, 22 Jul - UH-1 and AH-1 Gross Weight Validation Factor (Torque)
ATM Tasklist
UH-60 PPCs
Currency in CH-47D
Form 4186 Deficiencies

STACOM 71, 12 Aug - Operators Manual and Checklist Update

STACOM 72, 23 Sep - Aug 80-Aug 81 – Ditto
U-21 Oxygen System
FAC 2 ATM Tasks
DA Form 4507-1-R

STACOM 73, 21 Oct - Maintenance Mistakes
AH-1 Power Limitation in EMER
NOE/NH/NVG Qualification

STACOM 74, 11 Nov - Operators Manual and Checklist Update

STACOM 75, 16 Dec - Resolutions
UH-1D/H Control Check
EH-1 and EH-1X Qualification ■

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

Signal kit problem

A serious problem has been reported concerning the Signal Kit, Personnel Distress, P/N A/P 255-5A, NSN 1370-00-490-7362, L119, a component of the SRU-21/P survival vest. The M-207 flare launchers in some of these kits have been found with the collets flush against the inner housing wall, requiring the use of extreme force to insert and remove the signal flares from the launcher. Such a condition may result in the round remaining in the launcher after firing, leading to a heat buildup which may cause the round to explode and injure the operator. Defective launchers identified thus far bear P/N OL4891050; however, **all** M-207 launchers should be checked to insure that the flare rounds can be inserted and removed without the use of extreme force.

Units finding defective launchers should report the details to the U.S. Army Armament Readiness Command (ARRCOM), ATTN: DRSAR-QAS-P, on DA Form 2415, Ammunition Condition Report. POC at ARRCOM is Mr. Tom Bilyeu, DRSAR-QAS-P, AUTOVON 793-4851 X219. POC at TSARCOM is Mr. Jim Dittmer, DRSTS--MCAPL, AUTOVON 693-3112. ■

Clarification

In FLIGHTFAX, Vol. 10, No. 8, dated 18 Nov 81, the article titled "Who Pays the Price?" carried the statement that a missing UH-1 was sent into a remote jungle area with the ELT for that aircraft sitting in the supply room instead of being installed in the aircraft.

Since publication of this article we have learned that our information concerning the availability of the ELT was in error. An ELT for the ill-fated aircraft was not in unit supply. ■

ALSE school in operation

The Army ALSE school at Fort Eustis began its first class on 5 January 1982. To attend this school, qualified personnel should apply through MILPERCEN in accordance with the instructions in AR 614-200. ■

Unauthorized traffic on runways

The Air Force recently sent out a message concerning unauthorized vehicles on airport runways and taxiways. Drivers are failing to comply with tower instructions and disregarding flight line procedures because of unfamiliarity with the airfield movement area and runway boundaries. Lack of adequate driver training for flight line environments is the main reason for this problem. Malfunctioning and weak radios have also contributed to misinterpretation of verbal instructions.

Because of the frequent turnover of personnel, continuing driver education is a must. Army airfield and heliport commanders should review their driver training procedures and insure vehicle radios are in good working order. ■

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10 No. 15 □ 27 Jan 1982

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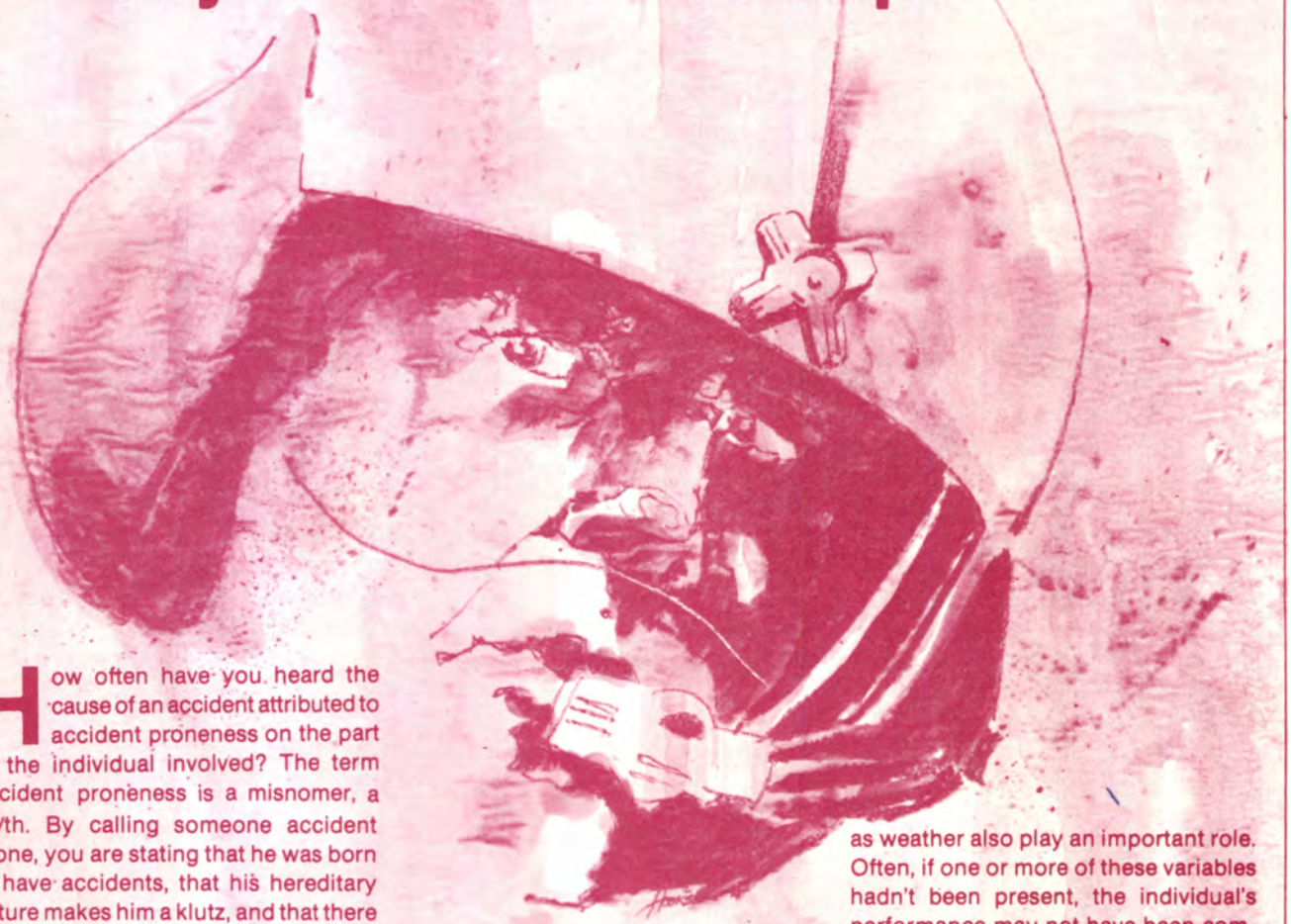
The myth of the accident prone



How often have you heard the cause of an accident attributed to accident proneness on the part of the individual involved? The term accident proneness is a misnomer, a myth. By calling someone accident prone, you are stating that he was born to have accidents, that his hereditary nature makes him a klutz, and that there is nothing that can be done to stop him from having an accident.

This is just plain nonsense. Geneticists haven't discovered any accident proneness genes, and accidents can be prevented, as will shortly be pointed out.

If accident proneness is a myth, why do some people have more than their share of accidents? To answer this question let us first examine the reasons why a single accident occurs.

In almost every accident, the accident investigation team is faced with a myriad of contributory variables. Very rarely is there a single cut-and-dry cause factor. There are almost always numerous contributory variables, such as poor man-machine interface, supervisory error, limited experience, failure to use accepted procedures, task oversaturation, overconfidence, etc. Sometimes these variables are transitory and stress related. For example, the accident victim may have been suffering from some temporary physiological variable such as fatigue, hypoxia, hypoglycemia, or a temporary psychological variable such as boredom, anxiety, frustration, or depression. Environmental variables such as weather also play an important role. Often, if one or more of these variables hadn't been present, the individual's performance may not have been compromised enough to result in a human-error accident.

Although there are several reasons why a person could be involved in an accident, is there a common denominator among these various reasons? Some early psychological research is suggestive. A few years ago a Navy flight surgeon/psychiatrist developed a psychological profile of the high-accident-risk aviator (he actually used the term accident prone, but we now know that this term is inappropriate). However, when you compare this theoretical profile of the high-accident-risk aviator to

(continued on next page)

The myth

the psychological profile of the outstanding aviator, you make a very interesting discovery. Namely, the profile of the outstanding aviator and the high-accident-risk aviator have much in common, with the exception of one very significant factor. The high-accident-risk aviator appears to be undergoing stress, whereas the outstanding pilot is not. Does this suggest to you that an outstanding aviator undergoing stress is, in actuality, a high-accident-risk aviator?

This doesn't mean that all human-error accidents are caused by stress. What it does suggest, however, is that if stress is present, and if the quantity and/or severity is great enough, an individual--any individual--will be more likely to be involved in an accident. This individual shouldn't be considered accident prone, but rather one who has currently entered a high-accident-risk category. And everyone at some point in time enters this category. If you alleviate the stress, you reenter the low-accident-risk category where, incidentally, the majority of us are most of the time.

What exactly is stress? Stress is simply normal "reaction of the body to the ordinary and extraordinary pressures of life." The presence of stress initiates hormonal and various other physiological changes, and can cause a drastic impairment in a person's cognitive and motor functioning. Remember Joe and his problems? What if you knew that Joe had been undergoing severe stress during the weeks prior to his numerous mishaps? His father, with whom he had a very close relationship, had recently undergone arterial bypass surgery. Joe's daughter, in asserting her independence, moved out of Joe's house, against his wishes, and into an apartment. Joe stopped smoking 2 weeks ago and has taken a second mortgage on his home. All those events are stressful. In light of what has been discussed, is it surprising that Joe has had a few close calls? When the stress diminishes, Joe will reenter the low-accident-risk category and be his old self again.

Prevention of stress-related accidents is a two-step process. First, you must learn to recognize that you are undergoing stress, and second, you must take action to reduce the stress affecting you.

Recognition of stress is really not all that difficult, since there are usually accompanying behavioral changes with increased stress. The following are common reactions to stress: anxiety, preoccupation, impatience, humorlessness, inability to concentrate, restlessness, frequent or prolonged headaches, unhappiness, depression, frustration, aggression, irritability, defiance, insomnia, and apathy or indecisiveness. A person undergoing stress will exhibit

some but not all of these symptoms. The key is that the stressed person is behaving atypically. He is just not himself.

Reduction of stress in most cases is relatively easy and can be handled in one of several ways. Physical exercise is an outstanding method of stress reduction. Whether it is intense, such as playing racquetball, or less strenuous, such as walking, it works well. Hobbies and other nonathletic events that you enjoy and derive pleasure from, such as reading, building model planes, needlepointing, or playing backgammon, are also excellent stress reducers. Your medical officer can provide you with specific "how to" information on relaxation therapies such as tensing and relaxing various muscle groups, or meditative techniques, which are easy, effective, require no special equipment, and can be performed by anyone. Additionally, don't sell your spouse or good buddy short. Talking your problem out with someone whose opinion you value, or with someone who will just listen patiently, may be the best stress reducer around. If the stress you are encountering is so intense that these methods provide little relief, don't be afraid to seek professional help. It may save your life.

In summary, remember that everyone (spouse, pilot, crew chief) enters the high-accident-risk category at some time or another. Entrance into this category is often preceded by a buildup of stress caused most frequently by the everyday variables that upset the normal routine of life. So when stress is present, increased awareness and caution are required. When you see the telltale behavioral changes taking place in yourself or someone else, take the necessary steps to reduce the stress and get back to being a low-accident risk. And, above all, remember the myth of the accident prone. ■

—adapted from APPROACH

Selected mishap briefs

Utility helicopters

UH-1 Class C mishap □ (H series) As aircraft was landing, rotorwash blew open copilot's door on an aircraft parked on an adjacent pad. Upper hinge snapped. As door twisted and fell, it broke chin bubble. Door was not latched.

UH-1 Class E mishaps □ (H series) Grinding noise was heard from hydraulic pump, followed by hydraulic caution light and loss of hydraulic pressure. Caused by failure of hydraulic pump. □ (H series) On approach to snow-covered confined area, pilot pulled excessive pitch during vertical descent. Torque topped at 54 pounds. □ (H series) As pilot was returning from practicing landings in loose snow, he felt cyclic feedback. Postflight inspection revealed ice on cyclic servos. □ (H series) Master caution and chip detector lights came on. Caused by faulty electrical contact at 42-degree gearbox. □ (H series) Loud grinding noise was heard from rear of aircraft. Crew smelled smoke, and engine chip detector light came on. IP checked engine compartment and saw flash fire around fuel control. Caused by internal failure of engine. □ (V series) During rapid refueling operation, crew chief noticed that hydraulic fluid sight gauge was less than full. He then checked under aircraft and saw hydraulic fluid dripping from hellhole. Caused by failure of O-rings in collective servo.

Attack helicopters

AH-1 Class A mishap □ (S series) As aircraft was brought to a hover at night, crew became disoriented because of lack of outside visual reference. Aircraft drifted to right about 100 feet, and main rotor blades hit large tree. Aircraft rotated to right and crashed upright. 8221

AH-1 Class E mishaps □ (S series) Pilot in back seat got out of aircraft and began to walk away. He turned around and saw smoke billowing out of pylon area. He returned to aircraft and told IP aircraft was on fire. Smoke was coming from alternator. □ (S series) Pilot noticed fore and aft motion in rotor system during flight. Caused by frozen feather bearing. □ (S series) Blowing snow caused loss of visual cues, and aircraft landed hard on left skid.

Cargo helicopters

CH-47 Class E mishap □ (B series) Master caution and engine oil system lights came on. Oil filler cap came loose in flight.

Observation helicopters

OH-58 Class E mishap □ (C series) Pilot felt binding in collective during approach to field site. Armor plate retaining pin was improperly engaged in locking slot, causing armor door to bind against copilot collective.

Training helicopters

TH-55 Class C mishap □ During clutch engagement after engine start, IP felt excessive vibration in antitorque pedals. Tip of tail rotor had separated 2 inches from trailing edge. Separation was caused by ice forming in tail rotor blade after a rain and a severely cold night.

Fixed wing

C-12 Class E mishap □ (A series) Torque for left engine fluctuated during takeoff roll. After takeoff, torque on No. 1 engine dropped and tgt rose. Power on No. 1 engine required reduction to about 80 percent to maintain tgt within limits. Caused by failure of high pressure bleed valve.

U-21 Class C mishap □ (RU-21H) Engine was overtorqued to 1600 pounds during takeoff.

U-21 Class E mishaps □ (RU-21H) No. 2 engine ran rough after takeoff. After landing, when power was reduced to idle, engine failed. Caused by malfunction of engine fuel control. □ (A series) During takeoff roll, flock of sea gulls flew in front of aircraft. Loud thump was heard and takeoff was aborted. Dent was found on leading edge of left wing.

C-7 Class E mishaps □ When mixture lever was advanced and primer switch was released during engine start, engine quit running. Mixture cable broke in area of pulley in wing root. □ Pilot noticed excessive vibration when power was reduced to cruise. Caused by stuck valve in No. 1 cylinder and several fouled spark plugs.

Maintenance

UH-1 Class C mishap □ (H series) Engine failed during flight. Turbine shaft shims did not align correctly when installed, causing end play on turbine shaft.

UH-1 Class E mishaps □ (H series) Full right pedal was not available during hydraulics-off maneuver. Caused by out-of-adjustment tail rotor cable. □ (H series) Needles did not split during autorotation. Caused by out-of-adjustment rotor rpm.

UH-60 Class E mishap □ Crew noticed No. 1 engine oil pressure was lower than normal during takeoff. Crew followed dash 10 procedures, but oil pressure continued to decrease. After landing, it was found that crew chief had not completely secured No. 1 engine oil after filling oil reservoir. Cap lock was found secure, but cap was only halfway seated in filler receptacle, allowing oil to be blown out. Preflight inspection did not reveal discrepancy.

AH-1 Class E mishap □ (S series) Aircraft was landed because of unusual feel in cyclic. Cyclic preset friction had backed off.

CH-47 Class E mishap □ (B series) During landing, crew chief noticed leak from flight control closet in vicinity of No. 2 SAS solenoid valve. Overtorqued locknut caused elbow fitting to crack.

OH-58 Class E mishap □ (A series) During main rotor blade tracking operations, crew chief allowed tracking flag to hit main rotor blade, damaging tip cap. □ (C series) Engine oil temperature gauge indicated 150° C. during flight. Caused by loose engine oil temperature sending unit cannon plug.

U-21 Class E mishap □ (RU-21H) After pilot leveled off during test flight, he noticed smoke coming from No. 1 engine. Pilot returned to base and made single-engine landing. O-ring packing for fuel dump valve nozzle was not seated correctly, allowing fuel leak.

Messages received

• Safety-of-flight message concerning airspeed limitation for UH-60A forward flight with cabin doors open (UH-60A-82-04, 151500Z Jan 82). Summary: Because of the lack of adequate retention for cabin soundproofing, the current limitation of 100 KIAS with doors fully opened and sidewall soundproofing installed aft of station 379 was imposed. Since the original airspeed restriction, soundproofing retention has been developed and incorporated into production aircraft, S/N 79-23265 and subsequent. Other aircraft are being field retrofitted by Sikorsky representatives. Paragraph 5-27a(2) of TM 55-1520-237-10 will be changed to read: "Cabin doors may be fully open up to 145 KIAS with soundproofing removed aft of station 379 or if soundproofing retention is installed." Contact: Earl Mundy, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance message concerning procedures check for UH-60A aircraft (UH-60A-82-03, 132045Z Jan 82). Summary: Two incidents have occurred where jet fuel has leaked into the T700 engine lubricating system as a result of an internal leak in the T700 engine oil cooler. Until further notice, UH-60A using/operating units will check the T700 engine oil level sight glass before the first engine start of each day and after each flight and/or engine operation per TM 55-1520-237-10. Contact: Douglas Danforth, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• OV-1 information message concerning operation in icing environment (301858Z Dec 81).

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

Changes to TMs

Change 18, dated 6 Nov 81, to TM 55-1520-228-23-1 has been released.

FY 82 Class A Mishap Countdown

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4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**14**	**10**

Lessons shared

The following accounts were received by message from our sister services. We thought the info might be of interest to our readers.

• A C-12 took off with a known inoperative stall warning device and flew its mission. Returning to home base, the aircraft flew through an inversion layer and, at 3,000 feet, collected a quantity of clear ice on the wings and fuselage. A pilot who landed shortly before the C-12 reported possible wind shear activity. The C-12 pilot pressed on to land, using his deice capability. The pilot allowed a "couple" of knots, to compensate for the ice. As he was flaring, about 5 feet over the runway, the pilot felt the airplane "fall out of the sky." He suggested that he might have stalled.

Postflight inspection revealed there was a considerable amount of ice on the aircraft. This ice, no doubt, increased the aircraft's gross weight and stall speed by an unknown quantity. Lift coefficient is dramatically altered with ice.

Aviators are expected to know and understand the effects of adverse weather on aircraft. Failure to do so endangers not only the life of the pilot but also those of the crew and passengers.

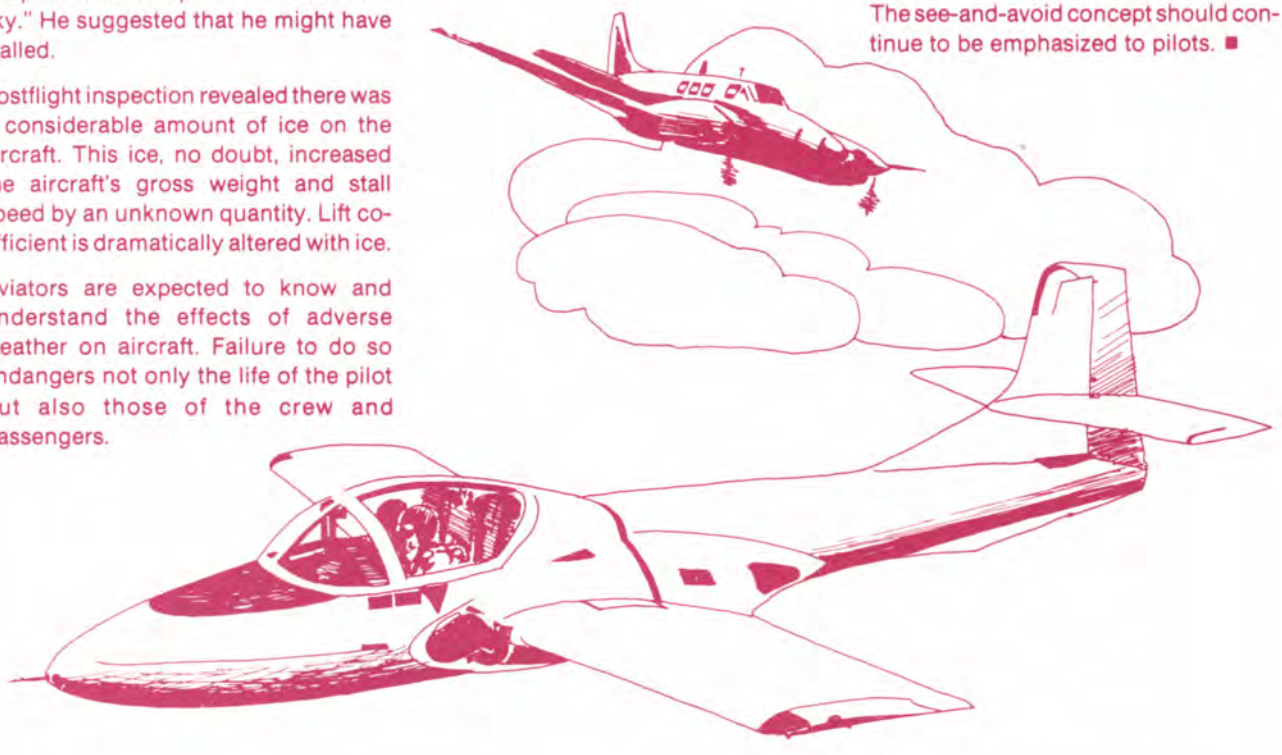
• A T-37 was on departure, receiving radar vectors, with an assigned altitude of 13,000 feet msl. ATC told the T-37 pilot to level at 8,000 feet msl. At that time, the crew stated they were passing 8,500 feet msl. The crew then saw traffic heading southeast at the 1 o'clock position at about 1 mile at an estimated 9,000 feet msl. The pilot said he took evasive action using a push-over maneuver, passing about 200 to 300 feet below an Army U-21 on an IFR flight plan. The T-37 pilot said the U-21 did not alter course or altitude until past the T-37, at which time the U-21 began a left turn.

A review of the radio communication transcript indicated that the U-21 had been given a vector of 090 degrees around traffic. The traffic the U-21 was being vectored around was the T-37. The U-21 pilot said he had the T-37 in sight and that the T-37 had passed 500 to 1,000 feet below the U-21.

The T-37 crew notified ATC of their intention to file a near-midair collision report. ATC advised the T-37 crew that their altitude readout at the time of the incident was 7,900 feet msl on radar. The T-37 crew said their actual readout was 8,900 feet msl. Further checks by the T-37 crew were unable to duplicate malfunctions between the cockpit altimeter and the radar scope printout.

Each aircraft was being controlled by separate controllers. Traffic advisories, which are not required, were not issued by either controller. However, minimum IFR separation is required and it is feasible the altitude readout of 7,900 feet msl on the radar scope for the T-37 did indicate proper separation between the T-37 and U-21 to the controllers.

The see-and-avoid concept should continue to be emphasized to pilots. ■



Recap of TSARCOM and AVRADCOM messages

Following is a list of AIG 8881 addressed messages transmitted by TSARCOM and AVRADCOM from 1 October through 31 December 1981.

CH-47-81-15 Safety-of-flight maintenance message on T55-L-11ASA engine variable inlet guide vanes

CH-47-81-16 Safety-of-flight maintenance message on pilot and co-pilot jettisonable doors

UH-60A-81-26 Safety-of-flight message on operational limits for turbulence and thunderstorm operation

UH-60A-81-27 Safety-of-flight message on one-time inspection for engine output shaft assembly

UH-60A-81-28 Safety-of-flight message on one-time inspection for deswirl duct and clamp

UH-60A-81-29 Safety-of-flight message on restrictions of flight in icing conditions

UH-60A-81-30 Change to UH-60A-81-28

OV-1-81-04 Safety-of-flight maintenance message on retorquing of main pressure regulator valve hold-down screws

UH-1-81-11 Safety-of-flight maintenance message on retorquing of main pressure regulator valve hold-down screws

UH-1-81-12 Safety-of-flight maintenance message on T53 engine cleaning procedures

UH-1-81-13 Safety-of-flight message on one-time inspection of pylon lever assembly

UH-1-81-14 Safety-of-flight one-time inspection concerning grounding of all UH-1/AH-1 aircraft with specific T53-L-13BA/703 engine fuel controls installed

UH-1-81-15 Change to UH-1-81-13

U-21-81-02 Change to safety-of-flight message on emergency inspection of U-21, RU-21, U-8 aircraft, and other nonstandard aircraft lower forward wing attachment bolt

U-8-81-01 Safety-of-flight message on inspection of U-21, RU-21, U-8 aircraft, and other nonstandard aircraft lower forward wing attachment bolt

OH-58-81-07 Message number cancelled

OH-58-81-08 Safety-of-flight maintenance message concerning procedures check for OH-58 aircraft

AH-1-81-30 Safety-of-flight maintenance notice concerning transmission oil line

AH-1-81-31 Safety-of-flight maintenance notice concerning AH-1S tail rotor pitch change horn retaining nuts

AH-1-81-32 Safety-of-flight maintenance notice concerning main rotor blade

AH-1-81-33 Safety-of-flight maintenance notice concerning service life of hot metal plus plume IR suppressor

AH-1-81-34 Safety-of-flight maintenance message concerning retorquing of main pressure regulator valve hold-down screws

AH-1-81-35 Safety-of-flight maintenance message concerning main rotor blade

AH-1-81-36 Safety-of-flight maintenance message on T53 engine cleaning procedures

AH-1-81-37 Safety-of-flight one-time inspection concerning immediate grounding of all UH-1/AH-1 aircraft with specific T53-L-13BA/703 engine fuel control units

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

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 16 □ 3 Feb 1982

A harsh lesson in pilot selection

Observers watched the AH-1S as the pilot began an autorotation with turn. At first, all seemed well. Suddenly, the aircraft assumed an extremely nose-low attitude and began a rapid descent.

About 300 meters short of the touchdown point the aircraft hit a marker pole, shearing the tail boom. It then struck the ground and bounced along the ground before coming to rest about 42 feet from the point of first ground contact.

Fortunately, there were no fatalities. The IP, who was seated in the forward cockpit, sustained a concussion and minor cuts and bruises. The rated student pilot (RSP) got out of the aircraft relatively unscathed. He then helped the dazed IP out of the destroyed aircraft. The total cost for this mishap was almost $2 million. The crash sequence was reconstructed as follows:

The flight

During a training flight in the Cobra, the RSP tried four times to do an autorotation with turn. The first ended with a power recovery because the aircraft was not aligned with the lane before descending below 200 feet agl. The second was completed to the ground, but the IP had to heavily coach the RSP. The third attempt, like the first, had to be terminated with power. On his fourth try, the RSP made the required traffic pattern and entered the maneuver at the correct point, but he was slow to begin the 180-degree turn. When he did enter the turn, the bank angle was too shallow for him to complete it and be aligned with the lane while above 200 feet agl.

The RSP then steepened the bank angle but failed to keep the aircraft in

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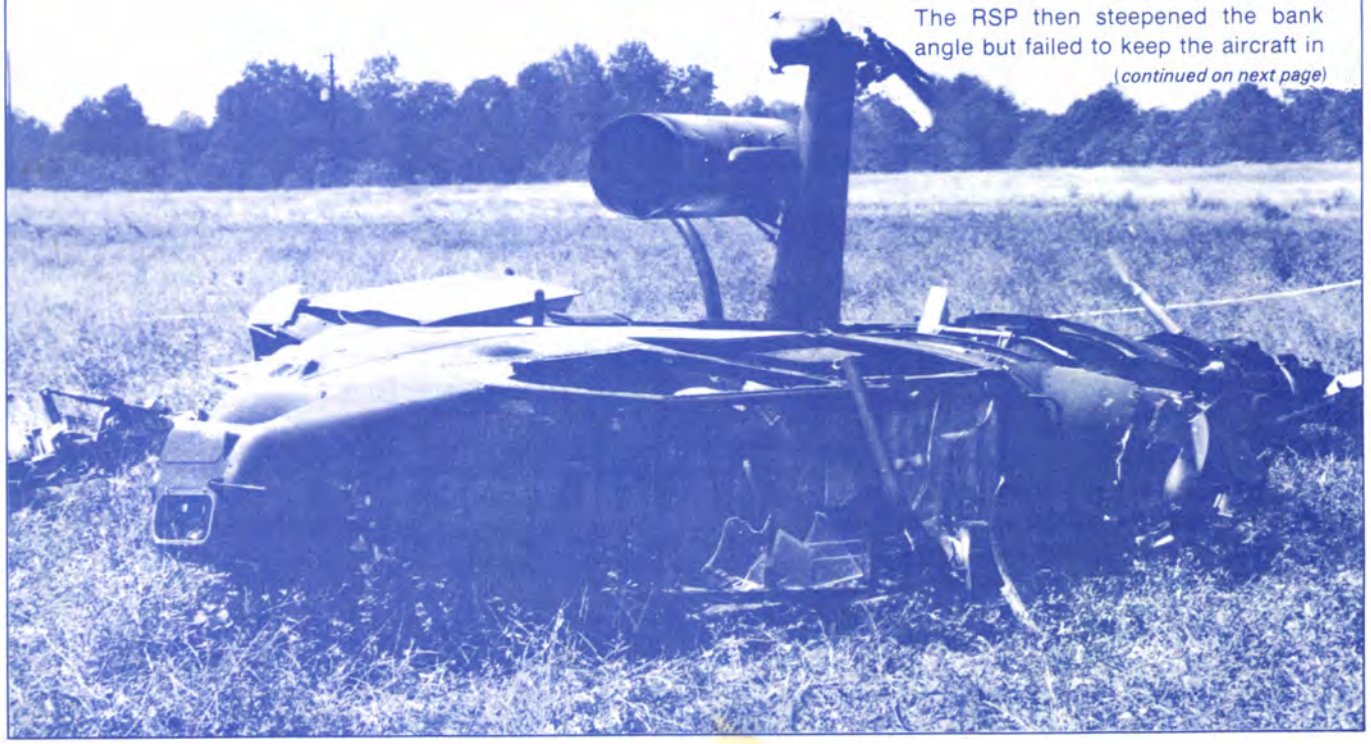


A harsh lesson

trim. Observers said it appeared to "tuck" when about halfway through the turn. The aircraft began a rapid descent. Main rotor rpm built up fast. The RSP applied collective--probably excessive--causing a loss of rotor rpm below the required limits.

Because of the dangerous situation developing, the IP tried to take control, shouting "I have the controls!" The RSP did not acknowledge the order. Instead, he momentarily "froze" on the controls. This prevented the IP from making a power recovery while there was enough altitude.

When the IP saw he would not be able to override the RSP, he shouted "Power recovery!" He repeated this command several times. The RSP responded to the order but used wrong power recovery techniques. Instead of increasing the throttle until full engine rpm was reached and then applying collective pitch, he did the reverse--he applied collective, then increased the throttle.

Knowing a crash was certain, the IP managed to gain enough cyclic control to level the aircraft during its rapid descent. About 300 meters short of the touchdown point, the aircraft hit a marker pole about 35 feet above its base, shearing the tail boom. The aircraft continued downward and crashed.

While the sequence of events that preceded the crash tells what happened, many questions are left unanswered. Why was the RSP having what seems to be more than average problems with certain flight maneuvers in the Cobra? This aviator had completed the Initial Entry Rotary Wing Course, transitioned in the UH-1, and had completed the OH-58 Qualification Course. In view of his past flight experience, it would seem that the problems he was having with the AH-1S were, indeed, excessive. And why did he panic and "freeze" on the controls?

Training record

The student pilot's grade folder while he was attending the IERW Course showed him to be a marginal student. Because of a flight deficiency, he was set back once during the primary phase. Afterwards, he soloed the TH-55A and completed primary.

He then transitioned in the UH-1. During the instrument phase, he failed his first Stage One evaluation. After receiving more flight time, he completed this stage. His performance tended to be marginal throughout most of his flight training.

After the RSP was assigned to a unit, his commander got him a school quota for the AH-1G Qualification Course. The RSP did not progress satisfactorily and was given a checkride evaluation. He failed this check and was dropped from the course. Although he was given no assurances, he was told that after he had gained more flight experience, he might be reconsidered for Cobra qualification.

Failing to qualify in the AH-1, he returned to his unit. His commander then decided to have him transition in the OH-58. The IP who instructed him during his OH-58 transition said he was a weak pilot and, at times, had a tendency to lock up on the controls. This tendency was more pronounced when he allowed the aircraft to assume an attitude or a flight condition he perceived to be dangerous.

The IP further recalled a particular instance when the RSP "froze" on the controls after placing the aircraft in a dangerous flight condition. "It took almost all my power, while shouting at the top of my lungs, for the RSP to release control of the aircraft," he commented.

Also, the IP stated that without a good deal of flight time and experience, the RSP was dangerous. Following the OH-58 transition, the IP told the commander that the RSP was a marginal pilot and should only be paired with experienced pilots--that he should not be considered for PIC designation.

When interviewed after the crash, the OH-58 IP said that he knew the unit commander had spoken with the RSP about his proficiency level.

The RSP's OH-58 qualification grade record and his Aircrew Training Manual (ATM) records contained several administrative errors. The RSP had been flying as pilot in the UH-1 without having completed an annual standardization flight evaluation. Also, 55 days had elapsed during which time the RSP

had made no flights in the UH-1. Therefore, he should have been given a proficiency flight with an IP before resuming flight duties in the UH-1. This had not been done. Yet, he continued flying.

The records further showed that the RSP had not completed six of the mandatory evaluation items at the time of his OH-58 qualification flight. As a result, the OH-58 qualification could not be considered valid.

The RSP had also failed to meet the Annual Aviator Proficiency and Readiness Test. Therefore, he should have been either suspended from flight duties or given a waiver. Neither of these actions had been taken.

When the RSP's commander requested a quota for this pilot for the AH-1S Qualification Course, DA officials turned down the request. This refusal was based on the RSP's previous flight

deficiency elimination. However, the commander personally contacted DA officials and a quota was obtained on a short fall basis.

Although the RSP's overall progress in the course was generally satisfactory, his IP did state, "I have to admit that probably I did carry him." When asked if the RSP's grade folder reflected a higher skill level than he actually had, the IP replied "Probably, yes."

The RSP had recurring problems with the attitude and trim control when doing an autorotation with turn. Overall, the IP indicated that the RSP demonstrated only marginal flying ability during the course. He further stated the RSP had been considered for a flight proficiency progress checkride.

When a postaccident evaluation flight check was given him, the RSP did not pass it. One of the comments the SIP made on the grade was especially noteworthy. It read: "On occasion, the IP had to direct a power recovery because of the dangerous attitude and rate of descent. During this recovery, as the pilot increased throttle, he also

increased the collective, causing a lag in engine acceleration and a loss of rpm. The IP took control to prevent a mishap."

The commander

Information provided by the RSP's commander was somewhat contradictory. At first, the commander indicated the RSP was an average aviator. Based on feedback from his IPs, he felt the RSP was ready for qualification in the Cobra. He later stated that the RSP still flies mechanically, and added, "As long as a guy is flying mechanically, he's a hazard."

The commander also related the conversation he had with the RSP about his flying abilities while the RSP was undergoing OH-58 transition training. During their talk, they discussed whether or not the RSP felt he was really safe to fly and whether he should get out of aviation.

The commander's statements raise the all-important question every aviation commander must face when selecting pilots for specialized training or qualification. Am I making the right decision? In some instances a commander can quickly arrive at his decision. In others, he may have trouble. A number of factors can enter the picture to affect his judgment.

Consider, for example, a pilot who is intelligent, knowledgeable, industrious, and has a sincere desire to make aviation his career. Now suppose this individual happens to be deficient in one or more areas of flying. Should he be selected for qualification in an aircraft more sophisticated than any he is currently flying? The commander's initial reaction might be to answer no. On the other hand, what about those pilots who--with a lot of help--barely made it through the initial entry course and later developed into outstanding aviators? What criteria should a commander use in making his decision?

Since every case is an individual one, there are no pat answers. It is the commander's responsibility to make sure the pilots in his command continue to grow in knowledge, proficiency, and skill. He is responsible for providing them with the training they need and can handle.

In selecting pilots for qualification training, commanders must realistically assess the aviator's capabilities and potential. All Army pilots are not equally suited for qualification in a particular type aircraft. In arriving at his decision, a commander must first consider the pilot's past performance, his own observations, those reported by other pilots, and, of course, information given him by IPs.

In the Cobra crash described, the crew was fortunate. But this is not always the case. Some years ago, a pilot transitioning in the OV-1 was deemed marginal in his performance. He was especially weak when it came to emergency procedures.

Despite the accumulation of pink slips and the recommendation he be eliminated from the program, he somehow managed--with additional time--to qualify in the aircraft. Several months later, one engine of his OV-1 failed on liftoff. He was not able to cope with the emergency and the aircraft crashed. Both pilots were killed and the aircraft was destroyed.

The lesson is harsh but clear: You don't do anyone a favor when you fail to exercise sound judgment based on facts.

In the AH-1S crash, the RSP did not possess the piloting skills needed to successfully complete the AH-1S qualification course and should not have been sent to the course. The decision to send him was made by his commander. ■

Selected mishap briefs

Utility helicopters

UH-1 Class A mishap □ (H series) Copilot in left seat made approach to confined area, with quartering tailwind. Approach was terminated at a high hover because copilot was not comfortable with the approach. He then hovered forward to a road junction, made a 90-degree right pedal turn, and placed aircraft on edge of dirt road. Slope was 6 degrees. Six passengers got out of aircraft. As copilot started to take off, left skid lifted off first. Pilot tried to reach controls but was unable to react in time. Aircraft rolled onto right side. 8222

UH-1 Class E mishaps □ (H series) Engine oil temperature climbed to 130° C. during hover. Caused by failure of engine oil temperature indicator. □ (H series) Master caution and engine fuel pump lights came on during hot refueling operation. Caused by failure of fuel pressure switch. □ (H series) Hydraulic pressure light came on, followed by hydraulic failure. Caused by cracked hydraulic fluid line. □ (H series) Master caution and transmission oil pressure lights came on, and cockpit filled with smoke. Caused by failure of oil filter gasket. □ (H series) Engine oil temperature rose to 94 degrees. Caused by failure of hose assembly. □ (H series) Crew felt excessive vertical and lateral vibrations during flight. Caused by separation of main rotor blade skin. □ (H series) Right cargo door was opened about 5 inches during descent for landing. Crew smelled fuel fumes. Caused by failure of preformed packing. □ (V series) During runup, copilot placed his helmet bag on right rear of center pedestal. When pilot requested a before-takeoff check, copilot released helmet bag to reach for checklist. Bag fell forward, obscuring fuel control panel. As checklist was being read, pilot started to move helmet bag from pedestal. Bag handle caught governor control switch and moved it to emergency position. Pilot immediately reduced throttle as master caution light came on and rpm began to increase. Pilot saw N_2 between 6800 and 7000 and continued to reduce throttle to engine idle. N_2 decreased below 5800, and governor switch was placed to auto position.

Attack helicopters

AH-1 Class B mishap □ (S series) Aircraft was on maintenance test flight. Autorotation resulted in hard landing. Engine may have failed. 8223

AH-1 Class C mishaps □ (S series) Pilot misjudged clearance during landing in confined area. Tail rotor blade hit tree. □ (S series) As aircraft was being landed on snow-covered field, it hit the ground twice. Pilot recovered to a hover and then landed at a spot blown clear during first approach. Contact with the ground did not appear hard during either landing, and aircraft was flown from site. Broken skid was seen in flight by crew of another aircraft.

AH-1 Class E mishaps □ (S series) While flying into the sun, pilot saw poles on both sides of the valley. Suspecting a wire was suspended between the poles, pilot took evasive action by applying collective pitch. This caused an overtorque to 62 psi. Wires were not present. Bright sun hindered pilot's ability to confirm presence of wires. □ (S series) After practice hovering autorotation, pilot in back seat heard a sound like SCAS was disengaging. SCAS was still engaged, but engine oil pressure was at 110 psi and then jumped to 150 psi. Caused by failure of engine oil pressure transducer. □ (G series) Static noise was heard over intercom system, and engine and transmission oil temperature gauges dropped to zero. Screw retaining wires to circuit breaker backed out, allowing wires to disconnect.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Engine screens were removed to facilitate snow and ice removal from engines. During engine runup, engine ingested unmelted ice, causing damage to first two stages of compressor. □ (C series) No. 1 and 2 engine torques would not stay matched. No. 1 engine torque then dropped to 15 percent and N_1 went to 97 percent. Postflight inspection revealed inlet guide vane assembly had failed and was ingested by engine. □ (C series) No. 2 engine transmission oil pressure dropped 8 psi during climbout. Caused by failure of thermostat flow control. □ (C series) No. 1 generator caution light came on about 20 minutes after takeoff. Caused by broken generator wire terminal.

Observation helicopters

OH-58 Class C mishaps □ (A series) Pilot tried to start engine with main rotor blade tied down. Start was aborted when aircraft began bouncing. □ (A series) Aircraft was hovering in open field next to tree line. Pilot, looking at flight of Cobras leaving field site, allowed aircraft to drift into tree limb. One main rotor blade was damaged.

OH-58 Class E mishaps □ (A series) Hydraulic and master caution lights came on. Loud squeal was heard from hydraulic pump and controls became stiff. Running landing was made. Caused by cracked hydraulic pressure filter housing outlet line. □ (C series) During local transition emergency maneuver training flight, pilot was performing left pedal simulated antitorque malfunction maneuver. About 1 to 2 feet above the ground, as effective translational lift was lost, pilot applied collective to slow rate of descent. With application of collective, nose of aircraft rotated from a 10-degree left out-of-trim condition to

(continued on back page)

Mishap review: wire strike

Synopsis

The OH-58A hit three electrical cables about 35 feet above the ground, rolled almost inverted, and crashed. Both occupants sustained major injuries.

History of flight

The pilot and passenger, a company commander, took off on a tactical service mission to provide coverage for two convoys. Neither the pilot nor the passenger did a hazards recon of the route to be flown. The weather was clear with unlimited visibility. After completing the convoy coverage mission, the passenger asked the pilot if he could land near the point where one of the convoys would turn off the highway. The pilot said he could.

Flying about 350 feet agl, the OH-58 crossed a valley and then passed over higher terrain. The pilot accelerated from 40 knots to 55 knots and had traveled about 400 yards at 35 feet above the ground when he saw some electrical cables in front of his aircraft. He banked steeply to the left to try to miss the cables, but the aircraft hit three of the seven cables. The aircraft rolled to the right as it passed through the cables and crashed almost inverted, coming to rest on its right side. The pilot and passenger sustained major injuries.

Crewmember experience

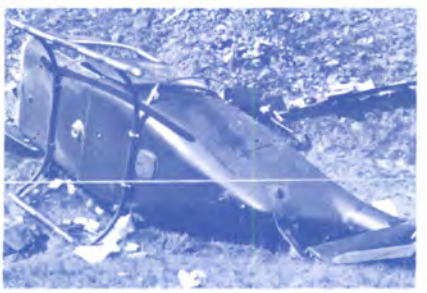
The 24-year-old pilot had more than 300 rotary wing flight hours, with more than 150 in OH-58As.

Commentary

The cables the aircraft hit were shown on the pilot's and passenger's maps. The pilot was not aware of the location of the cables because he did not do a map reconnaissance of the intended route and did not brief the passenger on identification of hazardous map symbols or assistance in obstacle avoidance.

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. The pilot said he knew he should not have been as low as he was but he was confident in his ability to avoid hazards because of the clear weather and unlimited visibility.

The pilot approached the higher terrain at a level, low altitude where the flight path appeared deceptively clear of obstacles. The cables and supporting structures blended into the background and were not readily visible until the aircraft was within about 300 yards of the cables. The pilot did not see the cables in time to avoid them because he was not scanning the flight path to the front of his aircraft. He may have been looking toward the intended landing site during this time or he may have been checking his instruments. The passenger was looking at his map. ■



FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	3	1-3 Feb	**0**	**0**
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**15**	**10**

Mishap briefs

a 50-degree right out-of-trim condition before pilot reduced throttle enough to control turn rate. IP took control, applied left pedal to align aircraft, and increased throttle and collective to prevent hard landing. Combination of rapid left pedal and throttle application induced an overtorque of 103 percent. IP was late with corrective action. □ (C series) N_2 fluctuated from 0 to 100 percent during flight. Caused by failure of N_2 gauge.

Fixed wing

C-7 Class E mishaps □ Landing gear warning light remained on after gear retraction. Caused by cracked nose gear collar assembly, preventing synchronization of nose gear strut and doors. □ Pilot heard clicking sound coming from left engine during landing. Caused by cracked cylinder.

C-12 Class C mishap □ (C series) Aircraft, landing at civil airfield, rolled over a ridge of snow and ice extending across the intersection of the runway and a taxiway. Both inboard flaps were damaged by ice and snow splashing up from around landing gear. Ridge of snow and ice was left by snowplow.

U-3 Class C mishap □ (A series) When landing gear handle was placed in down position, crew heard muffled bang. Landing gear safe light did not come on. Visual inspection using landing gear inspection mirror revealed nose gear had not locked in overcenter position. Main gear appeared down and locked. Nose gear collapsed on rollout, damaging radar dome, nose gear doors and linkage, and three propeller blades. Nose gear extension/retraction system failed.

U-8 Class E mishap □ (VU-8F) During short final approach to landing, gusting winds caused aircraft to lose lift and touch down short of intended landing spot on runway. Left main landing gear struck snow drift, causing aircraft to veer to left side of runway centerline. One blade of left engine propeller struck runway light. Aircraft was stopped without further damage.

Maintenance

UH-1 Class E mishaps □ (H series) Dual tachometer needles would not split during standard autorotation. Because of incorrect adjustment, rotor rpm remained low enough that needles would not split until engine was shut down. □ (H series) Master caution light came on after takeoff. Incorrectly installed transmission chip detector boot caused water collection in boot.

AH-1 Class E mishaps □ (S series) While leaving field site, IP noticed oil spot on snow. On short final to home base, transmission oil pressure fluctuated. Postflight inspection revealed transmission oil filter seal was leaking. O-ring was installed incorrectly. □ (S series) Pilot smelled electrical odor and saw smoke. Melting metal was then seen coming from behind pilot's instrument panel. Caused by chafing wire bundles.

Messages received

- Safety-of-flight maintenance message concerning maintenance procedures and engine performance check for OH-58 aircraft (OH-58-82-01, 221600Z Jan 82). Message provides engine performance check procedures for OH-58A and C helicopters and changes procedures for use of fuel control heater on OH-58A.

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

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Mishap review: night mission in marginal weather

Synopsis

As the UH-1H PIC was descending on a night VFR approach to a lighted pad, he flew into a fog bank. Ground reference was lost. The Huey hit a fence and crashed partially inverted.

History of flight

The training mission was flown at night. Four Hueys and their crews were assigned to pick up some troops and deliver them to a landing zone (LZ).

The flight left the heliport and proceeded to the pickup zone. Patches of ground fog were observed, and visibility was restricted. This was consistent with the weather forecast. The first lift was made without incident except that on arrival at the LZ, the pilots of the No. 1 and No. 2 helicopters had to go around on the first approach. After the troops were offloaded, the four aircraft were flown to an airfield to hot refuel.

After refueling, the flight received a special VFR clearance to leave the airfield control zone and went back to the pickup zone for the second lift. The second lift was completed, with the No. 1 and No. 2 aircraft again making a go-around on their first approach to the LZ. The flight returned to the airfield for hot refueling and then went back to the pickup zone for the third and final lift. The weather appeared to be deteriorating, with the ground fog getting thicker. The third lift was completed without a go-around.

The flight took off from the LZ to return to their heliport. One of the aircraft left the formation as prearranged to go to the installation airfield for instrument training. The remaining flight of three continued toward the heliport. When the air mission commander saw haze and patchy fog in the vicinity of the heliport, he told the flight to increase their separation. On the first approach, the No. 1 and No. 2 pilots made go-arounds because of the fog. The No. 3 pilot was able to land on the first approach and parked his helicopter with the lights on as a further reference for the other aircraft. The PIC of the No.

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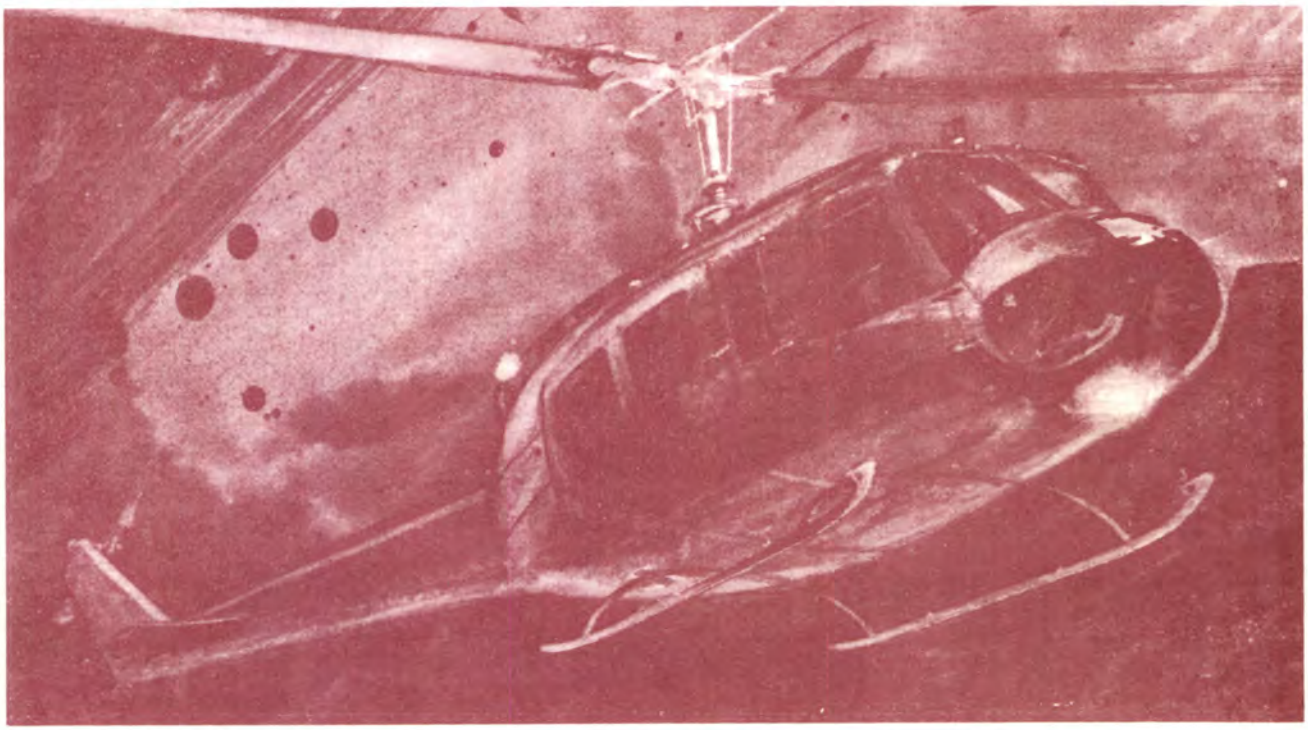

Night mission in marginal weather

2 aircraft, using his searchlight intermittently, made a second approach and a second go-around, ahead of the No. 1 aircraft.

The No. 2 PIC then decided to try an approach to another pad from the opposite direction. On short final, the aircraft entered a thick fog bank. The PIC applied power and began a right turn to go around. As he did this, the Huey hit a cyclone fence 600 feet short of and 420 feet left of the runway. The top of the fence was about 20 feet above field elevation. The aircraft turned tail over nose, came to rest inverted on its left side, and burned.

The PIC was knocked unconscious. The copilot and crew chief, who sustained minor injuries, were able to move part of the instrument panel off the PIC and pull him free of the aircraft before the fire spread.

Crewmember experience

The 26-year-old PIC had more than 500 rotary wing flight hours, with more than 200 in UH-1Hs. The 26-year-old copilot had more than 200 rotary wing hours, with more than 100 in UH-1Hs.

Commentary

The PIC used incorrect techniques for a night approach under marginal weather conditions. He concentrated his attention outside the aircraft on his perceived touchdown point and descended too low to clear the fence.

The PIC's lack of recent night flights and no hood and SFTS time in 6 months, plus a stressful night mission (3.3 hours), insufficient crew rest, and less than optimum conditions (special visual flight rules, patchy ground fog, and no moon), generated fatigue, a desire to get on the ground at the heliport, and apprehension about recovering to the installation airfield with a possible instrument approach.

The aircraft was on a circle red X status and restricted from flight into known or forecast instrument meteorological conditions because the RMI on the right side had been removed. The PIC decided to fly the aircraft from the left seat, a violation of a local regulation. The regulation requires the PIC to fly in the right seat in a UH-1H. Assuming the regulation is normally complied with, that decision placed the PIC in a comparatively unfamiliar seat with a different perspective in relation to aircraft attitude and instrumentation.

The reconnaissance platoon leader, who was the PIC of the aircraft, provided adequate time for crew rest for the other members of his platoon but not for himself. In the 24-hour period before the mishap, the PIC had worked more than 17 hours, slept less than 4 hours, and rested at home about 3 hours.

The heliport was only marginally adequate for night operations, especially during special visual flight rules conditions.

Minimum crew coordination existed between the PIC and copilot. Before the flight, it was established that the PIC would assume control of the aircraft if they entered IMC. No supplementary crew coordination was provided by the PIC. ■

Selected mishap briefs

Utility helicopters

UH-1 Class B mishap □ (H series) Aircraft landed hard during autorotation. 8224

UH-1 Class C mishap □ (H series) After door gunnery exercise, crew chief found two small holes in tail rotor blade. Probably caused by ammo link. Canvas ejection control bags were not installed.

UH-1 Class D mishap □ (H series) During hot refueling procedures, crew chief noticed that nozzle was leaking at point of attachment to hose. Before he could notify POL personnel, nozzle came off hose and spilled 21 gallons of JP-4 on his legs. Crew chief was rinsed off with water and taken to hospital, where he was dizzy and nauseated for 24 hours. Locking levers on nozzle were not engaged correctly, allowing nozzle to disengage from hose.

UH-1 Class E mishaps □ (H series) As aircraft was flying in IMC at night, loud whistling noise was heard. Aircraft vibrated and then went into an uncontrollable pitch and roll. Nose pitched high and left, and airspeed went from 90 knots to zero. Aircraft then banked hard right and nose down. Aircraft started to spin and then descended from 4,000 to 2,700 feet. Spins and vibrations were so severe that both shoulder harnesses locked. Crew was able to identify definite ground references, and running landing was made at airport. Inspection revealed blade separation, loose mast, broken and twisted right cyclic servo, and loose tail rotor bellcrank bracket. □ (H series) IP noticed noxious fumes during climb. Can of ether, carried on board by medic, was leaking. □ (H series) Loud bang was heard and aircraft yawed left, then right, during climbout. Caused by failure of fuel control. □ (H series) Aircraft yawed right several times and rpm light came on. Caused by malfunction of overspeed governor. □ (H series) Aircraft was No. 3 in flight of 5. On short final to LZ, crew encountered whiteout condition from blowing snow caused by first two aircraft. Crew made go-around and pulled 54 psi torque for 3 seconds to clear 50-foot trees. Maintenance inspection revealed no damage.

UH-60 Class C mishap □ During jump mission, jumpmaster inadvertently jettisoned both escape panels from left cargo door while trying to open door.

UH-60 Class E mishaps □ Master caution and No. 2 engine oil pressure lights came on. Failure of IPS blower vanes caused vibrations that dislodged IPS blower from accessory gearbox case. Engine lost all oil. □ Crew heard loud bang and grinding noise from main transmission area, and main module sump light came on. Caused by failure of main transmission.

Attack helicopters

AH-1 Class C mishap □ (S series) Pilot entered autorotation to check rpm during test flight. When N_1 decreased below 60 percent, pilot increased throttle, but engine did not respond. On touchdown, one main rotor blade flexed down and cut through No. 4 drive shaft and into tail toom.

AH-1 Class E mishap □ (TAH-1S) Aft fuel boost pump light came on during hover/taxi. Caused by failure of fuel boost pump.

Cargo helicopters

CH-47 Class C mishap □ (C series) As aircraft landed in LZ in blowing snow, 4-foot-long pole penetrated belly and floorboard. Crew saw pole on approach but thought they were clear of it.

CH-47 Class E mishaps □ (B series) No. 2 engine would not come on line during start. Caused by failure of direct flow valve. □ (C series) At 105 knots, forward speed trim indicator remained stationary at mid range. Caused by malfunction of speed trim gauge.

Observation helicopters

OH-58 Class C mishap □ (A series) Aircraft was moving down a ravine during NOE tactical training flight. Crew chief warned pilot of tree to his right rear. Pilot moved aircraft to left front to clear tail rotor. Main rotor blade hit tree to left front of aircraft.

OH-58 Class E mishaps □ (A series) Master caution and fuel pump lights came on during hover. Caused by failure of fuel pump. □ (A series) Torque and N_2 fluctuated during hover/taxi. Caused by overspeed governor failure. □ (C series) Master caution light came on during landing. Caused by failure of hydraulic pump. □ (A series) Pilot felt binding in collective during approach. Armor plate retaining pin was improperly engaged in locking slot, causing armor door to bind against copilot collective.

Fixed wing

U-3 Class E mishap □ (A series) Right main gear did not retract after demonstration of landing configuration stall. Gear was extended with emergency gear hand crank. Caused by failure of bearing on push-pull tube.

OV-1 Class A mishap □ (D series) Aircraft yawed left as rated student pilot (RSP) started a missed approach. IP took control of aircraft, but aircraft continued to yaw left and then began to roll left. Aircraft was decelerating as IP confirmed left engine had failed. IP was unable to level wings or maintain altitude. About 100 to 150 feet agl, IP told RSP to eject. IP ejected and landed in thickly wooded area, sustaining serious injuries. RSP remained with aircraft and was killed in the crash. 8225

C-12 Class E mishaps □ (A series) Pilot noticed 350-pound imbalance in left-side fuel. Fuel leak was caused by structural failure of fuel cell. □ (A series) After landing, pilot was unable to taxi aircraft off runway because of extremely stiff rudder pedals. Servo was replaced.

Maintenance

UH-1 Class E mishaps □ (H series) Pilot felt feedback in controls and master caution light came on. Hydraulics were lost, and pilot landed on road. Hydraulic tube assembly chafed against flexible stainless steel pressure line, causing loss of hydraulic fluid. □ (H series) Engine tachometer needles would not split during practice autorotation. Pitch change links were adjusted incorrectly. □ (H series) Noise was heard from transmission area as engine was coasting down. Bolt holding splined adapter to engine output shaft had worked loose. Bolt was not safetied. □ (H series) Antitorque pedal binding occurred during landing. Shim behind tail rotor chain sprocket was installed incorrectly, causing chain to rub against plastic guide.

AH-1 Class E mishaps □ (G series) Fuel filter light came on. Caused by loose wires on fuel filter sensor. □ (S series) Engine oil pressure fluctuated between 50 and 150 psi. Caused by loose electrical terminal. □ (G series) Loud whine was heard from transmission area, followed by illumination of No. 1 hydraulic pressure light and master caution light. Antitorque pedals became stiff, requiring assistance of crew chief on shallow approach to final. Postflight inspection revealed return line fitting to tail rotor servo had backed off, allowing system to drain. Fitting was torqued incorrectly. □ (S series) Aircraft rolled left about 5 seconds after takeoff. Pilot disengaged SCAS and aircraft returned to level flight. Roll channel SCAS card was out of adjustment.

CH-47 Class E mishap □ (C series) No. 1 engine transmission hot light came on. Caused by chafed wire on engine transmission temperature sensor.

OH-58 Class E mishaps □ (A series) Master caution and hydraulic pressure lights came on. Running landing was made. Hydraulic pressure filter housing outlet line/fitting was loose, causing hydraulic fluid to drip out and hydraulic pressure to be lost. □ (A series) Master caution and hydraulic pressure lights came on, and hydraulic pressure was lost. Caused by loose hydraulic line to outer filter.

C-7 Class E mishaps □ Right engine would not develop takeoff power. Carburetor door was partially closed, causing increased air temperature and loss of power. □ Landing gear would not retract after takeoff. Gear weight switch was out of adjustment.

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

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	3	1-10 Feb	**1**	**0**
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**16**	**10**

NVG battery failure

Battery failure in the AN/PVS-5 night vision goggles occurred in a recent AH-1S (Prod) Class A mishap. While emergency procedures have been developed to cope with battery failure, a delay in transferring controls when flying at cruise airspeed close to the terrain can be catastrophic, as it very nearly was in this case. We now know that battery failure is much more common than previously supposed.

While there have been a lot of battery failures before 10 hours of service life, there have been few quality deficiency reports (QDR) submitted on these batteries. Every failure before expiration of recommended service life should be reported by QDR so the scope of the problem can be known and action can be started to get better batteries.

To arrest this problem before we lose another aircraft, Electronic Research and Development Command has provided the following information concerning a field test which can help assure pilots are furnished batteries that will last at least 10 hours.

Test for battery life

Factory fresh BA-1567/U mercury batteries can power the AN/PVS-5 for more than 30 hours at room temperature. If you look at the date on your BA-1567/U batteries, you will find they may be a year or more old. And age means energy loss in mercury batteries, particularly if they have been stored at elevated temperatures. Some aviation units have found BA-1567/U batteries that are already dead when first removed from their plastic wrappers.

Pilots need to have some assurance that the batteries they use in their night vision goggles have sufficient operating life potential. A test is required to provide this assurance, but, unfortunately, the actual battery that is used cannot be tested for life potential. The only test method that can help is a sample test of one or more batteries out of each box of 20 BA-1567/U batteries. Since all of the batteries in a single box of 20 have the same storage history and are from the same manufacturing lot, their life potential is similar.

A sample test for a box of 20 BA-1567/U batteries should be done within 1 month of intended use. Batteries must be stored in a cool location or refrigerator to maintain their energy. To do the sample test, randomly select a battery from the box and place it in an AN/PVS-5 night vision goggle. The goggle objective lenses must be protected with the black lens caps to reduce aging of the image intensifier tubes. Cover the small holes in the lens caps with opaque tape. This allows the test to be more conveniently performed in a lighted area. Do not cover the eyepiece lenses.

Turn the goggle system on and note the start time for the test. Look in the eyepieces to determine that both the left and right channels are operating. Momentarily lifting the tape over the hole in each lens cap will provide a bright green image that demonstrates that both tubes are operating and that the battery is operating. After 8 hours of operating time (which need not be continuous), check for operation of both tubes. The battery has failed if either or both tubes no longer operate, provided both tubes do operate again with a good battery.

A failure in less than 8 hours is sufficient cause to discard the entire box of 20 batteries. They are not sufficiently reliable for aircraft operations. If the sample battery is working after 8 hours then it should be allowed to operate until it does fail, checking operation every 2 hours. Again, operating time does not need to be continuous, but an accurate record of "on" time must be kept. The total time to the last successful operation check should then be marked with a grease pencil on each of the individual small plastic wrapped battery boxes remaining in the box of 20. When a battery is removed from its individual wrapper for use, this sample test operating time should be marked on a piece of masking tape applied to the side of the battery. A record of actual hours of battery usage should also be recorded on this piece of masking tape. **When total actual hours of usage exceeds one-half the sample test time, the battery should be discarded.** This procedure should reduce battery failures in flight to a very low level.

Unit commanders should not let their concern for the cost of discarded low energy and partially used batteries prevent their carrying out this procedure. Lives and aircraft are worth far more than batteries.

Now for the good news: A lithium battery, BA-5567/U, has been approved for use in place of the BA-1567/U mercury battery in the AN/PVS-5. The lithium battery has much longer storage life, even at high temperatures. Of course, all batteries should be stored in a cool area to maximize life. The lithium battery also provides about 40 hours of operating time for the AN/PVS-5 at room temperature or above, and provides about 20 hours of operation at extreme cold, -52° C., without an arctic kit. By comparison, the mercury battery has greatly reduced life below 0° C., and the arctic kit battery holder must be used for operation below 0° C.

The lithium battery, BA-5567/U, will be available in the near future. Units should watch for requisitioning information to be announced. ■

Night collision avoidance

When was the last time you had a night hawk aircraft come smokin' through your night vision goggle formation (or vice versa)? What did you do about it?

With increased emphasis on night helicopter operations and concentration on night hawk and night vision goggles techniques involving minimally lit aircraft, we face a new and critical safety challenge. How do we keep these aircraft from running into each other during night operations? Concern has been voiced by many aviators and safety officers about the extreme difficulty that night hawk pilots have in distinguishing aircraft being flown by pilots wearing night vision goggles and, similarly, the difficulty that pilots of NVG aircraft, on different, unrelated missions, have in seeing each other. The problem is compounded during field training exercises where friendly and opposing forces are operating independently in the same airspace.

The Safety Center recognizes the problem and is trying to identify safety solutions that will complement NH/NVG operations. Alternatives such as designating separate locations for night hawk and NVG operations or separating the different modes of flight by altitude restrictions can degrade realistic training. Another possibility is readopting the proximity warning device for use on Army aircraft. This is an effective collision avoidance device that would not degrade tactical helicopter training, but it cannot be considered tactically feasible since aircraft security can be compromised in combat through its use. Besides, to get these devices, a requirement would have to be supported by the user and would have to compete for funding by DA.

We know you have a problem. Now we'd like to know what you are doing about it. Maybe we can use your ideas and solutions to help other units that haven't solved the problem or those that are just beginning to set up their NVG programs. Also, with large-scale, joint exercises which involve both friendly and opposing forces, such as Gallant Eagle and Team Spirit, coming up in the spring, we need some answers so we can help establish some ground rules which will support realism in training while reducing the potential for catastrophic midair collisions.

If you have answers or ideas which may help us, please call or jot them down and send them to Commander, U.S. Army Safety Center, ATTN: PESC-AT, Fort Rucker, AL 36362. Your contributions may help save lives.

Point of contact at the Safety Center is LTC Kenton, AUTOVON 558-3901/3913. ■

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 18 □ 17 Feb 1982

Mishap review: blowing dust

Synopsis

The OH-6 pilot lost outside visual reference because of blowing dust after liftoff to a hover. The helicopter drifted to the right, hit a tree, and came to rest on its left side.

History of flight

The mission was a night tactical training flight involving five helicopters which were to be moved to a forward landing zone. The platoon leader, who was the pilot of the No. 1 aircraft, brought his OH-6 to a hover with the navigation lights on and the rotating beacon and landing light off. Almost immediately, the pilot lost visual reference with the ground in the blowing dust created by the rotorwash. He turned on his landing light, but the reflected glare caused by the dust further reduced visibility. The pilot then turned off the landing light.

After hovering for almost 20 seconds, the pilot decided to land. Before the aircraft could be landed, the tail rotor and main rotor blades hit a large tree. The main rotor blades were torn from the aircraft and the tail boom was fractured. The OH-6 then landed hard on the left skid and came to rest on its left side. The pilot and observer exited uninjured.

Crewmember experience

The 33-year-old pilot had more than 1,000 rotary wing flight hours, with more than 500 in OH-6s.

Commentary

The pilot did not take immediate action to remedy his loss of outside visual reference. He sustained the hover for almost 20 seconds while turning the landing light on and off rather than immediately landing the helicopter or making a maximum performance takeoff.

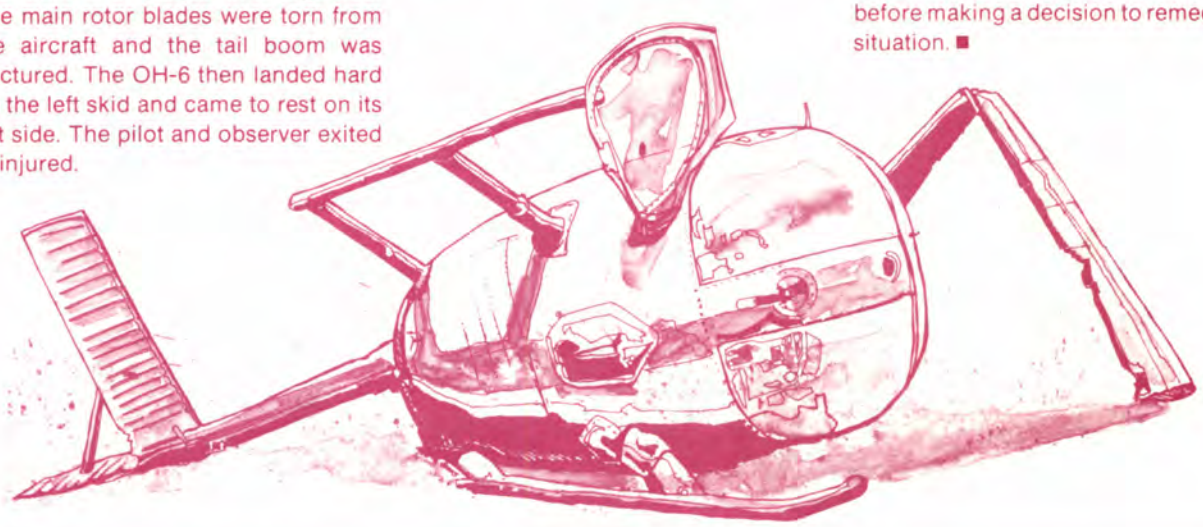
The pilot had only 5 hours of restless sleep during the previous night, followed by a 17-hour duty day before the mishap. Temperatures during the day exceeded 110° F. Neither the unit nor the battalion had a written crew rest policy. The pilot was not aware of the regulation requiring crewmembers to tell their commanders when they are approaching or have reached crew rest limits.

The pilot was the platoon leader in an attack helicopter company involved in a training and evaluation program, and he was to lead a flight of five aircraft on a night tactical move. The pilot had operated in blowing dust and blowing snow on several other occasions and may have been overconfident in his ability to deal with those conditions.

The portion of the LZ from which the pilot chose to operate was excessively dusty for night helicopter operations. The parking space occupied by the OH-6 was located next to an unimproved ground vehicle trail that had been used extensively by vehicular traffic for 3 days.

The pilot and observer partially cleaned the windshield during the preflight but left residue on the lower part of the plexiglass, which reduced visibility. The color and consistency of the residue were similar to the blowing dust.

The result was a tired pilot losing ground reference and then trying to hover in IMC for about 20 seconds before making a decision to remedy the situation. ■



Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 27 May 81 issue (8136) ☐ N_2 tachometer generator failed while aircraft was on ground controlled approach 800 to 1,000 feet msl. Bearing seizure was caused by loss of lubrication. As a result, rpm warning light came on, low rpm audio sounded, and N_2 needle on dual tachometer went to zero. Crew misinterpreted failure of the N_2 tachometer generator as a complete engine failure and autorotated the aircraft into a bay. Tail rotor drive shaft failed when the aircraft hit the water, preventing recovery when it was realized the engine was still running. Aircraft eventually filled with water and sank.

UH-1 Class A mishap in 24 Jun 81 issue (8143) ☐ Pilot, performing hydraulics check in high wind condition, channelized his attention inside the cockpit and did not detect a change in the aircraft's attitude. The aircraft became light on the skids, with the left skid coming off the ground. The aircraft slid to the right and rolled over onto its side.

UH-1 Class A mishap in 1 Jul 81 issue (8144) ☐ IP had demonstrated two NOE decelerations. Pilot had completed two slow decelerations (one satisfactorily) and was doing a faster third one. At a speed above effective translational lift, pilot incorrectly applied abrupt aft cyclic and insufficient collective pitch. Aircraft rotated about the mast and both tail rotor blades hit the ground, causing separation of the 90-degree gearbox and tail rotor system. Directional control was lost, and the aircraft rolled left and came to rest on its left side after the main rotor blades hit the ground. Pilot had not demonstrated 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.

UH-1 Class A mishap in 15 Jul 81 issue (8148) ☐ During VFR cross country flight at 10,500 feet msl, pilot deviated from his planned route along a valley and flew toward a 12,324-foot mountain ridge. As aircraft crossed an intermediate portion of the ridge at 100 to 200 feet agl, a higher portion of the ridge became visible. Pilot started a climb and reduced airspeed to 60 knots in an attempt to clear the higher terrain. Torque required for the climb exceeded torque available, resulting in rotor/engine rpm bleed-down and subsequent loss of effective aircraft control. Aircraft continued in an uncontrollable turn until it hit the ground on the right skid and came to rest inverted.

UH-1 Class B mishap in 26 Aug 81 issue (8153) ☐ Aircraft lost power during turn from base to final approach. IP took control, entered autorotation, and landed aircraft in trees. Engine failure was the result of fuel starvation which was caused by failure of fuel control drive gears.

8143

UH-1 Class B mishap in 16 Sep 81 issue (8160) ☐ Student pilot did not apply initial pitch during low-level autorotation. IP took control about 5 feet agl and attempted power recovery. Aircraft yawed right and pivoted about left skid. Main rotor blade hit ground, and aircraft came to rest upright. IP did not take corrective action in time.

Attack helicopters

AH-1 Class B mishap in 15 Jul 81 issue (8150) ☐ Emergency stow control unit malfunctioned during high-speed, low-level autorotation, allowing M197 20mm machine gun barrels to drop below the aircraft's skids and dig into the runway on termination of the maneuver. The specific cause of the malfunction could not be determined because of the damage sustained. However, several factors caused or allowed the mishap. The unit's armament maintenance section had not corrected a discrepancy involving the emergency stow control. Procedures in the operators manual and checklist permit the aircraft to be operated with the M197 weapon system positioned only by an emergency backup electrical system. Design of the weapon system does not provide a positive means of identifying the actual position of the 20mm machine gun barrels when power is applied to the armament system.

AH-1 Class A mishap in 26 Aug 81 issue (8154) ☐ While aircraft was on the ground at flat pitch and 100 percent rotor rpm, tip weight separated from

8148

red main rotor blade. The resulting 43,000-pound force imbalance caused transmission case to fracture and transmission to separate from aircraft. Mast snapped and red main rotor blade hit left side of aircraft, causing tail boom to separate and aircraft to roll over on right side. Tip weight separated because of a deficiency which resulted in cohesive failure (affected by extreme internal blade temperatures) of rubber bonding surrounding the weight. The excessive movement of the weight inside the rubber incasement allowed the sharp radius along the leading edge of the weight to cut/wedge its way through the rubber and the leading edge of the fiberglass spar surrounding the weight and rubber bonding.

Cargo helicopters

CH-54 Class A mishap in 2 Sep 81 issue (8157) ☐ During a transition training flight with a rated student pilot (RSP) at the controls, IP directed a maneuver beyond the capability of the RSP. He allowed the RSP to continue an approach, with a 10,300-pound load, to a confined area after simulating failure of the No. 2 engine. Neither the IP nor the RSP took corrective action when the approach became shallow and low. The load hit the ground. The main rotor blades hit trees and the aircraft crashed. The IP was probably overconfident in his ability and the ability of the RSP.

Observation helicopters

OH-6 Class B mishap in 5 Aug 81 issue (8152) ☐ As aircraft was on short final to field site, power surged and was immediately lost. Aircraft was too close to the ground for recovery and crashed in tail-low attitude. Power malfunction was caused by fatigue fracture which was the result of incorrect installation of the pressure reference (PR) air line between the fuel control and governor.

OH-58 Class B mishap in 11 Mar 81 issue (8127) ☐ As aircraft was being brought to an out-of-ground effect hover, it began an uncontrollable turn to the right. Pilot tried to fly out of the spin by reducing collective and applying forward cyclic. Throttle was then reduced to flight idle, and aircraft settled to the ground and came to rest on its left side. Aircraft may have had a partial power loss that went undetected by the crew.

OH-58 Class B mishap in 22 Apr 81 issue (8134) ☐ Pilot allowed airspeed to decrease from 60 knots to 20 knots while focusing his attention outside the aircraft during 180-degree right turn. Effective translational lift was lost because of 20- to 25-knot tailwinds. Density altitude was 5,000 feet. These conditions, combined with the pilot's probable demand for maximum power from an engine producing less than normal maximum power and the possible application of excessive right pedal during the right turn, resulted in the aircraft entering an uncontrollable spin to the right. Corrective measures were ineffective and the aircraft crashed. Coupling nut on engine bleed air line was not torqued correctly or was fitted incorrectly during installation. This resulted in excessive wear between the line flare and the fitting, allowing bleed air to escape during engine operation. This decreased the maximum torque available by a minimum of 10 psi. So the engine was not capable of developing full power during the mishap sequence. ■

8154

8157

8152

Selected mishap briefs

Utility helicopters

UH-1 Class A mishap □ (M series) During NOE training, pilot was hovering aircraft about 10 feet above trees to check his position on map. As aircraft started forward, crew heard loud bang. Aircraft spun rapidly to right and settled into trees, coming to rest inverted in a small stream. All three crewmembers were injured. Tail rotor pitch change link may have failed. 8226

UH-1 Class C mishaps □ (H series) IP was demonstrating straight-in autorotation. About 200 feet agl, IP requested landing light be turned on. Pilot turned on light, but it was not very bright because NVG cover and filter was installed. At 100 feet, IP initiated gradual deceleration and again requested that landing light be turned on. Searchlight was not turned on. As IP pulled initial collective pitch, aircraft landed hard, damaging skids, cross tubes, and landing light. Aircraft then bounced twice before coming to rest. IP was aware of filter and cover on landing light, but did not specifically request searchlight. □ (H series) Loud thud was heard during low-level flight. Postlanding inspection revealed skin damage to nose section. A soldier had been told by his platoon leader to fire an M79 practice training round behind aircraft. Round hit aircraft.

UH-1 Class E mishaps □ (H series) Oil pressure went to zero, and master caution and transmission lights came on during climb. Engine surged during landing and smoke filled cockpit because of oil coating hot engine. Caused by ruptured transmission filter gasket. □ (H series) After rapid refueling operation, aircraft was hovered to parking pad. Engine decelerated and quit. Caused by failure of fuel control. □ (H series) N_2 fluctuated, then dropped to zero, activating rpm warning system. Caused by sheared N_2 tachometer generator drive pin. □ (H series) On completion of hydraulics-off running landing, IP told pilot to turn on hydraulics. Pilot placed governor switch in emergency position momentarily before realizing his error. Max rotor rpm was 345; max N_2 was 7000. □ (H series) Shortly after takeoff, copilot heard popping and whistling sound. Postflight inspection revealed skin had peeled back on underside of main rotor blade. □ (H series) Master caution and hydraulic lights came on during approach. Loss of hydraulics then occurred. Caused by failure of hydraulic line at irreversible valve.

UH-1 aviation-related mishaps □ SM driving M880 truck in hangar ran over UH-1 particle separator. □ Steel-framed maintenance tent was set up on maintenance ramp following field exercise. Strong winds and gusts propelled tent across maintenance ramp to UH-1 parking area. Tent hit and damaged UH-1 chin bubble and then tumbled into another UH-1, damaging tail boom. OH-58 transmission cowling stored in tent was also damaged.

UH-60 Class C mishap □ During runup, 35- to 40-knot winds caused displacement of rotor disc. Three antiflap cam assemblies were broken.

UH-60 Class D mishap □ Crew chief was lying on floor with face over cargo hook access panel, viewing load. Section of trailing rope whipped up and hit crew chief on the left side of his face, cutting his eyelid. Crew chief was not wearing his visor down.

Attack helicopters

AH-1 Class E mishaps □ (S series) Transmission oil bypass light came on during takeoff. Caused by failure of bypass pressure switch. □ (TAH-1S) Rpm audio activated and light came on during takeoff. Caused by failure of

tachometer generator. ☐ (TAH-1S) Aircraft yawed left and right during hover/taxi, and N_1 and N_2 fluctuated. Caused by failure of overspeed generator.

Cargo helicopters

CH-47 Class E mishaps ☐ (B series) Aircraft was hovering with external load. No. 2 engine torque decreased to zero, N_1 decreased to 64 percent, and loud bang was heard. No. 2 engine would not respond to normal trim and would go to only 70 percent N_1 on emergency trim. Caused by failure of engine transmission. ☐ (A series) No. 1 engine oil low light came on, followed by drop in engine oil pressure to zero. Caused by failure of oil filler cap. ☐ (B series) Aircraft was being hovered over gamma goat for pickup. Crew lost sight of load because of extremely dusty conditions. Underside of aircraft hit antenna mount of gamma goat. ☐ (C series) After completing HIT check on No. 1 engine, pilot began moving No. 2 engine condition lever to flight. Crosscheck of instruments revealed No. 2 engine N_1 was decreasing through 55-50 percent and PTIT was increasing past 1,000° C. Caused by failure of engine.

Observation helicopters

OH-58 Class C mishap ☐ (A series) Pilot took off from confined area and entered steep left turn to return for another confined area approach for landing. Main rotor blades hit tree during approach.

OH-58 Class E mishaps ☐ (A series) Pilot felt feedback through cyclic and then noticed hardover from left rear to right front. Master caution, hydraulic, and generator lights came on. Generator failed and hydraulics were lost. Running landing was made. Failure of right cyclic servo resulted in hardover and feedback. ☐ (C series) TOT remained at 450 degrees during shutdown. Caused by failure of TOT gauge. ☐ (A series) During flight, pilot noticed his door was separating at lower hinge. Hinge was broken. Wind gusts of 25 knots during hot refueling operation caused door to blow open and may have broken hinge. ☐ (A series) N_2 fluctuated during hover/taxi. Caused by failure of overspeed governor.

OH-58 aviation-related mishaps ☐ As tug was being backed toward OH-58 at night, tug driver mashed accelerator instead of brake. Tug hit and damaged helicopter. Driver had been on duty 24½ of the last 38 hours. ☐ As aircraft was being ground handled into hangar, horizontal stabilizer hit hangar door. ☐ Aircraft had just received an engine flush, and engine was running. Pilot heard unusual sound and shut down engine. Fairing assembly which had been removed and stored under aircraft for safekeeping had been picked up by gust of wind and blown into tail rotor. ☐ As aircraft was being pushed tail first across a damp area on the runway, nose of aircraft pitched up, forcing tail skid down. Tail skid caught on steel matting used for parking. Tail section of aircraft bent downward and was damaged.

Fixed wing

C-12 Class E mishap ☐ (C series) No. 2 engine was shut down during simulated single-engine emergency procedure. When IP restarted engine, prop would not unfeather. Autofeather solenoid stuck in dump position, preventing oil flow to prop.

U-21 Class E mishaps ☐ (A series) Landing gear would not go up and down without cycling the handle. Caused by failure of landing gear up limit switch. ☐ (A series) Left engine

(continued on back page)

FY 82 Class A Mishap Countdown

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	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	3	1-17 Feb	**3**	**1**
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**18**	**11**

Mishap briefs

was slow to restart after practice shutdown in flight. Caused by failure of igniter plug. ☐ (A series) IP told pilot to perform single-engine go-around from 300 feet agl. Pilot applied maximum controllable power to left engine. Right engine was set at zero thrust. Pilot retracted gear and flaps and found himself fighting extreme control pressures. IP took controls and discovered that left outboard flap section had remained at 50 percent setting while the other three sections had retracted. IP adjusted the three controllable flap sections to match the stuck section and landed. Caused by failure of flap actuator.

Maintenance

UH-1 Class E mishaps ☐ (H series) Crew smelled smoke and landed. Uninstalled battery vent clamp was shorting inverter. ☐ (H series) Master caution and hydraulic lights came on, and controls became stiff. Running landing was made. Transmission oil line had chafed against bottom of hydraulic line, causing hole in hydraulic line and loss of fluid. ☐ (H series) Transmission oil pressure dropped to zero during start, and cockpit filled with smoke. Incorrectly seated quick disconnect coupling caused restricted oil flow and overpressurization of system, which ruptured at oil cooler and filter.

UH-60 Class E mishap ☐ Master caution and No. 2 reservoir low lights came on during takeoff. About a minute later, No. 2 hydraulic pump and No. 2 primary servo lights came on. Hole was chafed in hydraulic return line by a clamp.

AH-1 Class E mishap ☐ (S series) Master caution and engine oil pressure lights came on. Engine oil gravity feed line had uncoupled, allowing loss of oil.

CH-47 Class E mishap ☐ (C series) No. 2 engine transmission oil pressure dropped and caution light came on. Jam nut on engine transmission in-line filter between engine transmission and transmission oil cooler was loose.

OV-1 Class E mishap ☐ (D series) No. 2 engine chip detector light came on during climb. Caused by loose cannon plug.

U-21 Class E mishap ☐ (A series) Loud bang was heard and left main gear light remained on when landing gear was retracted. Tower personnel said all three gear appeared to be down. Aircraft was landed without incident. Caused by incorrect lubrication of worm gear in actuator.

Messages received

• Safety-of-flight maintenance notice concerning proper inspection of flight idle stop cam and washers (AH-1-82-01, 042000Z Feb 82). Message lists procedures to be used to perform inspection.

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. 10, No. 19 □ 24 Feb 1982

Mishap review: CH-47 engine transmission failure

Synopsis

The CH-47C flight engineer saw smoke in the vicinity of the No. 2 engine. The pilot entered autorotation, and the copilot secured the No. 2 engine. On short final, the No. 1 engine fire light came on. The copilot secured the No. 1 engine. The aircraft touched down in a level attitude.

History of flight

The mission was a maintenance support flight. The pilot, copilot, flight engineer, technical observer, and crew chief flew to their destination, spent the night, and accomplished their maintenance tasks. In the middle of the afternoon, they began their return flight home. Late that afternoon, to comply with the unit crew rest policy, they stopped at a municipal airport, where they planned to spend the night at a nearby motel.

After refueling their aircraft, they found that the metal elbow line attachment to the anti-icing valve had broken at the fairing. The broken elbow allowed the line to fall onto the No. 2 engine drive shaft, rubbing a deep groove into the shaft's circumference. The unit was notified and the necessary replacement parts requested. Another CH-47C brought the parts the next day.

The aircraft was repaired, and the pilot, on unit orders as a maintenance test pilot, inspected and signed off the drive shaft replacement. The aircraft then left the airport for the return flight to home base.

After a refueling stop en route, the flight progressed normally at 1,000 feet agl and 130 knots. The longitudinal cyclic speed trim was in the manual mode. The aft speed trim had been slow to program and was not extended far enough in the automatic position. The speed trim was manually programmed just short of a fully extended condition, a position proper for the altitude and airspeed being flown.

About 35 minutes into the flight, the pilot asked if anyone had heard a humming sound. The other crewmembers had not heard anything unusual. Five minutes later, all five crewmembers heard a noise described as a groaning or rubbing sound, followed by a low intensity, high frequency vibration, identified by the crew chief as coming

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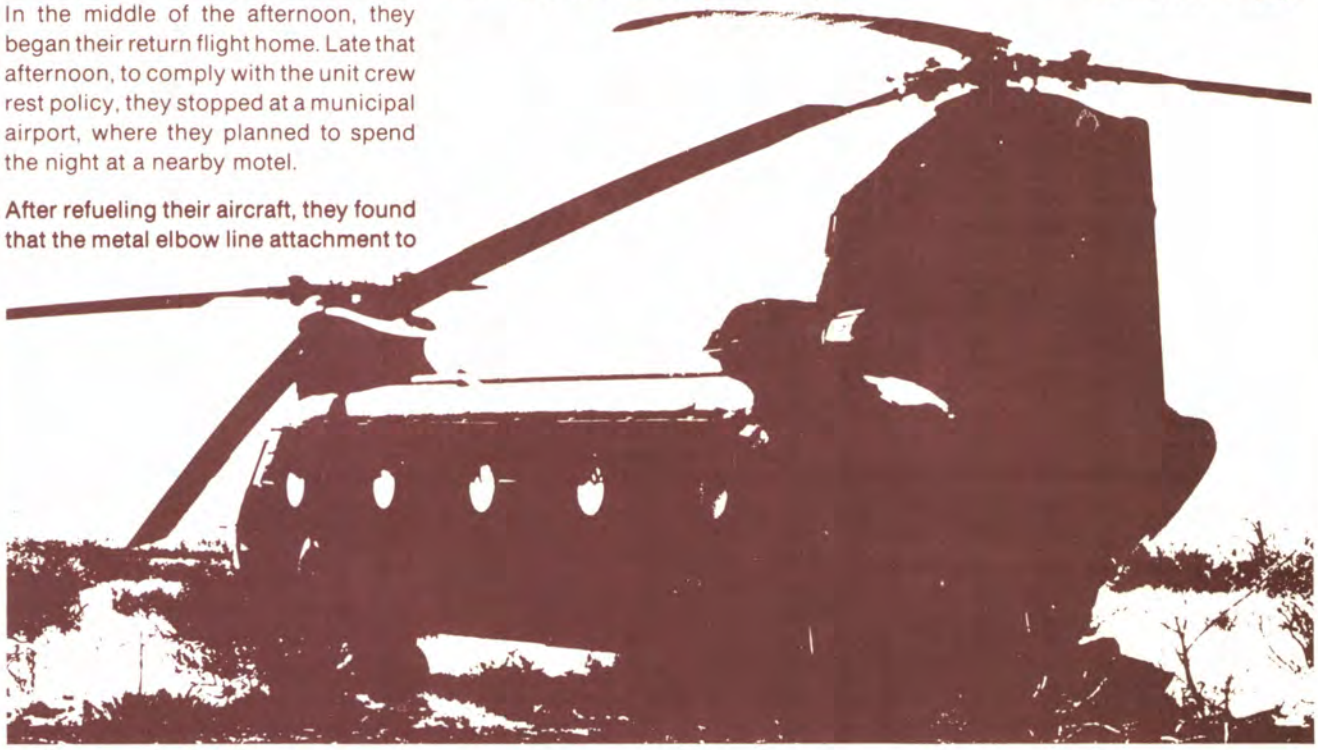

CH-47 engine transmission failure

from the No. 2 engine. When the noise began, the pilot saw a 20 percent split in the engine torque needles but did not note which engine was affected.

The pilot began a descent for landing and made a right turn toward his intended landing site. The crew chief said there was smoke in the ramp area. The flight engineer, looking out of the forward right cabin door, reported smoke and fire coming from the No. 2 engine. The copilot pulled the No. 2 fire handle and rapidly discharged both fire bottles into the engine.

The pilot reduced thrust to full down and began an emergency descent. The copilot told the pilot that rotor rpm was 265. On final approach, it became obvious to the pilot and copilot that they were too fast and would overshoot the landing site, a hilltop clearing. The pilot then turned left across the hill. The copilot, already aware the No. 1 engine had quit, saw the No. 1 engine fire light was on. As the aircraft cleared the hill at an altitude of 15 to 20 feet agl, the pilot saw the rotor rpm decaying. About 10 to 15 feet, the copilot pulled the No. 1 engine fire handle.

The CH-47 touched down, with low rotor rpm, in a level attitude at 35 knots, rolled 441 feet, and came to a stop. All crewmembers exited without injury. Fire in the No. 1 engine, drive shaft cover, and oil cooler area was extinguished by the flight engineer.

Preliminary inspection by the crew revealed no evidence of smoke, fire, or thermal damage to the No. 2 engine. The No. 1 engine transmission exhibited evidence of extreme high temperature and fire damage. The pilot started the auxiliary power unit, as part of his damage assessment. While the power unit was operating, the pilot noticed the wiring in the aft pylon and No. 1 engine transmission area was smoking, and the No. 1 engine and transmission oil hot lights remained on.

Crewmember experience

The 36-year-old pilot had more than 1,800 rotary wing flight hours, with more than 1,500 in CH-47s. The 39-year-old copilot had more than 4,000 rotary wing hours, with almost 2,500 in CH-47s.

Commentary

The No. 1 engine transmission input pinion support roller bearing failed. Portions of the bearing blocked the scavenge line, causing the engine transmission to flood and spew hot oil into the engine and drive shaft cowling. The lack of return oil flow made the debris detection system and temperature sensor ineffective. In the absence of any other indications, the pilot assumed the noise, vibration, and 20 percent split in torque indicated failure of the combining transmission.

The crew misinterpreted a No. 1 engine transmission failure and fire as being a No. 2 engine fire, resulting in the copilot shutting down the unaffected engine. The crew misinterpreted the engine transmission failure because of the following:

- Replacement of the No. 2 engine drive shaft just before the flight and the presence of nicks in the first stage compressor blades on the No. 2 engine resulted in the crew being preconditioned to expect problems with that engine.

- The smoke and fire, which was identified by the flight engineer as coming from the No. 2 engine, was actually being produced by the No. 1 engine transmission and trailing behind the aircraft. Autorotation of the aircraft in an out-of-trim condition helped create the illusion.

- Metal particles blocking the oil scavenge line on the No. 1 engine transmission did not allow the debris detection system to function as designed. Therefore, there were no cockpit indications of the impending drive train failure.

The copilot secured the No. 2 engine, pulled the fire handle, and activated both extinguishers to the No. 2 engine in rapid sequence without telling the pilot. The pilot assumed the combining transmission had failed, but he did not tell the copilot. When the pilot heard someone mention fire, he initiated an emergency descent, contrary to guidance contained in TM 55-1520-227-10-2. The TM states that the proper action for this emergency is a power-on approach and landing without delay. During the autorotation, the pilot allowed the rotor rpm to exceed the maximum limit of 261, requiring replacement of rotor system components.

The cyclic speed trims, being operated in the manual mode, were not retracted by the crew during the autorotation, in accordance with TM 55-1520-227-10-2 and TC 1-139. This contributed to overshooting the original touchdown point, an excessive landing roll, and damage to the aircraft.

The pilot placed the aircraft and crew in jeopardy when he started the auxiliary power unit after the mishap. There was hot oil standing in the combining transmission area, and electrical wiring had been damaged by the heat. While the power unit was running, the wiring began smoking and could have reignited the oil, resulting in an uncontrollable fire. ■

Shortfax

Oil pump FOD

While the UH-1 was in cruise flight at about 500 feet agl, the engine oil pressure and master caution lights came on. The engine oil pressure indicator and the torquemeter gauge both began decreasing to zero. The pilot promptly landed the aircraft.

Inspection revealed the engine oil pump drive shaft had sheared at the headless pin. Pump stoppage and shearing of the drive shaft was caused by a ¼-inch nut lodged in the scavenge section of the pump.

This emergency resulted in a Class E mishap. However, had it occurred over mountainous or wooded terrain, the results could have been far more serious.

As this mishap points out, you must **stay on guard against FOD at all times** when working on or around aircraft. ■

CH-47 engine transmission fairings can cause FOD

A recent CH-47 ground mishap resulted in foreign object damage to the first and second stage compressor sections of the No. 2 engine. The aircraft had been given a 5-minute maintenance operational check for installation of the No. 1 engine. The damage was found during routine inspection of both engines after the MOC. The engine transmission fairing upper panel hinge pin had worked loose and was ingested into the engine.

Research revealed an EIR had been submitted on the engine transmission fairing upper and lower panel hinge pins. A fix was published in TB 43-0001-2-2, Equipment Improvement Report and Maintenance Digest, Rotary Wing Aircraft, 2nd Quarter, CY 79, dated 1 July 1979. Extracts from that TB are below. Next time you have to remove your engine transmission fairings, fix 'em up to prevent FOD to your engines.

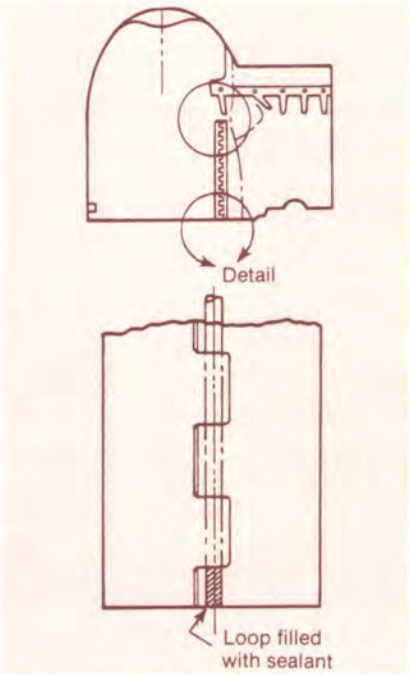

Figure 2-2.—Hinge Pin Sealant Retention

b. Engine Transmission Fairing (CH-47A/B/C, TSARCOM Case No. ZC-04-09-114P5003-85, -105.

(1) Deficiency: The hinge pins for the upper and lower doors on the engine transmission fairing can work loose and cause engine FOD.

(2) Comments. The following procedure is recommended for improving the retention of the hinge pins (figure 2-2):

(a) Remove each hinge pin and shorten it so that it does not enter the end loop at each end of the hinge.

(b) Clean the end loops of the hinge with methyl ethyl ketone or other non-residue solvent.

(c) Install the pin so that it does not enter the end loops.

(d) Fill the end loops with sealant MIL-S-8802. Case closed. ■

Nine 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.

Nine aviators received the Broken Wing Award from October through December 1981.

Broken Wing Award recipients

CW2 Roger A. Boyd II
DOFT, U.S. Army Aviation Center, Fort Rucker

CW3 John P. Dees
U.S. Army Missile Command, Redstone Arsenal, Alabama

CW2 Stephen W. Hickok
DOFT, U.S. Army Aviation Center, Fort Rucker

CW3 John T. Lewis
TRADOC Flight Detachment, Fort Monroe

Major Peter L. Petoskey
A Company, 146th Military Intelligence Battalion, APO San Francisco 96271

CW2 Brandon L. Tolbert
A Company, 501 Aviation Battalion, APO New York 09326

Frederick T. Walker, DAC
102d USARASF, Scott Air Force Base, Illinois

CW3 James E. Winston
DOFT, U.S. Army Aviation Center, Fort Rucker

CW3 Geary W. Younkin
D Troop, 1st Squadron, 10th Cavalry, 4th Infantry Division, Fort Carson

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (V series) Aircraft was on medevac mission. Pilot lost visual contact with ground in blowing dust. Aircraft landed hard. □ (V series) During rescue hoist training with simulated load at 100 feet agl, hoist separated from aircraft. Hoist was destroyed, and roof former of aircraft had to be replaced.

UH-1 Class E mishaps □ (V series) Three banging sounds were heard, aircraft yawed, and engine instruments fluctuated. Caused by failure of gasket. □ (H series) N_2 fluctuated during flight. Caused by malfunction of N_2 tachometer generator. □ (H series) On termination of emergency governor operation, governor would not return to auto mode when switch was moved to auto. Caused by failure of governor solenoid. □ (H series) Pilot noticed unusual lateral vibration during start. Inspection revealed 1 to 1½ pounds of ice inside blade tip cap. Sealant deteriorated and allowed water to accumulate. □ (H series) Pilot was told to pick up a jumper who had missed the drop zone and landed in a field. A high and low recon was made. One set of wires was seen running across the field. During the approach, pilot saw a second set of wires and told copilot to pull power to miss wires. Left skid caught top powerline and broke it. Aircraft landed in drop zone with no damage.

UH-60 Class A mishap □ Pilot landed after unexplained caution lights. Aircraft caught fire in control access area and sustained substantial damage. 8227

UH-60 Class C mishap □ As cargo was being removed from aircraft, someone threw a tent pole away from aircraft. Pole hit main rotor blade.

UH-60 Class E mishap □ Stabilator failed during takeoff. Auto reset button was pressed three times but stabilator was not reset. Caused by failure of stabilator actuator.

Attack helicopters

AH-1 Class A mishap □ Crew chief walked into tail rotor blades as aircraft was being run up for voltage regulator check. 8228

AH-1 Class E mishaps □ (JAH-1S) Pilot was maneuvering aircraft through an established NOE course. During a turn around a tree line, pilot became disoriented and right skid tube hit the ground. Power was applied and control regained. NOE course was snow covered, making altitude estimation extremely difficult, and terrain was sloping. □ (S series) Roll channel SCAS caused immediate left 30-degree bank. Pilot disengaged SCAS. Attempts to reengage SCAS resulted in continuous oscillation. SCAS card was replaced. □ (S series) Pilot was hovering from hover lane to parking pad in tailwind. As pilot was about to touch down on pad, gust of wind blew aircraft forward. When pilot applied power and left pedal to stop forward movement, overtorque occurred.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Pilot decreased airspeed from 100 knots to 80 knots during flight. Forward speed trim indicator did not retract automatically or manually. Caused by malfunction of actuator. □ (C series) No. 1 engine oil pressure gauge indicator went to zero. Caused by failure of transmitter. □ (C series) Smoke filled cockpit after aircraft was landed. Searchlight motor shorted out.

Observation helicopters

OH-8 Class C mishap □ Tail stinger hit ground during deceleration of autorotation. Tail rotor blades, tail stinger, and horizontal stabilizer were damaged.

(continued on back page)

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	3	1-24 Feb	**4**	**1**
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**19**	**11**

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL36362 □ STACOM 77 □ 24 Feb 1982

Operators Manual and Checklist update

Listed below are the effective dates of the current aircraft operators 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	2, 14 Nov 80	Jul 78	1, 14 Jan 81
204-10/3	OV-1B	9 Mar 79	2, 25 Mar 81	Feb 79	
204-10/4	OV-1C	10 Apr 79	2, 14 Jan 80	Apr 79	
208-10	T-42A	27 Feb 79		Feb 79	
209-10	U-21A	25 Mar 77	5, 6 Oct 80	Feb 77	5, 12 Jun 80
209-10-1	RU-21A/D	28 Feb 77	8, 25 Nov 81	Mar 77	6, 23 Nov 81
213-10	OV-1D/RV-1D	4 Aug 78	5, 9 Apr 81	Nov 78	2, 8 Apr 81
214-10	RU-21B/C	15 Mar 77	9, 30 Nov 81	Apr 77	7, 23 Nov 81
215-10	U-21G	11 Mar 77	6, 23 Nov 81	Apr 77	5, 23 Nov 81
215-10-2	RU-21H(GR-V)	29 Dec 78	4, 27 Nov 81	Dec 78	3, 27 Nov 81
216-10	U-3A/B	11 Dec 78	1, 3 Jul 80	Dec 78	
	C-12A	8 Jan 80		Jan 80	
	C-12C	1 Dec 78		Jan 79	
TO1C-7A-1	C-7A	1 Oct 70	10, 11 Jan 80	Oct 70	13, 11 Jan 80

Rotary Wing TM 55-1520-	Aircraft	Basic Manual	Last Change	Basic Checklist	Last Change
209-10	CH-47A	9 Jan 79	2, 21 Aug 81	Dec 78	1, 2 Feb 79
210-10	UH-1D/H	18 May 79	14, 24 Feb 82	Feb 79	3, 21 Mar 81
214-10	OH-6A	17 Dec 76	10, 13 Aug 81	Dec 76	3, 20 Jun 80
217-10-1	CH-54A	8 Apr 77	2, 1 Oct 80	Mar 77	2, 10 Oct 79
217-10-2	CH-54B	15 Apr 77	2, 10 Oct 79	Mar 77	2, 22 Aug 79
219-10	UH-1B	16 Jan 69	17, 11 Feb 81	Dec 68	8, 11 Apr 79
220-10	UH-1C/M	8 Sep 80	8, 11 May 81	Sep 80	
221-10	AH-1G	18 Mar 80	1, 6 Nov 80	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	9, 30 Oct 81	Nov 79	2, 9 Apr 81
228-10	OH-58A	7 Apr 78	16, 18 Nov 81	Jul 78	7, 26 May 81
233-10	TH-55A	30 Sep 76	2, 14 Jul 78	Oct 76	4, 17 Oct 78
234-10	AH-1S (MOD)	17 Nov 76	12, 4 Apr 81	Nov 76	3, 30 Nov 79
235-10	OH-58C	7 Apr 78	22, 6 Nov 81	Jul 78	9, 29 May 81
236-10	AH-1S (PROD)	11 Jan 80	2, 20 May 80	Jan 80	
237-10	UH-60A	21 May 79	12, 31 Dec 81	Dec 78	9, 17 Aug 81

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

OH-58 Class E mishaps □ (A series) Master caution and generator lights came on. Caused by failure of starter/generator armature shaft. □ (A series) Loud banging noise was heard. Aircraft was landed at airport. Cowling was damaged by oil cooler fan cover. Each pilot assumed the other had removed cover. □ (C series) Flight controls became stiff. Caused by malfunction of magnetic brake. □ (C series) Abnormal vibrations were felt and grinding noise was heard during touchdown. Caused by failure of fuel boost pump.

Fixed wing

C-7 Class E mishaps □ Pilot noticed unknown aileron inputs which moved yoke with intermittent jerking motion. Aileron trim indicator was not moving. Right fuel cap cover was unfastened and raised into airstream. □ Flap lever was raised to retract flaps to zero setting during landing rollout. Flaps stopped at 20-degree position. Caused by failure of gear shaft housing assembly.

U-21 Class E mishaps □ (A series) No. 2 engine oil pressure fluctuated. Prop was feathered and engine secured. Oil was seen around cowling. Inspection revealed dipstick was not seated correctly, allowing oil to siphon. Engine was 8 quarts low. Copilot had checked oil and seated dipstick. Dipstick was facing properly but evidently was not fully seated before latch was flipped to rear. □ (RU-21H) Fuel was seen siphoning from left wing outboard tank during takeoff. Fuel cap was not seated correctly.

Maintenance

AH-1 Class E mishap □ (G series) No. 1 hydraulic and master caution lights came on during autorotation to landing. Loud screeching noise was heard. Running landing was made. Caused by chafed tube.

OH-58 Class E mishaps □ (A series) When aircraft was brought to hover, nose yawed left and right 30 degrees and tail rotor pedals were stiff. Tail rotor pitch change boot was removed and drive shaft cleaned. □ (A series) When engine was started, smoke was seen coming from generator. Caused by incorrect connection of wires to starter. □ (A series) During engine shutdown, pilot rolled throttle off with no engine response. Caused by failure to insert cotter pin in power control linkage assembly when engine was changed.

U-21 Class E mishaps □ (D series) When pilot tried to reduce power to 400 pounds of torque during descent, No. 1 engine would not reduce below 700 pounds of torque and about 92 percent N_1. In-flight troubleshooting could not correct problem. Single-engine landing was made. Rod end bearing on connector rod froze. Bearing race was nicked and scarred, probably from a screwdriver. □ (RU-21D) Gear partially retracted after takeoff. Crew followed emergency procedures, lowered gear, and landed. Landing gear clutch was not adjusted correctly.

Messages received

- Safety-of-flight maintenance mandatory message concerning inspection of all UH-1B/C/D/H/M/V and EH-1H aircraft for defective rigid connecting links for collective and left/right cyclic (UH-1-82-01, 082045Z Feb 82).
- OH-58 information message on power limitations program update (112130Z Feb 82).

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

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Published by the
United States Army Safety Center
Fort Rucker, Alabama 36362

Volume 10
Number 2
7 October 1981

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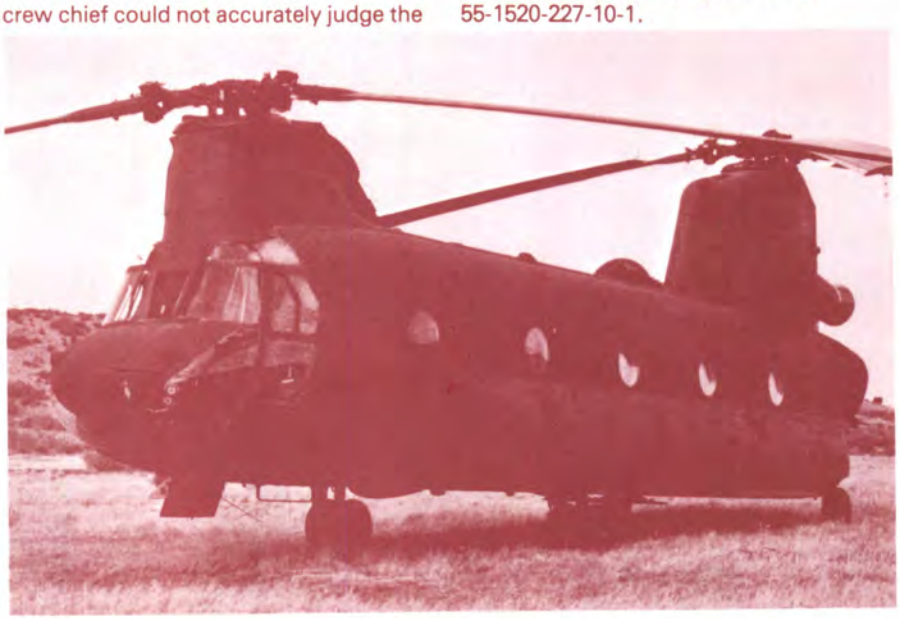
Followups

Additional information on mishap briefs previously published

uh1 **Class B mishap** in 15 Apr 81 issue (8132) ☐ Student pilot applied collective pitch abruptly during instrument takeoff, causing aircraft to roll to right. IP applied corrective control inputs too late, and aircraft continued to roll to right, where it came to rest on its side.

ch47 **Class B mishap** in 8 Apr 81 issue (8131) ☐ Aircraft was flying about 3,000 feet agl and 95 knots when it entered unforecast clear air turbulence and pitched up about 40 degrees. Pilot applied forward cyclic, but aircraft rolled left and pitched down about 80 degrees below the horizon. Two aft rotary wings hit the forward tunnel cover. Control was recovered and aircraft was landed with no further damage.

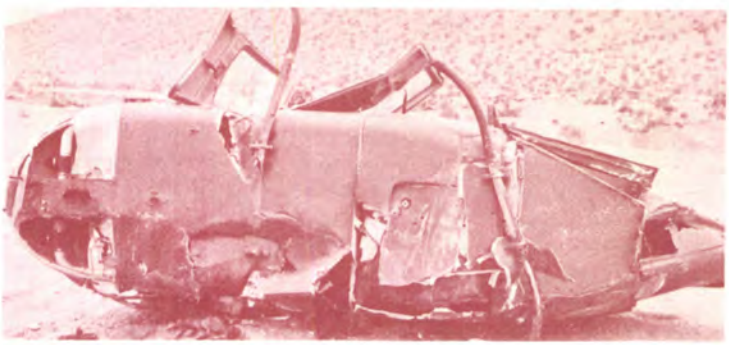
Class B mishap in 20 May 81 issue (8135) ☐ Pilot was ground taxiing to parking position. As he tried to make a 90-degree right turn, aft main rotor system hit a light pole, damaging the three aft rotor blades. Directions and clearance were given by a crew chief outside and forward of the aircraft and a crew chief inside the aircraft. The outside crew chief could not accurately judge the proximity of the pole and the rotor disc from his position and signaled the pilot to turn to the right, assuming he would make a gradual turn. The inside crew chief could not see the aft rotor tip path plane and the top of the pole because of his position in the rear of the aircraft. No blade watcher was positioned outside the aircraft as shown on page 8-11, TM 55-1520-227-10-1.



8131

8132

oh58 **Class A mishap** in 1 Apr 81 issue (8129) ☐ Aircraft was on night training flight at about 55 knots and 40 feet agl when it hit a wire suspended between two hills. Aircraft was destroyed on ground impact and crew chief was killed. Wire was not plotted on the crew's hazard map. Post regulations required an operations and safety briefing be conducted before aviation units were permitted to train at the post. This was not done, and the aviation unit did not know about the wire hazard.



8129

u21 **Class A mishap** in 15 Apr 81 issue (8133) ☐ Pilot was given simulated single-engine failure on final approach. When aircraft reached a position from which a safe landing was questionable due to runway alignment, IP told pilot to go around. Because of position, altitude, airspeed, and landing configuration, the go-around was contradictory to published procedures. Pilot applied maximum power instead of maximum controllable power to the operating engine, resulting in complete loss of control. IP reached for the controls too late to prevent the crash. ■

8135

8133

Selected mishap briefs

uh1 **Class C mishaps** ☐ (H series) Pilot made slow pass over and visually checked intended landing area. Three other aircraft had landed and a fourth was in the process of landing. As approach was initiated, tree limb was pulled into rotor, damaging one main rotor blade. ☐ (H series) Ammunition box cover on M-23 system blew off and passed between vertical fin and tail rotor, damaging one tail rotor blade and 42-degree gearbox cover. ☐ (H series) Tail boom hit stump during landing in confined area. Tail boom former was damaged.

Class E mishaps ☐ (H series) Crew heard whistling noise and landed. Caused by materiel failure of main rotor blade. ☐ (H series) Smoke was seen coming from battery vent during landing. Caused by cell leakage. ☐ (H series) Maintenance manual fell out of aircraft during missed approach. Three manuals had been secured with two seatbelts. Manuals will now be placed in a container and secured under an unoccupied seat. ☐ (V series) Fumes and spray were seen coming from top forward battery vent during flight. Battery contained cellophane cells, 10 of which were unserviceable. ☐ (H series) Transmission oil pressure dropped to zero, and master caution and transmission lights came on. Caused by worn transmission oil quick disconnect line.

ah1 **Class A mishap** ☐ (TH-1S) SP was attempting autorotation with turn. On completion of turn and rollout, SP and IP realized they were low and short of the lane. Power recovery was too late. Aircraft hit powerlines and pole before crashing. 8162

Class C mishaps ☐ (S series) Preflight inspection revealed main rotor pitch change links were bent. Caused by unreported hard landing. ☐ (S series) Aircraft was No. 2 in flight of three on NOE flight. IP saw wires just above his eye level, took controls, and tried to fly under wires. Main rotor blades hit wires and were damaged. Aircraft was landed with no further damage. ☐ (S series) Loud bang was heard and power was lost as aircraft was at 15-foot OGE hover. Aircraft hit the ground hard, causing damage to cross tubes and tail rotor blades.

Class E mishaps ☐ (S series) Collective lever would not move during emergency hydraulic pump check. Main rotor feather bearings were frozen by dust and sand. Sand and dust deflectors were not installed. ☐ (G series) No. 1 hydraulic and master caution lights came on during landing. Caused by failure of hydraulic pressure line.

ch47 **Class E mishaps** ☐ (C series) Crew smelled burning rubber odor during flight. Caused by overheated battery. Two cells had melted. ☐ (B series) No. 1 engine beep stuck intermittently and would not respond to normal or emergency beep. Caused by malfunction of actuator. ☐ (B

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	1-7 Oct	**0**	**0**
	November	5	4	November		
	December	1	1	December		
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**0**	**0**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

series) No. 2 engine fire light came on during runup. Caused by malfunction of fire detector element.

ch54 **Class E mishap** ☐ (B series) As aircraft began moving forward with sling load, aft cable of sling cut into skin of load, severing cable. Part of the load hit the ground, causing aircraft to roll right and yaw left. Crew chief jettisoned load. Aircraft was not damaged, and load was minimally damaged.

oh58 **Class C mishap** ☐ (A series) Pilot picked aircraft up to hover in grass 2 to 3 feet tall. As aircraft touched the ground, pilot noticed large ruts in the ground and decided to reposition aircraft to a more suitable site. As collective was applied, aircraft yawed left, then right. Aircraft hit on left skid twice, then rocked back onto tail skid. Both cross tubes were bent.

Class E mishaps ☐ (A series) Pilot transferred control to copilot and lowered his head to look at instrument approach plate. Instrument hood came off pilot's helmet and left aircraft through right door. Doors were not installed. ☐ (C series) High frequency vibration developed during flight. Caused by failure of hanger bearings.

c7 **Class E mishaps** ☐ No. 2 engine low oil light came on. Caused by cracked intake pin cap. ☐ Mag drop on No. 2 engine was caused by malfunction of high tension leads.

c12 **Class E mishaps** ☐ (C series) Torque would not reduce below 72 on left engine during descent for landing. Caused by failure of fuel control unit. ☐ (A series) TGT fluctuated and then went to zero during climbout. Caused by broken thermal coupling wire on No. 1 engine.

t42 **Class E mishap** ☐ Right auxiliary fuel tank cap began siphoning during takeoff. Fuel filler cap was not seated correctly.

u21 **Class E mishaps** ☐ (F series) No. 2 engine torque fluctuated during flight. Caused by failure of fuel control. ☐ (H series) Oil pressure on right engine began fluctuating, and oil was seen seeping from engine. Oil filler cap was not fully seated, causing oil to siphon.

Maintenance

uh1 **Class E mishap** ☐ (H series) When pilot pulled trigger to start, ignitors popped, but starter did not engage. Caused by loose power terminal on starter relay.

ah1 **Class E mishap** ☐ (G series) Aircraft developed 1:1 vertical vibration during NOE flight. Main rotor grip spacing was incorrect.

ch54 **Class E mishap** ☐ (B series) Transmission oil pressure gauge fluctuated and dropped to zero during touchdown. Caused by loose transmission oil pressure transmitter hose.

u21 **Class E mishap** ☐ (A series) IP noticed fuel vaporizing off trailing edge of right outboard flap. Fuel vent lines were installed backwards and were cross connected.

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

Shortfax

The "buck" stops here

This was a favorite saying of President Harry Truman, who displayed the words on a sign on his desk. These words also apply to Army aviators because they are the last barrier between the mistakes of others and their own safety. The mistakes that others may make in relation to a flight must be recognized and corrected by the pilot-in-command. This includes errors made in a takeoff clearance at strange airfields.

An Army National Guard Huey was given clearance to take off from a ramp west of the active runway as follows:

Guard 123 to fly runway heading and contact approach control on 120.9. Prior coordination with Rapcon from the tower advised of an upcoming Stage III departure of Guard 123. The tower then cleared an Air Force fighter for a closed pattern and cleared Guard 123 for takeoff. The tower issued instructions for Guard 123 to remain west of the runway. Guard 123 acknowledged. The Air Force fighter was cleared for a low approach and advised of helicopter traffic. Guard 123 left the tower frequency after takeoff and contacted Rapcon, advising climbout to 2,000 feet msl. Rapcon queried Guard 123 of desired heading on course. Guard 123 stated 120 degrees cardinal heading. Rapcon cleared Guard 123 right turn on course. Rapcon then coordinated with the tower about Guard 123 heading 120 degrees. Tower advised the Air Force fighter of traffic and restricted the pilot to maintain present altitude (50 feet agl). Rapcon advised Guard 123 of traffic and changed course to 090 degrees to expedite separation. The fighter passed 500 feet behind and 200 feet below Guard 123.

Three factors contributed to this near-midair collision:

1. The tower issued departure clearance to Guard 123 to fly runway heading and contact approach control on 120.9. Correct terminology in accordance with FAA 7110.65B, par. 983A1, Standard Transmission, should have been "Departure frequency will be 120.9." This may have led Guard 123 to misinterpret the authority to leave the tower frequency and contact Rapcon prior to a coordinated handoff.

2. The Airman's Information Manual, par. 324c, states that even though a departure frequency is given in the departure clearance instructions, it is the pilot's responsibility to remain on tower frequency until specifically directed to change frequency.

3. Rapcon cleared Guard 123 right turn on course, which caused the Guard aircraft to turn across the active runway. Rapcon assumed that Guard 123 was taking off from the runway center line.

Back to the business of the pilot being the last barrier between the mistakes of others and his own safety. Yes, the tower used improper terminology. Yes, Rapcon made a false assumption as to the actual position of the aircraft with reference to the active runway. And, yes, the pilot should **not** have changed frequency until directed to do so.

Aviators have come to have blind faith in the radar environment. This is not the safe way to operate. Remember, the pilot-in-command is the final barrier between the mistakes of others and his safety. The "buck" stops with the pilot-in-command. ■

Do something!

You know who's going to have the next accident. You saw him on the flight line last week. You've seen him do stupid things with an aircraft and you know he'll do it again. "He's crazy," you've said over a beer at the club. You know him, but you haven't done anything about him. That's the sad part and that's going to be tough to live with when he buys the farm and takes some other people in with him.

Go see somebody! See the ASO or the IP or the operations officer or your platoon leader or his platoon leader or the commander. Get up on both feet and talk to somebody and keep talking until somebody does something about him. You'll feel better about yourself for it and you may save someone's life. ■

Hazardous load

An Air Force C-5A was recently forced to abort a mission because Army cargo was incorrectly prepared for shipment. Fuel bladders were placed in an Army truck and covered with hoses, baggage, and plywood. The truck was then loaded aboard the C-5A. During climbout, sharp objects punctured the fuel bladders, and one-half gallon of fuel spilled onto the floor of the aircraft. Fortunately, the fuel spill was noticed before a fire started. The C-5A pilot returned to his takeoff point, the truck was taken off, and the cargo compartment floor washed down. The fuel bladders were removed from the truck, the truck was loaded again, and the mission was resumed.

An aircrew and aircraft were unnecessarily placed in a very dangerous situation because the C-5A loadmaster was not told about the fuel bladders hidden from view in the bottom of the truck. All Army personnel in charge of material for air shipment should insure the equipment is correctly packaged. If you are in doubt about any phase of the packaging, ask someone who knows. ■

FOD walks—how to do

"FOD walks" are a flightline tradition. "FOD walks" were done before the advent of jet aircraft. They are called, guess what? "Police up." Now everybody knows they should "police up" during and after a job. But what do we pick up during "FOD walks"? Junk, junk, and more junk. Somebody isn't policing up, are they? Here are some hints on how to do a good "FOD walk" or if you like, "flightline police-up."

DO's and DON'Ts of FOD walking:

- **Do** keep your head down, eyes open.
- **Do** concentrate your vision on the 4 feet or so in front of your toes.
- **Don't** worry about bumping into something or someone—your peripheral vision will keep you out of that sort of trouble.
- **Do** use an FOD bag; otherwise, you could end up losing a portion of what you pick up—especially if there is a great deal of junk in your area.
- **Don't** let that attractive person next to you distract your attention—you will have plenty of time later to admire him or her.
- **Don't** worry about those aircraft landing and taking off as the FOD walk you are doing makes them safer.
- **Don't** watch the feathered birds. I assure you that the chances of one dropping something on your head are infinitestimally small—although there are reported incidents of birds dropping snakes, fish, and other odds and ends down intakes of flying aircraft.

Above all, please maintain a positive attitude, for what you are doing is extremely important. You are helping to prevent expensive foreign object damage. Imagine that each piece of FOD you pick up is worth $50,000 plus, because if it's ingested by an engine, then that is about its actual value. ■

—from **FLIGHT COMMENT**

Submit QDRs

When a materiel failure causes aborted or delayed missions and a PRAM is submitted, a QDR should also be submitted. According to TM 38-750, par. 10-28e, an EIR will include but is not limited to the following: A condition or materiel fault that is a hazard to personnel, equipment, and missions. ■

Takeoffs are optional

Landings are mandatory

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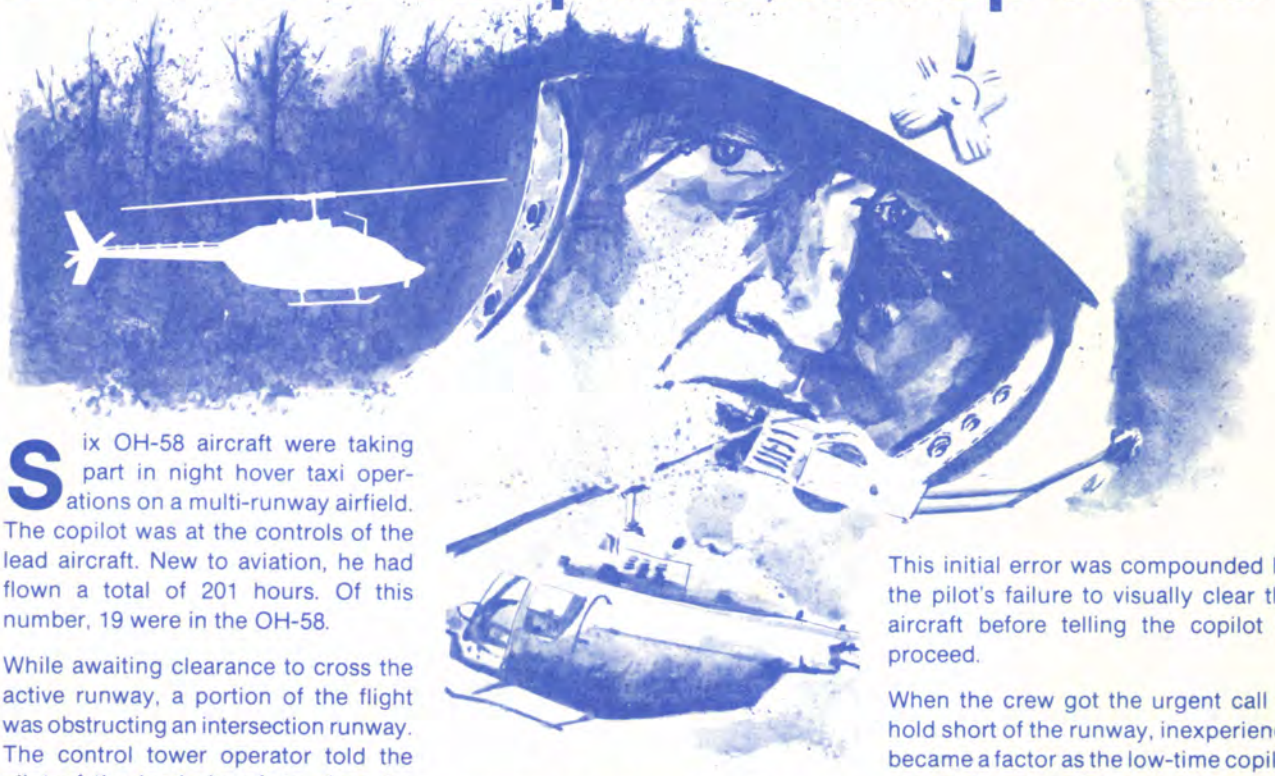
Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 20 □ 3 Mar 1982

Crew error still prime mishap cause



Six OH-58 aircraft were taking part in night hover taxi operations on a multi-runway airfield. The copilot was at the controls of the lead aircraft. New to aviation, he had flown a total of 201 hours. Of this number, 19 were in the OH-58.

While awaiting clearance to cross the active runway, a portion of the flight was obstructing an intersection runway. The control tower operator told the pilot of the lead aircraft to clear the runway the flight was blocking. Since he had seen a commercial aircraft depart the runway as the flight was landing, the pilot thought he was being given clearance to cross the active runway.

Without clearing the aircraft, the pilot told the copilot to hurry across the runway. Neither pilot was aware that a multi-engine fixed wing aircraft was on short final. As the OH-58 hovered forward at an airspeed of around 30 knots about 5 feet off the ground, the tower operator issued a second warning to hold short of the active runway. This warning was repeated by the pilot. The copilot overreacted and promptly placed the aircraft in a severe nose-high attitude of about 45 to 60 degrees in an attempt to halt its forward movement. The main rotor blades hit and severed the tail boom, causing loss of aircraft control.

As the aircraft began to spin, the copilot failed to follow correct emergency procedures for loss of tail rotor thrust. The aircraft landed hard and continued to spin for a short time. Substantial damage resulted.

This mishap clearly shows how a simple human error can spark a series of events that can cause damage to equipment and compromise the safety of the crew. In this case, the pilot's failure to clearly understand the tower operator's directions set the stage for the mishap.

This initial error was compounded by the pilot's failure to visually clear the aircraft before telling the copilot to proceed.

When the crew got the urgent call to hold short of the runway, inexperience became a factor as the low-time copilot placed the aircraft in a severe nose-high attitude in an attempt to stop its forward movement. This resulted in severing of the tail boom and loss of tail rotor thrust. Because of his lack of experience, the copilot did not follow correct emergency procedures and the aircraft hit the ground while spinning uncontrollably.

Although substantial damage resulted, the crew was fortunate. The results could have been far more serious had the OH-58 entered the runway in the path of the landing aircraft. Yet, had the pilot made certain he understood the control tower operator's directions, the mishap would have been avoided. Failing in that, had he not assumed the

(continued on next page)

Crew error

runway was clear, he would have made a visual check and seen the aircraft on short final.

In the way of additional preventive measures, it makes good sense to assign newly qualified pilots with unit trainers or IPs whenever possible. This policy should be followed until low-time pilots have demonstrated their ability to properly perform all required tasks.

While this mishap was initiated by crew error, inexperience played a key role in the damage that resulted. However, in most instances, personnel involved in mishaps generated by crew error are experienced aviators. Following are a few examples.

■ An OH-58 pilot was on a day VFR training mission. About 100 feet agl, he began a right turn, reducing airspeed below effective translational lift. The right turn placed the aircraft in a 16- to 25-knot tailwind condition. Because of the low forward airspeed, the right turn, a high gross weight of 2,961 pounds, and the tailwind, the aircraft began to settle.

To check the descent, the pilot increased his demand for power, exceeding the power available. Main rotor rpm bled off and the aircraft continued to descend. As the tail rotor became ineffective because of the loss of rpm, the aircraft began to spin, completing two turns before hitting the ground. Substantial damage resulted.

In this instance, the pilot performed an inadequate aircraft inspection, failed to prepare a performance planning card, and did not compute a weight and balance form. These deficiencies resulted from overconfidence in his own abilities as well as the capabilities of his aircraft. He had flown the aircraft during the four previous days and was thoroughly familiar with the mission requirements.

When he became airborne, he was not aware of the power available, of the directional control margin, or that the aircraft exceeded maximum allowable gross weight by 26 pounds. As a result, he demanded more power than was available while in a turn at a low altitude and airspeed. The main rotor rpm bled off, tail rotor thrust became ineffective, and the aircraft crashed.

■ Another OH-58 pilot was on a support mission at about 100 feet agl and 80 knots. The doors of the aircraft were removed. Suddenly, the pilot felt a jar and heard a loud noise. The aircraft would not respond to pedal input.

The pilot began a cyclic climb to gain altitude. As airspeed decreased below 60 knots, the aircraft began a right turn. The pilot then closed the throttle and entered autorotation, temporarily checking the right turn as he tried to reach a clearing. When he saw he could not make it to the clear area, he applied collective. The aircraft resumed its spin to the right and the main rotor blades hit a 60-foot pine tree about 20 feet below its top. The transmission failed and the aircraft fell to the ground in a nose-low attitude.

It was later learned that the pilot's flight jacket had blown out of the aircraft into the tail rotor. This caused loss of one blade and subsequent loss of the gearbox.

At present, there is no prescribed method for storing loose personal items aboard the OH-58. This, however, does not relieve the pilot of his responsibility to insure all items in the aircraft are secured—especially when flying with the doors removed.

■ An OH-6A was being returned to its home station following maintenance at a repair facility. About 35 miles from his destination, the pilot saw that the low fuel warning light had come on. He decided to land at a small airport nearby and refuel. When he found that no fuel services were available, he called a local gasoline station and ordered some regular (89 octane) gasoline.

After the fuel was delivered and the aircraft serviced, the pilot resumed flight. En route, he noticed that the TOT was 15 to 25 degrees hotter than normal. Shortly afterwards, the engine flamed out and the pilot autorotated into trees 35 to 40 feet tall.

The flameout resulted from a fuel control vapor lock. The pilot was operating the aircraft with unauthorized fuel. Further, he had not switched on the fuel boost pumps—an action required even when the alternate fuel being used is an authorized one.

■ Another crew error mishap occurred after the pilot of an OH-58 landed in a muddy field to discharge some passengers. The skids sank into the soft mud, and when the pilot tried to pick the aircraft up to a hover, the left skid broke loose from the mud before the right one. The aircraft promptly rolled onto its right side.

■ IPs are also subject to crew error. In the following case, the error was one of judgment. It resulted from the IP's failure to consider the effects of changing lighting conditions.

The IP was performing a standard autorotation in an OH-6. He applied improper flight control action during deceleration. He did this because he misjudged speed, distance, and rate of closure. This caused him to apply collective pitch too high and bleed off main rotor rpm.

This error in judgment was probably caused by the environmental conditions that prevailed. Daylight was rapidly giving way to dusk, causing the IP to improperly correlate the flight conditions as they appeared to him with how they actually were.

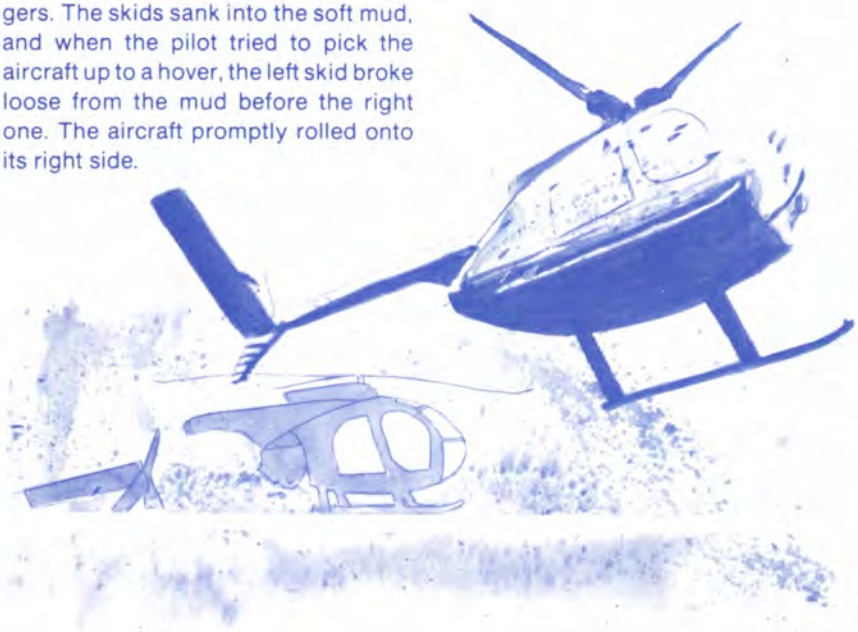
While crew error was involved in all of these mishaps, it was not of the reckless variety. For example, pilots did not do such things as deviate from their flight plans to fly low level over unauthorized areas—an action that has resulted in numerous wire strikes in the past. Instead, the crew errors involved in these mishaps were those associated with carelessness. Some errors were simple oversights. Nevertheless, the mishaps they produced not only cost money but also threatened the safety of the aircraft occupants.

Preventing crew errors, such as those that led to these mishaps, depends, first of all, on realizing that all crewmembers—experienced as well as inexperienced—are subject to human error. This being the case, it makes good sense to take all precautions possible. Toward this end, proper flight planning is essential, including thorough preflight inspections and cockpit and engine operational checks.

Of equal importance is the need to follow established flight procedures. Basically, this means avoiding unnecessary risks—taking no chances. Knowing and observing prescribed procedures is one way of reducing the possibility of error.

Finally, should an emergency arise during flight, the experienced aviator has a definite advantage over the inexperienced one in coping with the problem. So, less experienced pilots should be paired with seasoned aviators until they gain the expertise and confidence they need.

When you consider that crew error plays a key role in about 80 percent of all aircraft mishaps, it's just plain good sense to keep your guard up at all times—in every area related to flight safety. ■



Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) During start, student pilot placed throttle in nearly full open position before engaging starter. As start continued, starter was released at 25 seconds and 40 percent N_2 with egt in normal range. Engine continued to accelerate and reached 6000 rpm N_2 speed before IP took control and rolled off throttle. As engine accelerated rapidly, aircraft yawed 20 degrees right, causing left synchronized elevator to hit windshield of truck. □ (V series) Aircraft landed hard in extremely dusty LZ at night, spreading skids.

UH-1 Class E mishaps □ (H series) Excessive vertical vibration was felt during flight. Caused by separation of skin on underside of rotor blade near tip. □ (H series) Aircraft was on maintenance test flight. While hovering, aircraft assumed extreme nose-low attitude. Test pilot applied 60 pounds of torque to prevent aircraft from hitting ground. □ (H series) Master caution and hydraulic lights came on. Caused by failure of hydraulic pressure switch. □ (H series) Pilot smelled burning odor and saw smoke coming from overhead console. Caused by overheated windshield wiper motor. □ (H series) IP felt unusual stiffness in cyclic during takeoff. Hydraulic valve was blocked.

UH-60 Class C mishap □ Radio compartment door flew open during approach and crashed into front of aircraft, damaging windscreens and windshield wipers.

Attack helicopters

AH-1 Class E mishaps □ (S series) Engine oil pressure went to zero during climbout. Caused by failure of oil pressure transducer. □ (S series) During shutdown, with engine throttle at flight idle, master caution and aft fuel boost pump lights came on. Caused by failure of aft fuel boost pump. □ (TAH-1S) Engine chip detector light came on. Maintenance test pilot checked plug and found no metal. Aircraft was flown to airfield. On final approach, engine failed. Caused by frozen compressor.

Cargo helicopters

CH-47 Class E mishaps □ (A series) On final approach, pilot noticed that torque needles had split. No. 1 torque was indicating 300 pounds and No. 2 was at 600 pounds. Rotor rpm remained at 230. Pilot was unable to match torque with normal engine trim. Suspecting beep failure on No. 1 engine, pilot released No. 1 normal engine trim switch and continued approach using emergency engine trim. After landing, No. 2 torque would not respond to normal or emergency engine trim, so condition lever was brought to ground. No. 2 engine chip detector light came on. Engine was shut down and aircraft was taxied to parking ramp. During engine shutdown, No. 1 normal engine trim was engaged and responded properly. Ball bearing from torquemeter drive roller assembly was found on No. 2 engine chip detector. □ (C series) As ramp was being raised before flight, ramp tongue disengaged from ramp. Caused by broken release assembly. □ (A series) Grinding noise was heard in vicinity of forward transmission during shutdown. Rotors stopped when engine condition levers were moved from ground to stop. Caused by failure of forward transmission.

Observation helicopters

OH-58 Class A mishap □ (A series) Aircraft picked up passengers from field site. After taking off, aircraft was seen to circle field site and then crash. Four injuries. 8229

(continued on back page)

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	3	February	**4**	**1**
	March	4	1	1-3 Mar	**0**	**0**
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**19**	**11**

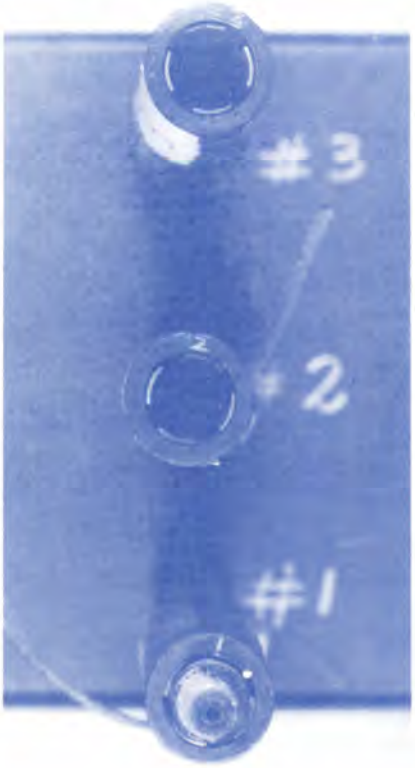
Shortfax

Signal kit followup

FLIGHTFAX, Vol. 10, No. 14, identified a problem with L119 signal kits. Excessive pressure is sometimes required to insert the flare in the OL 4891050 launcher. The accompanying photo shows one of three L119 flares which when test fired was held so tightly by the collets that it did not leave the launcher. Large quantities of propellant escaped through the firing mechanism slot. It is also possible for the flare round to explode and injure the user.

The force required to insert the flare should be no more than enough to keep the round in the launcher. All OL 4891050 launchers should be checked to determine the amount of force necessary to insert the flare. Those requiring excessive force should be discarded. ■

—thanks to ASO, 3d ACR, Fort Bliss.



Visor track assembly for SPH-4 helmet

A problem has arisen concerning the use of the visor track assembly for the SPH-4 helmet. It seems that when the lens [visor] is in a full down position, and the pilot tries to move the lens to the full up position, the lens tends to bind in the track. When additional force is applied to the lens, it jumps out of the track, leaving the pilot blank faced and lensless.

Should you experience such a problem, replace the visor track assembly, NSN 8415-01-083-8372, with the original track assemblies, NSN 8415-00-410-4668 (right hand track) and NSN 8415-00-410-4669 (left hand track). If the replacement tracks aren't available, continue using NSN 8415-01-083-8372 until the replacement tracks are made available. ■

—from USATSARCOM Information Bulletin

Water purification tablets

The following lot numbers of water purification tablets are unsuitable for issue and use. These tablets should be destroyed.

Lot No.	Mfd Date
264	Jun 66
2007-628	Mar 73
2007-647	Apr 73
2007-648	Apr 73
4641-397	Sep 68

The following water purification tablets have been tested and found suitable for issue and use providing the units have a good wax closure and show no signs of physical deterioration.

Lot No.	Retest Date
1311-694	Jan 84
1311-699	Jan 84
1311-713	Jan 84
1311-717	Jan 84
1311-725	Jan 84

M-151 jeep hazard

According to a message from the Air Force, two flight mishaps were recently reported involving sparks and smoke coming from the batteries of M-151 jeeps airlifted during a joint training exercise. One incident required the aircrew to evacuate the aircraft during taxi for takeoff because of severe arcing and smoke in the cargo compartment resulting from a short caused by a crossover battery cable installed backwards. In the other incident, a missing battery cover caused a short during landing. The crew was forced to discharge three extinguishers to contain the smoldering battery.

A random check of both Army and Air Force M-151 jeeps involved in the exercise showed evidence of similar arcing. These extremely hazardous conditions which could result in serious vehicle fires and/or ignition of explosive vapors in flight are being investigated in both Air Force and Army channels.

Until a materiel fix can be implemented, extreme caution must be used in the movement of M-151 jeeps. Thorough inspection of the battery compartments and cables must be made on all joint airlift inspections. Jeeps with hazardous battery compartment deficiencies which cannot be corrected should not be accepted for air shipment. ■

Mishap briefs

OH-58 Class E mishaps □ (A series) Crew chief saw steady stream of fuel flowing from engine deck drain line onto mooring pad during runup. Caused by failure of fuel pump packing. □ (A series) Master caution and fuel boost pump lights came on. Caused by failure of fuel pump assembly. □ (A series) Aircraft was being test flown for engine replacement and adjustment of autorotation rpm. During previous flight, engine did not pass turbine engine analysis check (TEAC) with all power perimeters too low. Max N_1 adjustment screw was turned one full turn clockwise to increase power. On mishap flight, engine passed TEAC and pilot proceeded to check autorotation rpm. On completion of rpm check, engine would not develop full power. Pilot completed rotation to open field. Engine power returned after landing. During autorotation, pilot checked several times to insure throttle was full power.

Fixed wing

C-7 Class E mishaps □ Loud bang was heard during taxi, and control of nose wheel steering was lost. Caused by failure of hydraulic hose. □ No. 1 engine vibrated and loud bang was heard. Caused by failure of carburetor air door assembly and valve assembly.

C-12 Class E mishaps □ (A series) No. 1 engine would not develop full power during start. Caused by malfunction of fuel control. □ (A series) Aircraft began to depressurize during climb. Caused by malfunction of pressurization controller.

OV-1 Class E mishaps □ (D series) No. 2 engine chip detector light came on, followed by two compressor stalls. Oil analysis revealed high iron content in No. 2 engine oil system. □ (RV-1D) Fuel strainer light came on. Caused by water in fuel.

Maintenance

UH-1 Class E mishap □ (H series) When power was increased by 3 to 5 psi torque, N_2 decreased 150 to 200 rpm. Droop compensator was out of rig.

UH-60 Class E mishap □ When pilot tried to ground taxi, left main gear brake locked. Mechanic did not bleed complete brake system. System was bled only as far as the mixing valve, allowing air in system.

Messages received

- OH-58 information message concerning tail rotor drive shaft cover (121800Z Feb 82).

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

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Mishap review: U-21 training flight

Synopsis

During single-engine operations, the U-21D IP told the pilot to make a go-around. The pilot applied full power to the No. 2 engine. The aircraft pitched nose up and banked 90 degrees to the left in an uncontrollable, descending left turn. The left wing hit the ground and the aircraft cartwheeled. A postcrash fire occurred.

History of flight

The mission was an authorized refresher training flight for the pilot in preparation for a currency checkride in the U-21. During the preflight planning, the crew received a request to transport two passengers to an Air Force base, pick up some equipment, and return to the airfield. The flight was uneventful. On the return flight to the airfield, the IP shut down the No. 1 engine to practice an in-flight engine restart. The engine was restarted with no problems.

When the crew landed at the airfield, they were asked to go back to the Air Force base to deliver some supplies. This was accomplished. On the return flight to the airfield, the IP requested an ILS approach at an airport. About 400 feet agl, after the pilot had completed his turn to final, the IP reduced the No. 1 engine power lever to engine idle and told the pilot he had a simulated engine failure. As the pilot continued the approach, the aircraft drifted left of the runway, and the IP told the pilot to go around. About 75 feet agl and 85 knots, the pilot applied maximum power to the No. 2 engine and tried to go around. The U-21 pitched nose up and banked 90 degrees to the left, out of control. The left wing tip hit the ground and the aircraft cartwheeled 48½ feet, where the left propeller and nacelle hit the ground. The aircraft came to rest in an upright position.

The instrument panel was forced rearward, pinning the IP and pilot in their seats. A postcrash fire hampered the rescue attempt. After the fire was extinguished, a hydraulic mechanism was used to displace the instrument panel and free the crewmembers. About 35 minutes elapsed before the rescue attempt was completed. The pilot and IP sustained major injuries.

(continued on next page)

U-21 training flight

Crewmember experience

The 32-year-old IP had almost 1,000 fixed wing flight hours, with more than 500 in the U-21. The 40-year-old pilot had more than 500 fixed wing hours, with more than 40 in the U-21.

Commentary

After the IP reduced the No. 1 engine to flight idle, the pilot was late in applying corrective action for the simulated engine failure. The aircraft was allowed to slow and drift left of the runway. When the aircraft reached a position from which a safe landing was questionable, due to runway alignment, the IP told the pilot to go around. Because of position, altitude, airspeed, and landing configuration, the attempt to make a single-engine go-around was contrary to published procedures.

When the pilot was told to make a go-around, he applied maximum power to the operating engine, instead of applying maximum controllable power. The U-21 responded to the excessive power by slipping, turning, rolling left, and pitching nose up. The aircraft's response resulted from a combination of low airspeed, high drag caused by gear and flaps extended, a windmilling propeller (No. 1 engine), level wings, and maximum power on the right engine.

The IP was not prepared for the action that resulted when he improperly directed the pilot to go around. As the aircraft entered a steep left turn, the IP reached for the controls, but not in time to keep the aircraft from crashing.

The company commander allowed the IP to continue performing required IP duties after he failed a no-notice evaluation flight in a similar type aircraft. He did not require the IP to complete additional training recommended by the SIP, and he did not monitor the IP's reevaluation checkride given by a unit IP. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) As aircraft was hovering between parked aircraft on maintenance ramp, main rotor blades hit tied-down rotor blade of parked UH-1. Rotor system and transmission separated from aircraft and aircraft landed hard, spreading skids. Main rotor blade and drive train of parked UH-1 were damaged. Two other parked UH-1s were slightly damaged. 8230

UH-1 Class C mishaps □ (H series) Pilot of No. 4 aircraft in flight of five lost visual contact with the ground on final to LZ. Because of the close proximity of the other aircraft in the flight, IP took control and continued approach. Aircraft landed hard. Blowing dust resulted in brown-out condition. □ (H series) Slingload began to oscillate during climbout. Copilot tried to stop oscillations by using cyclic inputs. Pilot realized copilot was overcontrolling with cyclic and immediately took control. Pilot lowered collective and placed aircraft in descending right turn. Oscillation stopped and mission was continued. Postflight inspection revealed damage to fuselage.

UH-1 Class E mishaps □ (V series) High performance hoist fell inboard from top male hold-down point, landing on crew chief but not hurting him. Quick disconnect adapter failed in connection with plunger. □ (H series) Pilot became spatially disoriented during takeoff in whiteout conditions and pulled an excessive amount of collective to fly into the clear. Torquemeter registered 62 psi. □ (H series) Master caution and engine fuel pump lights came on. Caused by failure of engine fuel pressure switch. □ (H series) Engine compressor stall occurred during flight. Caused by dirty bleed band actuator. □ (H series) Whining sound was heard, followed by inverter light and smoke in cockpit. Caused by failure of main inverter.

UH-60 Class B mishap □ Aircraft preparing for night formation takeoff drifted backward, striking tail wheel and tearing it off. Stabilator and aft pylon were also damaged. 8231

UH-60 Class C mishap □ Loud noise was heard during flight. Postflight inspection revealed left engine fairing/work platform had blown open and was destroyed. Crew chief did not secure fairing/work platform after preflight, and pilot did not insure all covers and fairings were secured.

UH-60 Class E mishaps □ Engine rpm fluctuated. Caused by failure of No. 1 engine ECU. □ During loading operation, crew chief noticed excessive oil on side of aircraft. No. 2 engine was 3½ quarts low. Caused by defective oil relief valve O-ring.

Attack helicopters

AH-1 Class E mishaps □ (S series) Engine fuel pump light came on during engine runup, followed by engine failure. Caused by engine-driven fuel pump failure. □ (S series) No. 2 hydraulic light came on. Caused by malfunction of hydraulic pressure switch. □ (S series) While hovering in refueling point, aircraft hit dead tree stump hidden by vegetation. Cross tube cover was torn and dented.

Cargo helicopters

CH-47 Class C mishaps □ (C series) Slingload consisting of water trailer and A22 bag fell from aircraft and was destroyed. Slings rated at 6,000 pounds broke with approximately 4,600 pounds suspended on them. □ (C series) Master caution and No. 2 engine chip detector lights came on. Inspection of transmission chip detector revealed fine metal particles mixed with sludge. Tech inspector checked aircraft, and decision was made to clean chip detector, start No. 2 engine first, and then start No. 1 engine. Checklist was continued to the point of the copilot checking engine beep trim switch. Crew then heard sound similar to an air leak. Engine oil pressure gauge rose to just below red line for about 5 seconds, then dropped to 50 psi. Pilots immediately shut down No. 2 engine. While engine was coasting down, crew chief saw oil coming from engine and told crew to shut down No. 1 engine. Inspection of No. 2 engine area revealed engine transmission was cracked. Part of transmission case entered engine inlet, damaging inlet guide vane, first-stage compressor blades, and engine drive shaft.

CH-47 Class E mishap □ (B series) Transmission oil pressure would only come up to 8 psi during runup. Caused by failure of oil pressure indicator.

CH-54 Class E mishap □ (A series) Crew chief saw oil coming from top of aircraft during hover. Caused by ruptured hoist line.

Observation helicopters

OH-58 Class E mishaps □ (A series) Engine oil bypass light came on during landing. Oil tank cap was not seated correctly, causing oil to seep around cap. □ (A series) Collective binding occurred during autorotation. Caused by malfunction of collective servo. □ (A series) N_1 and N_2 fluctuated during takeoff. Caused by failure of double check valve.

Fixed wing

C-12 Class C mishap □ (D series) While holding short of runway, awaiting clearance, crew heard explosion in nose area, felt vibrations, and saw cloud of smoke coming from nose section.

Air conditioner condenser had exploded. Condenser air vent was damaged.

C-12 Class E mishap □ (A series) While flying in IMC at night, with OAT of -16° C., pilot was told to descend to 10,000 feet. To initiate descent, pilot used pitch control thumbwheel to lower the nose 2 degrees. AP trim fair warning annunciator illuminated, autopilot disconnected, and controls became free except for elevator, which was immobile. Pilot pressed AP/YD release button on outboard horn of his control wheel to clear AP trim fail warning annunciator and to disengage what appeared to be an autopilot hold on elevator. Elevator remained immobile. Pilot and copilot discussed the problem and then tried all available means to insure disconnect of autopilot. Substantial physical force by pilot and copilot fore and aft against control wheels was unsuccessful and elevator remained immobile. Crew then decided to descend and experiment with pitch controllability using power changes and manual control of elevator trim with handwheel on left side of pedestal. Sufficient control was available for limited pitch changes, allowing descent and level-off at 10,000 feet. Crew decided to attempt ILS, using no-flap approach to avoid pitch changes caused by flap extension and facilitate go-around should one be necessary because of marginal weather. To insure that roundout could be successfully completed at end of approach, crew decided that pilot would reduce power to idle while rolling trim wheel aft for nose-up trim, and copilot would simultaneously lower flaps to approach position to help reduce rate of descent and raise nose before touchdown. Clearance was given for ILS approach. Roundout was successful using the steps previously coordinated by the crew. After aircraft landed, elevator control became free. Inspection of closed cable bellcrank systems did not reveal exact cause of malfunction, although a piece of ice 2 inches wide, 6 inches long, and almost 1 inch thick fell from aft access compartment . More than one-quarter inch of water was found below elevator control horn when top center cover plates were removed. Aircraft had flown 8 hours of the preceding 35-hour period in steady rain, freezing temperatures, and occasional light rime ice.

T-42 Class E mishaps □ Aircraft was in IMC at 5,000 feet when it vibrated severely. It then yawed and loud bang was heard. IP feathered No. 1 prop and followed engine clean-up procedures. Aircraft was landed at airport. Postflight inspection revealed counterweight had separated from No. 1 prop. □ During preflight, pilot told maintenance personnel to inspect left main tire because of smooth condition of tire. Tire was determined to be serviceable. Tire blew out on seventh landing, possibly due to excessive braking.

U-21 Class C mishap □ (RU-21A) Pilot, using ground guide, was taxiing about 75 feet from hangar. When aircraft was turned 45 degrees to right, propwash entered hangar, knocking over right rear door of helicopter, breaking plexiglass in door.

U-21 Class E mishap □ (A series) Left fuel boost pressure fluctuated. Circuit breaker opened and would not reset. Caused by failure of fuel boost pump.

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**4**	**2**
	March	4	1	1-10 Mar	**2**	**2**
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**21**	**14**

Maintenance

UH-1 Class E mishaps □ (H series) Engine rpm dropped when power was applied to gain altitude. Rpm increased when power was reduced. Droop cam compensator was out of adjustment. □ (H series) Master caution and chip detector lights came on during engine

(continued on back page)

Shortfax

FOD awareness program

Preventing foreign object damage (FOD) can save millions of dollars. A recent industry study conducted by the Air Transport Association of America indicates that FOD cost its member airlines over $30 million in a single year.

"Foreign object damage can be cured, or at least the number of cases can be greatly reduced," according to Milton Ellyson, Republic's director of airport requirements. Ellyson is coordinator of the company's FOD prevention program. "If bits and pieces of plastic, metal, wire or any object found lying on airport ramp areas across the country are picked up before they are ingested in aircraft engines, millions of dollars can be saved," Ellyson says.

In 1980, Republic mechanics repaired 21 jet engines with foreign object damage at a cost of $220,500. One recent FOD case at Minneapolis/St. Paul caused the removal and repair of an engine and resulted in an $11,290 repair job. The culprit was a piece of metal, later determined to be a nut and bolt assembly about 3 to 4 inches long when ingested that had been reduced to less than an inch long when removed from the engine. Cost to repair that one engine consumed the revenue of a jet aircraft filled with passengers on a flight from the Twin Cities to Chicago.

Today's jet engines are efficient, rugged, dependable, and worthy. They can lift an aircraft, weighing tons, and propel it at hundreds-of-miles-an-hour speeds. But it is the little things that give a turbine engine a bad case of the fits. To create the enormous thrust needed to move an aircraft through the sky, the turbine jet blades must push tons of air through the back end every minute. The engine was not designed to be a vacuum cleaner, however. The foreign objects causing the problem are lying on the ground on airport ramps, taxiways, runways, and maintenance areas. These objects can easily become embedded in aircraft tires. The objects often shake loose on takeoff, bounce around, and are pulled into an engine.

Republic's FOD awareness program is still in effect. Other operators should follow suit. "FOD is a revenue loss," Ellyson says. "It's also a waste of people, planes, and time. Whenever your business takes you to a ramp or taxi area, keep your eyes open for objects lying around on the surface. When you see a potential hazard, don't pass it up, pick it up. It's everyone's concern. You might save the company the cost of repairing an engine, and every dollar counts—as you are well aware. ■

—from Aviation Mechanics Bulletin

CS agent exposure guidelines

We have received many inquiries from the field regarding the length of time an aviator is grounded after being exposed to CS agent. The "rule-of-thumb," at least for the present, is that an aviator may return to duty as soon as he is without symptoms. The symptoms include, but are not limited to, coughing, sneezing, profuse nasal discharge, labored breathing, burning and watering eyes, continuous blinking, burning of the skin, nausea, and vomiting. Aviators should launder the clothing that was worn at the time of exposure and take a thorough shower to remove all residue. NBC protective clothing should be laundered in accordance with TM 10-277, paragraphs 2-2c, 2-3f, and 2-4f.

As a final precaution, an aviator exposed to CS gas should see his flight surgeon for a professional opinion as to whether or not he is physically fit for flying duties. ■

Aircraft fire extinguishers

The type of fire extinguisher shown here is still installed in many Army aircraft. This fire extinguisher has a metal spacer beneath the operating handle. The spacer is held in place by the operating handle locking pin and is secured by a chain to the "D" ring used to pull the locking pin. It is possible to pull the safety pin and not be able to actuate the extinguisher because of the spacer remaining under the operating handle. This can happen if the person trying to use the extinguisher maintains pressure on the operating handle when pulling the pin. Unless the pressure is released and the pin and "D" ring are pulled out at exactly the proper angle, the spacer will hang up, and the extinguisher will be inoperative. ■

—thanks to P.V. Sturges, Jr., Army Aviation Maintenance Shop, Florida ARNG

Mishap briefs

runup. Ninety-degree gearbox oil had been changed immediately before mission. Wire was loosened during reinstallation of chip detector plug, causing faulty electrical connection. ☐ (H series) After landing from a hover, with engine at flight idle, pilot placed hydraulic switch in off position for further hydraulic checks. Hydraulic pump became extremely noisy. Hydraulic switch was then turned on but controls stiffened and hydraulics failed. Hydraulic line was positioned incorrectly, causing it to chafe against left cyclic control tube. ☐ (H series) Crew chief was warming the aircraft with a Herman Nelson heater after pilot had completed preflight inspection. Crew chief had tied windshield cover around mixing levers to hold the heat blown in the transmission area. The procedure was a standard unwritten policy in the platoon. Crew chief was then called away from the aircraft to prepare another aircraft for an alert. During his absence, another crew chief removed the heater. When the first crew chief returned, he assumed the other crew chief had completed his duties. Windshield cover was not visible from the ground because it apparently had been blown loose by the wind or a hovering aircraft and had fallen into transmission area. During forced trim check, crew heard noise. Pieces of cloth cover were ejected from transmission area.

UH-60 Class E mishaps ☐ Stabilator failed preflight test. Stabilator amplifier had been replaced and adjusted with a unit that was out of calibration. ☐ Low rotor audio sounded during descent. Wire from rotor rpm sensor was chafed under wire bundle clamp.

AH-1 Class E mishaps ☐ (S series) Master caution, transmission oil pressure, and transmission oil bypass lights came on during landing. Attaching bolts for internal transmission filter were incorrectly torqued, allowing O-ring to displace and causing excessive fluid loss. ☐ (S series) Crew smelled fuel odor when ECU was turned on. Packing between filler port and fuel cell was installed incorrectly. Packing was pinched at the bottom, causing leak. ☐ (S series) Master caution, transmission oil pressure, and transmission bypass lights came on. Caused by incorrectly installed O-ring.

CH-47 Class E mishap ☐ (C series) No. 2 engine transmission hot light came on. Electrical short was caused by chafing of electrical wire on engine transmission.

OH-58 Class E mishaps ☐ (A series) Binding was felt in cyclic control during hover. Incorrect thrust washers and washer stack were installed on intermixing bellcrank. ☐ (A series) Fuel filter and master caution lights came on during shutdown. Pressure switch was loose.

Messages received

• Safety-of-flight message concerning one-time inspection of servo extension tubes (AH-1-82-2, 262115Z Feb 82). Summary: Some AH-1s were released with hydraulic servo extension tubes having improper or no internal corrosion prevention treatment. Only 165 control tubes are affected. Inspection is required to locate and purge defective tubes from the inventory. Contact: John Morris or Jim Simon, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

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

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 22 □ 17 Mar 1982

Mishap review: spatial disorientation

Synopsis

The UH-1H was the No. 2 aircraft in a formation of nine aircraft on a night terrain flight support/training mission. About 5 minutes after takeoff, the Huey entered a descending left turn from about 100 feet agl. The aircraft crashed and the three crewmembers were killed.

History of flight

The mission required nine Hueys in support of troops engaged in field training exercises. The aircraft were to pick up the troops, fly them to a landing zone, and return to the airfield. The crews were told they would be flying nap-of-the-earth.

The air mission commander filed a flight plan but did not get a weather briefing. The flight then left the airfield. The crew of the No. 2 aircraft had been assigned the task of contacting the ground unit on FM while en route. The IP, who was in the left seat, was heard several times trying to contact the unit. He was unsuccessful.

The flight left the military reservation, and the No. 2 aircraft was seen to bobble and rock slightly. After passing a village, the lead aircraft pulled away from No. 2. No. 2 was seen to speed up, slow down, and again bobble and yaw slightly before entering a descending left turn. The turn appeared standard at first, but angle of bank, nose-low attitude, and airspeed continued to increase. After traveling about 1,500 feet horizontally following initiation of the turn and about 150 to 200 feet vertically because of the sloping terrain, the helicopter crashed and was destroyed. The pilot, IP, and crew chief were killed.

Crewmember experience

The 33-year-old IP had more than 1,000 rotary wing flight hours. More than 950 of these were in UH-1Hs. The 27-year-old pilot had more than 350 rotary wing hours, with almost 300 in UH-1Hs.

Commentary

The flight took off in weather conditions below that required for night VFR. As a result of the .6 nautical mile visibility, the pilot of the No. 2 aircraft unexpectedly lost sight of the lead aircraft. The pilot, flying with an inoperative and possibly fluctuating attitude indicator, inadvertently placed the aircraft in a descending left turn after becoming spatially disoriented at an estimated airspeed of 40 knots and 100 feet agl over unfamiliar snow-covered terrain. Ambient light was minimal and the aircraft had just cleared a well lighted village, resulting in a loss of night vision.

The pilot was on his second flight following a 45-day grounding and had done no instrument work since graduating from flight school 8 months earlier. The only weather time in his records was 2 hours as copilot during flight school. This left the pilot ill prepared to cope with the loss of outside references.

The IP had been on duty at least 35 of the last 48 hours and was heard to complain of fatigue. He was preoccupied with unsuccessful attempts to make radio contact with the ground unit. This distraction and the fatigue factor may have prevented the IP from detecting the descending left turn in time to prevent ground impact.

The unit regulation required that maximum duty time not exceed 27 hours in a 48-hour period. Other qualified aviators were available for the mission.

The unit commander may have been overconfident in the ability of the air mission commander to plan and perform the mission. He did not monitor the air mission commander's activities to insure that required mission and preflight planning tasks were performed. He permitted and participated in a night formation terrain flight for which a current weather briefing had not been obtained. ■

Shortfax

Beware of good enough

Over 20 years ago my dad gave me the following poem that he clipped out of his company's sales magazine. It sort of set a standard for me that has assisted me through 7 years of active duty and 13 years in the Reserves, of which the last 9 have been in the same squadron. When I was younger, the term "good enough" meant that it was just a little past the unacceptable; and now, whenever I preflight or hear that sound that doesn't sound quite right, "good enough" means perfect or as close to it as possible. For all you "younger" aviators out there, please read this poem twice—the life you save may be your own. The author is unknown.

My friend, beware of "good enough."
It isn't made of sterling stuff.
It's something any man can do;
It marks the many from the few.
It has no merit to the eye;
It's something any one can buy.
Its name is but a sham and bluff,
For it is never "good enough."

With "good enough" the shirkers stop
In every factory and shop.
With "good enough" the failures rest
And lose to those who give their best.
With "good enough" the plane breaks down
And we fall short of high renown,
My friend, remember, and be wise,
In "good enough" disaster lies.

With "good enough" have ships been wrecked,
The forward march of armies checked.
Great buildings burned and fortunes lost,
How can the world compute the cost?
In life and money it has paid
Because at "good enough" we stayed.
Who stops at "good enough" shall find
Success has left them far behind.
There is no "good enough" that's short
Of what you can do and you ought.
The flaw which may escape the eye
And temporarily get by
Shall weaken underneath the strain
And wreck the ship or car or plane.
For this is true; you should not bluff. . .
Only the best is "good enough."

Anon

—from APPROACH
CDR Lawrence E. Gemma
HS-74

Do something!

You know who's going to have the next accident. You saw him on the flight line last week. You've seen him do stupid things with an aircraft and you know he'll do it again. "He's crazy," you've said over a beer at the club. You know him, but you haven't done anything about him. That's the sad part and that's going to be tough to live with when he buys the farm and takes some other people in with him.

Go see somebody! See the ASO or the IP or the operations officer or your platoon leader or his platoon leader or the commander. Get up on both feet and talk to somebody and keep talking until somebody does something about him. You'll feel better about yourself for it and you may save someone's life. ■

New directions on lensatic compasses

Lost and bewildered when it comes to compasses? Here's some information for your guidance and protection.

Lensatic compasses manufactured before 1962 contain radium. Radium has some hazardous aspects, so compasses manufactured after 1962 used tritium, a less hazardous material. The old radium compasses were recalled in 1969, but some of them are still in the field.

If your unit has any of these old radium lensatic compasses, **dispose of them immediately.** Use AR 385-11 for directions.

It's simple to identify these old compasses. The old compasses will either **not** be marked with an NSN or, if they do have an NSN, it will not be one of the following: 6605-00-846-7618 or 6605-00-151-5337.

If you are still uncertain, use a gamma radiation survey meter (AN)PDR-27 or equivalent. The old compasses will emit a measurable gamma field; the new compasses won't emit a measurable gamma field.

To repeat, **dispose of those old compasses immediately**! Use AR 385-11 for directions. If you need further guidance, call or write: Headquarters, ARRCOM, ATTN: DRSAR-SF, Rock Island, IL 61201. Point of contact is Mr. Byron Harris, AUTOVON 793-3383/3483.

Replacement compasses can be requisitioned using NSN 6605-00-151-5337. ■

—from USATSARCOM Information Bulletin

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Exhaust diffuser cover separated from aircraft during flight and hit tail rotor blade. Blade was dented.

UH-1 Class E mishaps □ (H series) Hydraulic pressure light flickered during hover. Caused by failure of irreversible valve. □ (H series) As IP initiated simulated forced landing, engine and rotor tachometer needles did not split. Caused by failure of sprag clutch. □ (H series) Master caution and engine oil pressure lights came on. Caused by sheared engine oil pump adapter coupling. □ (H series) Master caution and hydraulic pressure lights came on. Caused by failure of hydraulic pressure switch. □ (H series) Crew heard loud whine and grinding noise during shutdown. Caused by failure of No. 5 tail rotor hanger bearing. □ (H series) Crew heard loud popping sound from rear of aircraft during hover and controls stiffened. Caused by failure of lower piston rod packing. □ (H series) Rotor rpm decreased to 260 during autorotation. Caused by seizure of freewheeling unit.

UH-60 Class C mishap □ Change in engine noise was heard, No. 2 engine oil pressure decreased, and tgt increased. No. 2 engine was shut down and fire light came on. Main fire bottle was discharged, but fire did not go out. Reserve fire bottle did not discharge because of popped circuit breaker. After landing, crew chief, using aircraft fire extinguishers, put out remaining engine fire. Cause of fire is being investigated.

UH-60 Class E mishaps □ Chip detector left-hand accessory module light came on. Caused by failure of No. 1 generator. □ No. 1 engine torque fluctuated. Caused by failure of electrical control unit.

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**4**	**2**
	March	4	1	1-17 Mar	**2**	**2**
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**21**	**14**

Attack helicopters

AH-1 Class A mishap □ (G series) Aircraft was No. 1 in flight of four. As flight tried to go through a pass, weather deteriorated to almost zero-zero. Shortly afterward, lead aircraft flew into low clouds. Both aviators experienced vertigo, and aircraft assumed unusual attitude. Aircraft broke into the clear about 50 feet agl, with very high sink rate. Copilot leveled aircraft and pulled full collective pitch to slow high sink rate. Aircraft hit hard on an upslope of 10 to 12 degrees. Pilot and copilot were injured. 8232

AH-1 Class E mishaps □ (S series) Postflight inspection revealed damage to main rotor blades and one tail rotor blade. Caused by flying debris. □ (TAH-1S) Aft fuel boost pump light came on. Caused by failure of boost pump. □ (TAH-1S) Master caution and d.c. generator lights came on during runup. Caused by failure of voltage regulator.

Cargo helicopters

CH-47 Class E mishaps □ (B series) Excessive oil leak was found around No. 1 generator during runup. Caused by failure of garlock seal. □ (C series) As aircraft was carrying sling load from PZ to LZ, outer loop of two-loop sling broke. Aircraft was landed and load rerigged. □ (C series) No. 2 engine chip detector light came on. Caused by failure of engine nose box. □ (C series) No. 1 engine chip detector light came on. Wire had broken on chip plug and was shorting against airframe. □ (C series) No. 2 engine oil pressure fluctuated. Caused by failure of oil pressure line at engine oil transmission cooler.

Observation helicopters

OH-58 Class C mishap □ (A series) Aircraft was on tactical training flight. As aircraft moved into hovering position, tree, which was bent by rotorwash,

sprang up. Main rotor blade hit tree, damaging rotor blade tip cap.

OH-58 Class E mishaps □ (A series) During preflight, ice was found on transmission support mount, pylon isolation mount, and drag pin. Ice was broken loose by manually rocking transmission. On climbout, aircraft vibrated and loud rumbling noise was heard. Aircraft was returned to airfield and placed in hangar to thaw ice. Water in transmission support mount and isolation mount had frozen. Temperature was -17° C. □ (A series) When throttle was rolled to engine idle during autorotation, N_2 fluctuated. Caused by failure of fuel control. □ (A series) Master caution and engine chip detector lights came on. Pilot landed in field. AH-1 pilot landed to offer assistance. OH-58 passenger opened left front door. Rotorwash from AH-1 snapped door from its hinges. Light illumination was caused by loose wire. □ (C series) D.C. generator light came on. Caused by failure of voltage regulator. □ (C series) Transmission oil pressure light came on during refueling operation. Caused by failure of oil pressure switch.

Fixed wing

C-12 Class E mishap □ (C series) Pilot noticed about ¾-inch space at rear of forward cowling during flight. Pilot reduced airspeed and extended ice vanes, which reduced space to about one-fourth inch. Cowling was latched but not correctly locked in place.

U-21 Class E mishaps □ (A series) About 30 minutes after takeoff, crew chief noticed fuel siphoning from right nacelle fuel tank cap. Airspeed was reduced to 120 knots and siphoning stopped. Pilot did not seat fuel cap correctly during preflight. □ (RU-21H) Left fuel transfer light came on during taxi. Caused by failure of fuel transfer pump.

Maintenance

UH-1 Class E mishaps □ (H series) Low rpm audio did not activate when N_2 decreased below 6200 rpm. Audio box was out of adjustment. □ (V series) Master caution light came on during flight. Contacts on clamp loop were dirty, causing short circuit.

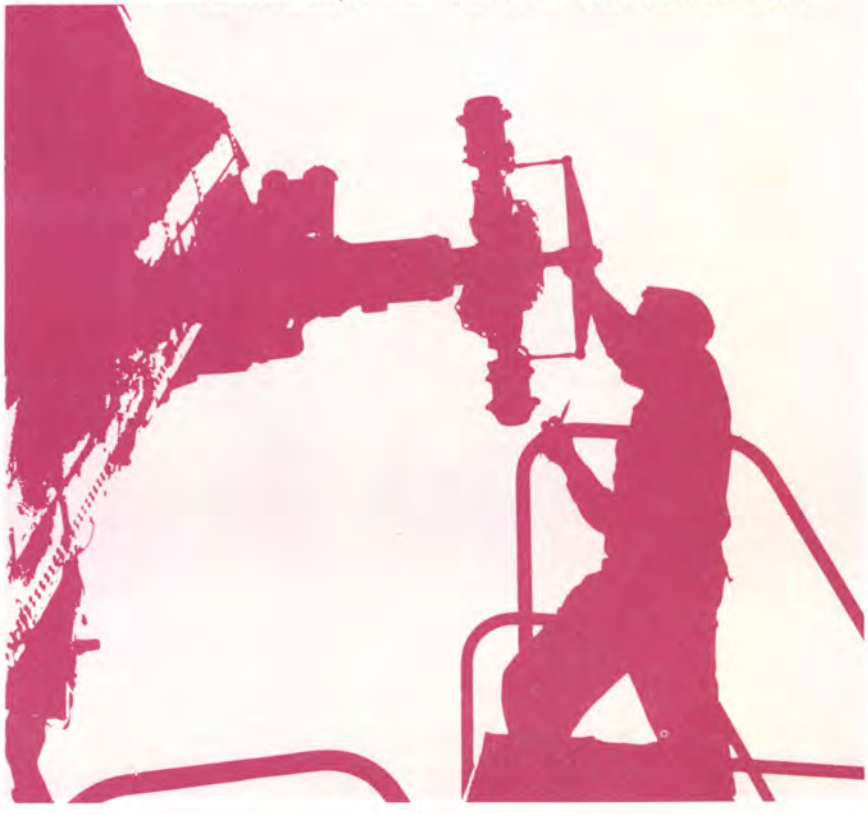
AH-1 Class E mishaps □ (S series) During start and runup, N_1, N_2, rotor tachometers, and tgt gauges indicated zero. Crew chief had reversed battery leads and connected positive to negative and negative to positive. When battery was connected for start, short circuit caused gauges to burn up. □ (S series) Linear actuator would not beep down during NOE flight. Wire had come loose from terminal lug.

OH-58 Class E mishaps □ (A series) N_2 would not increase above 102.5 percent with low side at 96.5 percent during before-takeoff check. Caused by incorrect rigging of governor control against high side stop. □ (C series) Pilot noticed rpm light and drop in power during flight. Caused by loose P3 lines.

T-42 Class E mishap □ Crew noticed landing gear motor circuit breaker was out during level-off. Everytime circuit breaker was pushed in, it popped back out. Gear handle was placed down, and circuit breaker stayed in but gear did not come down. Crew then hand-cranked gear down and landed. Caused by loose wire on dynamic brake relay.

OV-1 Class C mishap □ (D series) Postflight inspection revealed a section of No. 2 engine cowling was missing. Dzus fasteners securing cowling probably vibrated loose.

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 78 □ 17 Mar 1982

Procedures for student selection

The following is from the Directorate of Training and Doctrine, USAAVNC:

The Aviation Center has had numerous questions during the Aviation Center Training Analysis and Assistance Team (ACTAAT) visits about the procedures used to select OH-58 and AH-1 pilots for training. Here is the way these actions are handled:

The OH-58 Aeroscout students are identified during their initial entry rotary wing (IERW) flight training approximately 2 to 3 weeks before the beginning of Aeroscout training. The process starts in the fourteenth week of IERW when all students are ranked on their early performance in training. The factors on which students are evaluated were developed in the field with proficient aviators, and they have been shown to predict student performance in OH-58 tactics training.

This approach to selection was developed by the Army Research Institute Field Unit located at the U.S. Army Aviation Center (USAAVNC). It has been evaluated by ARI, together with the Aviation Center's Directorate of Evaluation and Standardization, and it was found to be a valid predictor of student training grades. Essentially, the decision as to who enters the Aeroscout track of IERW is made by personnel within the Aviation Center for warrant officer candidates and by DA, MILPERCEN, for officers.

Selection processes are similar for the AH-1S(FM) transition training in that potential turnaround students are evaluated according to the same factors used to select Aeroscout students. Presently, for warrant officer aviators, the Adjutant General, USAAVNC, identifies eight warrant officer candidates (six primary and two alternates) per class for further training in the AH-1S(FM) after IERW. This selection, done at USAAVNC, is coordinated with DA, MILPERCEN (Warrant Officer Division), and is based on student performance factors and student mission preference during flight school. This tentative list is confirmed by MILPERCEN before the issuance of any orders.

Selection of commissioned officers for AH-1 training is also a coordinated effort between DA, MILPERCEN, and USAAVNC. The Adjutant General, USAAVNC, provides DA, Company Grade Combat Arms Division, at MILPERCEN with class rosters and current class standings whereby selections are made for "turnarounds" from IERW. Additionally, DA MILPERCEN fills their class quotas with individuals from field units who require transition training.

The established general guidelines to allocate the quotas for AH-1S(FM) transition training are:

- Approximately 29 percent of AH-1S quotas will be filled from the OH-58 track of IERW.
- 56 percent will be filled from the UH-1 track of IERW.
- 15 percent will be filled from field units.

These general guidelines for student selection for the OH-58 and AH-1 courses are furnished to inform aviation field units of on-going programs at USAAVNC. The policies outlined are designed to provide qualified aviators, in specific type aircraft, to meet the Army's present needs. However, this system is also flexible in that it can readily change to meet the new challenge and future aviation mission requirements of our modern-day Army. ■

(continued on back page)

Stacom

Questions and answers

Question: What is the principal factor in determining G loading while in a turn? Is it the airspeed, the angle of bank, or both?

Answer: A similar question was discussed in the July 1976 STACOM, but we'll try to answer in great detail.

Aircraft G loading in a steady coordinated turn is a function of **angle of bank** and nothing more. An aircraft in a 60° bank, at a constant altitude, will be subjected to 2 Gs regardless of the airspeed.

Airspeed is a factor only to the extent that a definite speed is required to maintain altitude while the aircraft is in a bank.

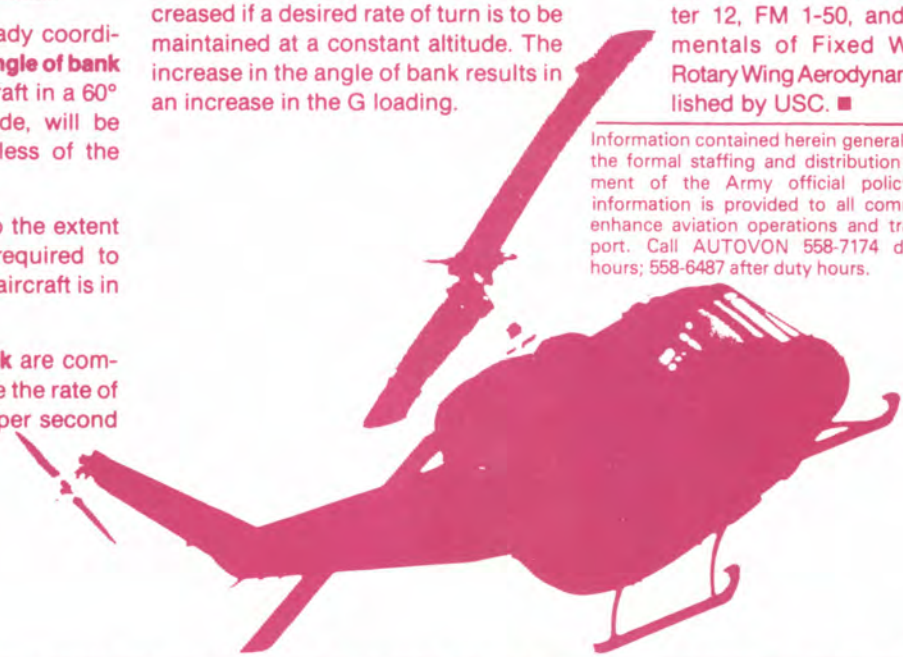
Airspeed and angle of bank are combined factors that determine the rate of turn. As an example, a 3° per second rate of turn is commonly used in instrument flight procedures. Such a rate of turn at a constant altitude is always dependent upon a specific angle of bank for the airspeed being flown.

The aviator must be aware of the relationship between airspeed and angle of bank. That is, as the airspeed is increased, bank angle must also be increased if a desired rate of turn is to be maintained at a constant altitude. The increase in the angle of bank results in an increase in the G loading.

This relationship of airspeed, angle of bank, rate of turn, and G forces applies to both rotary wing and fixed wing aircraft.

NOTE: To compute the G loading for any angle of bank, divide 1.0 by the cosine of the angle and the result will be the G force. For more on this subject, see Chapter 12, FM 1-50, and "Fundamentals of Fixed Wing and Rotary Wing Aerodynamics" published by USC. ■

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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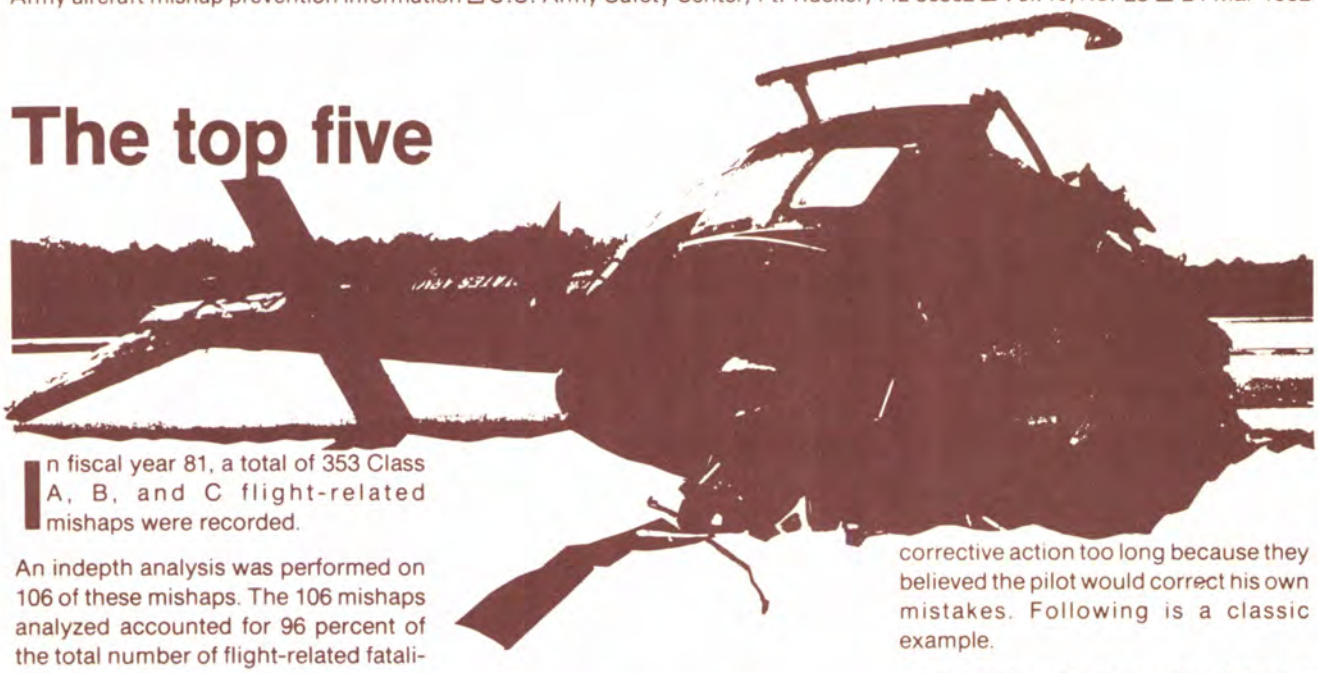
The top five



In fiscal year 81, a total of 353 Class A, B, and C flight-related mishaps were recorded.

An indepth analysis was performed on 106 of these mishaps. The 106 mishaps analyzed accounted for 96 percent of the total number of flight-related fatalities last year, 94 percent of the destroyed aircraft, and 83 percent of the total dollar losses. This analysis identified the five top aviation mishap cause factors for FY 81. The top five cause factors ranked in terms of frequency of occurrence, severity of injury, and dollar losses were:

1. Faulty judgment
2. Inexperience
3. Overconfidence in others
4. Improper motivation
5. Overconfidence in self

Faulty judgment

Most of the cases of faulty judgment involved violations of flight discipline at NOE or low-level attitudes. Generally, the violations were committed by properly trained and prepared aviators who disregarded or ignored regulations and directives.

A typical example involved an OH-58A IP who gave a pilot a forced landing while hovering over an unsuitable landing area . . . a course of action he knew to be improper. The helicopter skids sank in the soft terrain and the aircraft came to rest on its side.

Inexperience

The mishaps involving inexperience were the result of errors committed by aircrewmembers whose skills in flying or maintaining the aircraft were not at the level required to do the job.

In one case, an OH-58 pilot just out of flight school was assigned an NOE flight. He placed the aircraft in a steep left turn to evade a simulated engagement by an aggressor tank, and his main rotor blades hit a sand dune. The severity of the flight maneuver was not warranted by the existing conditions.

Overconfidence in others

Mishaps involving overconfidence in others were the result of tasks critical to flight safety not being accomplished due to a belief that another had performed or would perform the tasks. In some of the cases, IPs delayed taking corrective action too long because they believed the pilot would correct his own mistakes. Following is a classic example.

After a tachometer generator failure, a UH-1 IP took the controls from the rated student pilot and autorotated into water with the engine still running. When the emergency occurred, the pilot was flying under the hood and the IP was looking outside the aircraft. When the pilot said something about an engine failure, the IP had such confidence in the pilot that he assumed the pilot had confirmed an engine failure, and he did not check his gas producer to determine the extent of the emergency.

Improper motivation

Mishaps involving improper motivation were caused by errors made due to an excessive desire on the part of the pilot to impress someone, to complete a mission, or simply to relieve boredom.

In one case, a UH-1H pilot, while awaiting IFR clearance, decided to perform a hydraulic check at operating rpm rather than at engine idle as required by the operators manual. He just got tired of sitting and waiting and decided to do

(continued on next page)

The top five

"something." As a result, when the pilot put movement into the cyclic as required by the hydraulic check, the aircraft rolled over.

Overconfidence in self

A large number of mishaps were caused by aviators performing a prohibited or unauthorized action and violating established procedures. These aviators committed these acts with full confidence that they could handle any problem resulting from their undisciplined behavior.

An OH-58 pilot had just completed a day tactical mission and was flying toward a landing point. Visibility was unlimited. The pilot had crossed a valley and was passing over higher terrain. Flying about 35 feet above the ground, the pilot saw some wires in front of him. He banked steeply to the left, but the aircraft hit three of the wires and crashed. The pilot had not done a hazards recon of the route he was flying. He knew he should not have been as low as he was, but he was confident in his ability to avoid hazards during periods of clear weather and unlimited visibility.

Crew error

In fiscal 81, Army aircraft mishaps killed 29 aircrewmembers and passengers, injured another 111, destroyed 37 aircraft, and cost the Army almost $40 million. Through the first 5 months of this fiscal year, 18 flight-related Class A mishaps had been recorded. While investigations of all 18 mishaps are not complete at this writing, crew error has been identified as a definite factor in 11 of the 18. These 11 crew error mishaps resulted in 11 fatalities, 10 destroyed aircraft, and the loss of $9,309,629 in property damage and injury costs.

• During preflight, a pilot did not insure the engine cowling of his UH-1 was secure. The cowling came off during flight and hit the tail rotor. The pilot entered autorotation and hit the ground with enough force to destroy the aircraft. Result: a $619,000 loss.

• A PIC allowed his OH-58 to start across an active runway because he misinterpreted tower instructions to hold short of the runway. The copilot performed a quick stop maneuver to try to stop short of the runway. The main rotor struck and severed the tail boom, and the helicopter landed hard. Result: $143,782 in damages.

• An OV-1 pilot exceeded ATM bank standards while trying to avoid further penetration of restricted airspace he had entered. He put the aircraft in a bank of approximately 90 degrees and allowed the Mohawk to assume a nose-low attitude. Result: 2 fatalities and a $2,892,634 loss.

• The pilot of an OH-58 did not adequately secure his flight jacket. The jacket blew out of the helicopter and hit the tail rotor, causing the loss of both tail rotor blades and gearbox. The pilot autorotated into trees. Result: $143,782 in damages.

• An AH-1S pilot's night vision goggles failed while the aircraft was flying at 100 knots and 100 feet above trees. The crew did not adequately coordinate exchange of control from pilot to copilot, and the Cobra crashed into trees and burned. Result: a $1,598,131 loss.

• When a UH-1H vibrated excessively during flight, the pilot began looking for a landing spot. He used too much airspeed during the approach and overshot the intended landing point. The Huey descended into trees, landed hard, and was destroyed. Result: a $618,055 loss.

• During takeoff, the pilots of two OH-58s allowed their helicopters to drift into each other. Result: 4 fatalities and $345,680 in damages.

• A Cobra pilot was taking off from a tactical field location and allowed his helicopter to drift backward into trees. Result: $650,000 in damages.

• A UH-1H pilot allowed his helicopter to roll on its right side (dynamic rollover) during takeoff from a field site. Result: $618,055 in damages.

• The pilot of an OH-6 flew his aircraft into wires. Result: 1 fatality and $140,450 in damages.

• When the pilot of a UH-1 tried to hover between parked aircraft on the ramp, his main rotor blade hit the tied-down rotor blade of a parked aircraft. Result: $200,000 in damages.

The situation is not improving. As this issue goes to press, three more Class A mishaps have been recorded. Preliminary information indicates that crew error may be a factor in all of these.

There's nothing new nor unique about the cause of these crew error mishaps. They happened because commanders, supervisors, SIPs, IPs, PICs, and aviators allowed old "repeat" causes to creep back—unrecognized—into the aviation system.

There's also nothing new nor unique about what's needed as a cure for the crew error problem. It's the elimination of substandard performance in every phase of operation by commanders, supervisors, SIPs, IPs, PICs, and aviators. And the time to begin is now. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Pilot tried to start engine with main rotor tiedowns partially wrapped around tail stinger. Tiedown came loose from tail stinger and hit and damaged tail rotor blades.

UH-1 Class E mishaps □ (V series) Master caution and transmission oil pressure lights came on. Caused by failure of thermostatic switch. □ (H series) While returning from unscheduled RON at field site, crew became disoriented because of restricted visibility. Fuel was low, and crew landed. Crew left field site without adequate weather forecast. Inadequate food at field site and fatigue from unscheduled RON prompted crew to return to home station. □ (H series) High frequency vibration was felt during engine shutdown. Caused by failure of engine oil cooler bearing. □ (H series) Engine rpm dropped and engine quit during hover/taxi. Caused by worn fuel control drive splines. □ (H series) Grinding noise was heard and engine chip detector light came on. Caused by failure of engine. □ (H series) Crew smelled strange odor, and master caution and transmission oil pressure lights came on. Caused by failure of transmission.

UH-60 Class A mishap □ SIP was giving pilot a checkride. Aircraft traveled through 30- to 60-foot trees and then hit the ground in a near-inverted attitude. Two fatalities. 8233

UH-60 Class C mishaps □ Cargo hook opened during takeoff, and load dropped into wooded area. Load consisted of two fuel drums containing 1,000 gallons of JP4. □ Aircraft began to oscillate with external load (fuel drums). Load was jettisoned. Drums burst on impact and fuel was lost.

UH-60 Class E mishaps □ No. 1 input module light came on, followed by failure of No. 1 engine. Input module bearing failure caused engine vibration. This caused P_3 line on engine to shear, which caused engine to fail. □ Stabilator amplifier failed in flight, causing stabilator to have limited travel.

Attack helicopters

AH-1 Class C mishaps □ (S series) Postflight inspection revealed damage to both main rotor blades. Crew had been flying in wooded area. □ (S series) Student pilot pulled initial pitch too high during autorotation, and aircraft landed hard. IP was not able to correct in time to prevent ground contact.

AH-1 Class E mishaps □ (S series) Main rotor was rotated 90 degrees with front tiedown attached. Pilot noticed tiedown and aborted start. □ (G series) Tail rotor pedal force gradient assembly froze during takeoff, causing fixed right pedal setting on tail rotor.

Cargo helicopters

CH-47 Class E mishaps □ (B series) No. 1 engine would not beep down using normal beep trim. Caused by failure of N_2 actuator. □ (B series) No. 2 engine torque and N_1 dropped and then fluctuated rapidly. Engine failed because of FOD. □ (C series) Torque and N_1 fluctuated during takeoff. Popping sounds were heard from No. 1 engine. Single-engine landing was made. Twelve turbine blades on first stage and three blades on second stage sustained FOD.

Observation helicopters

OH-6 Class C mishap □ During runup after engine start, pilot removed left hand from collective to close door. Aircraft came up on toes of skids. Collective was reduced, resulting in damage to skid.

OH-6 Class E mishap □ Rotor rpm indication went to zero during flight. Caused by failure of electrical tachometer indicator.

OH-58 Class E mishaps □ (A series) Master caution and hydraulic lights came on. Caused by failure of hydraulic pump. □ (A series) N_2 decreased when power was applied. Caused by failure of fuel control. □ (C series) Transmission oil pressure low light came on. Caused by failure of sending unit. □ (A series) Free air temperature (FAT) gauge indicated 0° C. during attempted start. N_1 peaked at 13.5 percent, and pilot rolled throttle to engine idle. Turbine outlet temperature (TOT) gauge climbed rapidly. At 900° C., pilot rolled throttle off and continued to motor starter. TOT rose to 927° C. but was back to normal operating limits within

10 seconds. Pilot continued to motor starter until TOT was below 200° C. Pilot waited several minutes before attempting another start. Copilot opened fuel heater valve and pilot turned off fuel boost switch. As pilot attempted start, he noticed FAT gauge at 0° C. and residual TOT indication was 100° C. N_1 peaked at 13 percent and pilot rolled throttle to engine idle. TOT gauge immediately climbed above 749° C. At 890° C. pilot pressed engine idle detent button, rolled throttle off, and continued to motor starter. TOT climbed to 980° C. Pilot secured aircraft and reported hot start.

Fixed wing

C-12 Class E mishap ☐ (A series) After aircraft was run up, auxiliary tanks were topped off. When crew chief removed left auxiliary cap, locking tab broke. Fuel cap was replaced. After takeoff, pilot noticed siphoning from left auxiliary filler cap. Antisiphon flapper valve was bent.

OV-1 Class E mishaps ☐ (D series) When crew chief tried to lower gear for an approach, they found they had lost hydraulics. Gear was blown down and aircraft landed. Caused by failure of piston rod in flap actuator. ☐ (RV-1D) Pilot received unsafe nose gear indication. Gear was recycled several times without success. Emergency blowdown system was used. Unsafe indication was caused by failure of sensitive switch. ☐ (D series) No. 2 engine chip detector light came on. Caused by excessive wear of accessory drive box.

T-42 Class E mishaps ☐ Engine ran rough and would not develop full power during takeoff. Caused by bent fuel pump drive shaft. ☐ Left strut collapsed after aircraft was landed. Preformed packing failed, allowing hydraulic fluid to leak out.

U-21 Class E mishaps ☐ (RU-21H) Immediately after takeoff, No. 2 engine N_1 increased and then began fluctuating. Caused by failure of N_1 tachometer. ☐ (F series) Explosion was heard about 3 minutes after takeoff, and pilot saw sparks and flames coming from No. 1 engine exhaust. Engine was secured and attempt was made to activate fire extinguisher. Pilot could not break breakaway wire securing hinged transparent plastic cover over fire extinguisher switch. He finally activated switch after breaking plastic cover. Flames continued to come from exhaust stack for about 2 minutes after fire extinguisher was activated. Aircraft was landed without further incident. Engine malfunction was possibly caused by failure of propeller reduction gearbox. ☐ (RU-21H) On takeoff roll, No. 2 engine went to 103% N_1. Torque indicated only 800 pounds. Caused by failure of fuel control. ☐ (RU-21C) Fault warning light and LH secondary low pitch stop light came on. Pilot tried to cancel low pitch stop light by depressing secondary low pitch test switch. Light did not cancel. Pilot noticed decay of propeller rpm and told copilot to pull propeller governor idle stop circuit breaker. Propeller continued to full feather position. RH secondary low pitch stop light then came on and propeller rpm decayed to full feather position. Attempts to regain control of propellers failed. Power-off landing was made at airport. Caused by failure of secondary idle stop test circuit board. Copilot may have been pulling and recycling the wrong circuit breaker. When propeller governor idle stop circuit breaker was pulled on the ground, malfunction ceased and propellers returned to normal operation. The markings on the propeller governor idle stop

(continued on back page)

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**4**	**2**
	March	4	1	1-24 Mar	**3**	**2**
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**22**	**14**

New parking criteria

The U.S. Army Corps of Engineers has revised the criteria for rotary wing parking spaces. This revision will be included in the next printing of TM 5-803-4, Planning of Army Aviation Facilities.

Rotary wing aircraft parking spaces, on a parking apron, generally consist of two types. Type 1 parking spaces are those in a single row and perpendicular to the taxi lane. Type 2 spaces are those in double rows and parallel to the taxi lane (except for end rows, there will be a taxi lane, two rows of parking, a taxi lane, two rows of parking, etc.).

The following criteria will be used for rotary wing parking spaces:

For OH, UH-1, and AH-1 aircraft, type 1 and type 2 spaces will be 80 feet by 80 feet, the same size as they are in the current TM 5-803-4. Taxi lanes will be 120 feet wide.

For UH-60 aircraft, type 1 parking spaces will be 80 feet by 80 feet. Type 2 spaces will be 80 feet wide by 160 feet long (nose to tail, parallel to taxiway). Taxi lanes will be 140 feet wide.

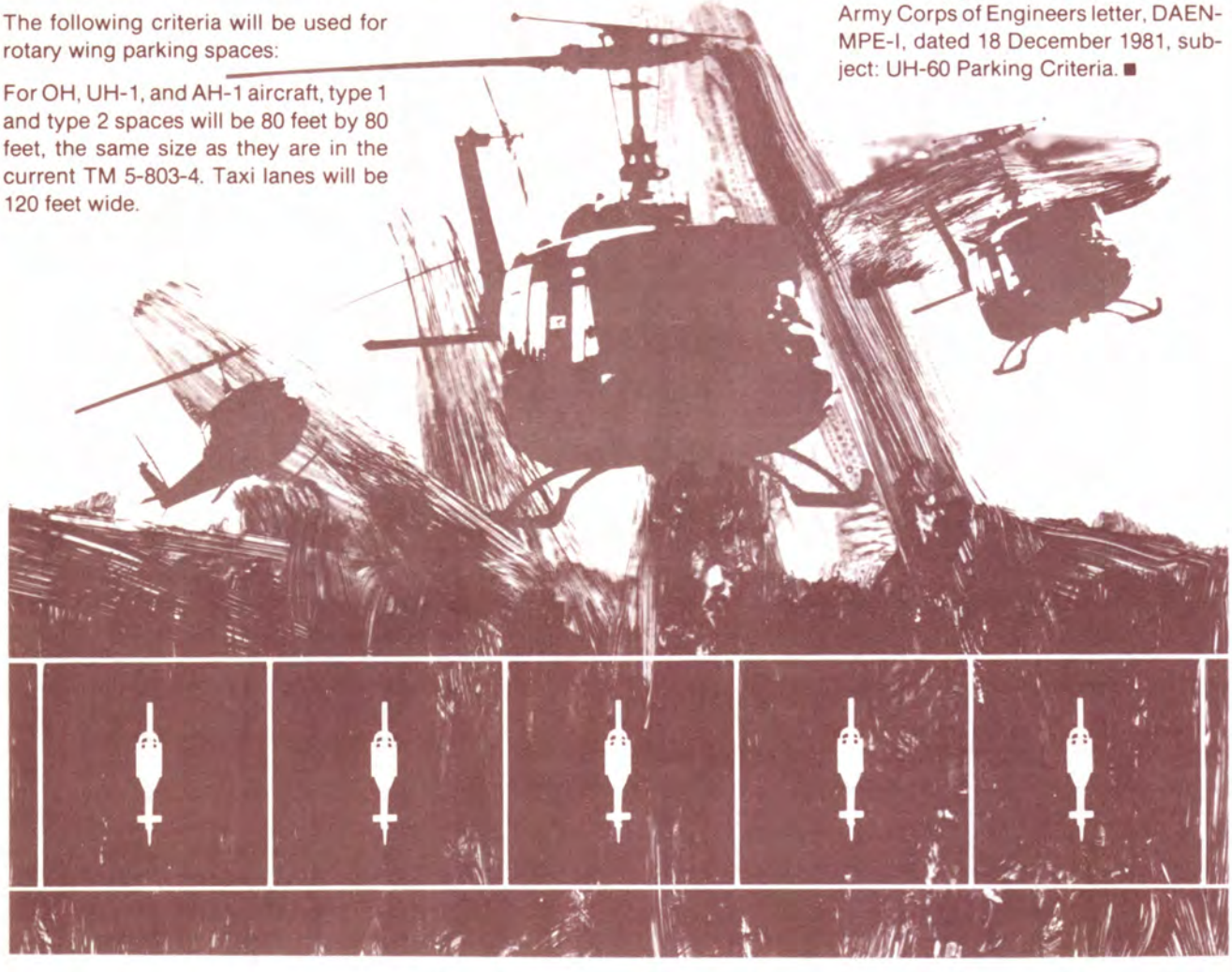
For AH-64 aircraft, parking space and taxi lane dimensions will be the same as for UH-60 aircraft. Although the UH-60 is longer than the AH-64, both are wheel-mounted, and the same parking dimensions offer flexibility of parking assignments.

For CH-47 aircraft, type 1 parking spaces will be 80 feet wide by 100 feet long (nose to tail, perpendicular to taxi lane). Type 2 parking spaces will be 80 feet wide by 160 feet long (nose to tail, parallel to taxi lane). Taxi lanes will be 160 feet wide.

CH-54 parking criteria will remain the same as stated in the current TM 5-803-4.

Type 1 parking, perpendicular to taxi lane or pullthrough configuration, has proven to be much better, operationally, for wheeled aircraft and is recommended where feasible.

These changes were published in U.S. Army Corps of Engineers letter, DAEN-MPE-I, dated 18 December 1981, subject: UH-60 Parking Criteria. ■



Mishap briefs

circuit breaker, when viewed from the copilot's position, can cause the copilot to mistake the second circuit breaker on the third row for the propeller governor idle stop circuit breaker. This aircraft usually had a pull ring attached to the propeller governor idle stop circuit breaker, but the ring had been recently removed for modifications to the aircraft. ☐ (JU-21A) Aircraft was in single-engine training maneuver. Three flaps went full down and one full up. Flap motor circuit breaker popped out. Caused by separation of right inboard flap control cable housing from retaining net at flap actuator.

Maintenance

UH-1 Class E mishaps ☐ (H series) Ground crew noticed what appeared to be oil in vicinity of 42-degree gearbox. As aircraft left helipad, TI tried to get pilot's attention. Failing to do so, TI told tower personnel to notify pilot. Post-flight inspection revealed large amount of oil around gearbox. Crew chief had pulled 42-degree gearbox oil cap for oil samples and to add oil. He replaced the cowling without replacing cap. TI and pilot did not remove cowling and check for cap replacement on inspection and preflight. ☐ (V series) Engine rpm surged to 6800 and then dropped to 6200 during hover. Droop cam was out of adjustment.

CH-47 Class E mishap ☐ (C series) No. 1 engine fire light came on during runup. Caused by broken metal pin in fire element.

U-21 Class E mishaps ☐ (D series) When secondary idle stop was checked on No. 2 engine, propeller rpm would only rise 150 rpm. Minimum tolerance for check is 170 rpm. Caused by out-of-adjustment secondary idle stop. ☐ (JU-21A) When flaps were extended to approach position, control problem was noticed. Right inboard and left outboard flaps were fully extended, and left inboard flap was three-fourths extended. When attempt was made to retract flaps, right inboard flap was the only one to retract. Caused by failure to correctly set cable end in flap gearbox.

Messages received

- CH-47 maintenance information message concerning fuel pod repair instructions (111430Z Mar 81).
- Message concerning high performance hoists (261930Z Feb 82). Purpose of message is to obtain operational status of fielded hoists from user activities for evaluation and budgeting of repair program requirements.

Changes to TMs

The following changes to TMs have been published:

- Change 6, 23 Dec 81, to TM 55-1520-214-PMS, for OH-6A.
- Change 9, 6 Jan 82, to TM 55-1520-228-CL, for OH-58A.
- Change 10, 8 Jan 82, to TM 55-1520-235-CL, for OH-58C.
- Change 19, 9 Mar 82, to TM 55-1520-228-23-1, for OH-58A/C.

OH-58A/C MWO

Modification Work Order, MWO 55-1520-228-30-32, dated 27 Oct 81, has been distributed. The purpose of the modification is to improve fuel supply system for OH-58A/C helicopters.

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

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Mishap review: mountain flying

Synopsis

As the UH-1H pilot was climbing to clear mountainous terrain, he exceeded maximum torque available. The Huey began a slow right turn, airspeed decreased to 45 knots, and rpm deteriorated to 5700. The aircraft became uncontrollable and crashed on sloping terrain.

History of flight

The aircraft was on a 7-day cross country flight. On the fourth day, flying in mountainous terrain, the copilot was following the highways through the valleys. The PIC then decided to deviate from the planned route, took control, and turned toward higher terrain. He had started a cyclic climb and was flying toward a ridge line at an altitude of about 12,100 feet msl (100 to 200 feet agl) when he realized he did not have enough altitude to clear the terrain to his front. About the same time, he noticed he had applied full left anti-torque pedal and engine rpm had decreased to 6300.

The PIC attempted a shallow turn to the left toward lower terrain, but the helicopter would not respond. It began a gradual right turn toward higher terrain. The PIC lowered the collective slightly, neutralized the pedals, and tried to follow the aircraft through its right turn. During this turn, airspeed and engine rpm continued to decrease and the aircraft became uncontrollable. The Huey turned about 330 degrees before hitting the ground right skid first. It rolled to the left at least 1½ times and came to rest inverted.

The PIC, copilot, and crew chief exited through the right cargo door window. They used pen flares, a mirror, a signal panel, and an AN/PRC-90 radio to try to signal their position. At least four aircraft overflew them. After about 30 minutes, the crew decided to walk toward the valley and a highway. After walking about 5½ miles, they were picked up by a civilian.

Crewmember experience

The 34-year-old PIC had more than 3,300 rotary wing flight hours, most of them in UH-1Hs. He was a standardization instructor pilot and instrument flight examiner. The 33-year-old copilot had almost 700 rotary wing hours, most of them also in UH-1Hs. The PIC and copilot were not trained or experienced in high altitude mountain flying.

Commentary

The PIC deviated from his planned route along the valley for no valid reason. He wanted to take a close look at the ridge. He allowed overconfidence in his ability as an aviator to affect his judgment. Based on his UH-1 experience, he was confident he would be able to handle any situation he might encounter. Because of his inexperience in high altitude mountain flying, the PIC was not aware of problems in determining altitude and terrain clearance, visual illusions, and other conditions unique to mountain flying, as identified in TC 1-10, Mountain Flying Sense. He initially misjudged the height of the 12,324-foot ridge as being the same as the aircraft's (10,500 feet). He also misjudged the

(*continued on next page*)

Mountain flying

contour of the steep sloping crest of the ridge as being generally level terrain.

As the aircraft approached the ridge, it would have been difficult to determine if the altitude of the aircraft was sufficient to clear the ridge. However, once the PIC became aware that the ridge was higher than the aircraft, he did not initiate a climb that assured adequate altitude for clearance of terrain and possible effects of the wind. Five hundred feet agl minimum is recommended in TC 1-10. Instead, he began a gradual climb of 250 to 350 fpm and 75 knots, clearing the intermediate portion of the ridge with a minimal altitude of 100 to 200 feet.

The aircraft crossed the intermediate portion of the ridge before the PIC saw the higher crest of the ridge to his front. He did not start an immediate turn to the left toward lower terrain but delayed until the operating limits of the aircraft were exceeded and the aircraft would no longer turn to the left. The PIC also misjudged the slope of the rising terrain. Clearing the ridge would have required a climb angle of about 14 degrees and a 2,150-fpm rate of climb. This was beyond the performance capabilities of the aircraft under the environmental conditions encountered.

Because the crew was habitually concerned only with aircraft performance data for takeoff during their normal aviation operations near sea level altitude, they did not compute performance data for climb, cruise, and arrival in accordance with the operators manual, TC 1-10, and AR 95-1. Therefore, they were not aware that the torque available had decreased from 40.5 pounds at the takeoff point (6,000 feet msl) to about 35 pounds at the higher altitude (12,100 feet) at which the mishap occurred.

During cruise flight, the engine rpm had been increasing above 6600 by 20 to 50 rpm because of suspected slack in the droop compensator linkage. The PIC beeped the rpm down to 6500. He unnecessarily reduced the rpm which is essential for maximum aircraft performance at high altitude. Flight tests revealed the indicated torque required at 6500 rpm increased by about 2 pounds over that required at 6600 rpm. The PIC's action contributed to the rpm bleed-down by reducing the available rpm and increasing the torque required.

The PIC's attention was directed outside the aircraft, and he did not use the copilot to monitor the torque. During the climb, the PIC was not aware he was increasing torque above the 27 to 28 pounds required for cruise at 75 knots. The climb to the intermediate portion of the ridge at 75 knots and 6500 rpm would have required 33 pounds of indicated torque.

Just before the bleed-down of rpm, the PIC became apprehensive about clearing the terrain and increased the rate of climb, primarily using cyclic, and decreased airspeed to 60 knots. The cyclic climb increased the rotor disc's angle of attack and induced a further increase in the amount of torque required. When the PIC began to lose rotor rpm, he applied full left pedal to maintain directional control and tried to turn to the left. The application of left pedal and attempted left turn added to the induced torque required.

Torque required exceeded torque available, resulting in rotor/engine rpm bleed-down and loss of control. Because of the aircraft's low altitude above the ground and the rising terrain to the front, the PIC was unable to sufficiently lower collective or apply forward cyclic to regain rpm or aircraft control. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (JUH-1H) Crew heard loud noise from engine compartment, followed by aircraft yawing to left. Engine and rotor rpm began to decay, and pilot entered autorotation. When engine failed, debris from engine damaged turbine rotor blades, main rotor blades, tail rotor blades, vertical fin on tail boom, and synchronized elevator.

UH-1 Class E mishaps □ (M series) Crew heard loud squealing noise during hover for takeoff. Antitorque pedals stiffened and hydraulic light came on. Caused by broken line from bottom of accumulator to T-tube. □ (V series) Aircraft was on the runway, awaiting takeoff. While searching for passenger briefing card, copilot placed his helmet bag on right rear position of pedestal. Pilot requested before-takeoff check, and copilot released helmet bag to reach for checklist. Helmet bag then fell forward, obscuring fuel control panel. As pilot started to move bag from center pedestal, bag handle caught governor control switch and moved it to emergency position. Pilot was immediately aware that switch had been moved to emergency position and reduced throttle as master caution light came on and rpm began to increase. Pilot saw N_2 between 6800 and 7000 and continued to reduce throttle to engine idle. N_2 decreased below 5800 and pilot returned governor switch to auto position. □ (H series) During refueling operation, copilot saw smoke coming from engine compartment. Failure of No. 2 engine bearing caused excessive loss of engine oil. □ (H series) Cockpit filled with smoke, followed by illumination of master caution and transmission oil pressure lights. Failure of seal caused main transmission to lose oil. □ (H series) Engine oil temperature rose after takeoff. Failure of engine oil cooler bypass valve thermostat caused engine oil to bypass engine oil cooler. □ (H series) Excessive cyclic binding was caused by failure of left lateral servo.

UH-60 Class C mishap □ Main rotor and tail rotor blades hit trees during night landing in LZ. Blades were damaged.

UH-60 Class E mishaps □ Low rotor warning light came on and horn activated intermittently. No. 2 generator, No. 2 hydraulic pump, and backup pump lights then came on. Caused by failure of No. 2 input module. □ As aircraft was brought to 80-foot hover, repel master tried to open left cargo door. He grabbed emergency jettison handle for cargo windows and pulled lever before crew chief could stop him. Windows jettisoned, and one fell to the ground.

Attack helicopters

AH-1 Class B mishap □ (S series) Aircraft landed hard during termination of night low-level autorotation. Aircraft slid off runway and came to rest upright. 8234

AH-1 Class E mishaps □ (S series) Hydraulic warning light came on during takeoff. Caused by malfunction of hydraulic control switch. □ (S series) Engine oil temperature rose during flight. Caused by failure of oil cooler turbine bearing. □ (S series) While waiting to take off, pilot smelled burning odor, and cockpit filled with smoke. ECU impeller failed, causing ECU to overheat and smoke. □ (G series) During shutdown, crew chief saw oil coming from oil cooler deck drain line. Caused by cracked drain valve. □ (TH-1G) Master caution and No. 1 hydraulic lights came on, and pedals became stiff. Caused by failure of hydraulic pressure line from No. 1 pump to module.

Cargo helicopters

CH-47 Class E mishaps □ (A series) No. 1 N_1 gauge went to zero. Caused by sheared tachometer generator shaft. □ (A series) No. 1 engine chip detector light came on. Caused by failure of engine transmission. □ (C series) No. 1 normal engine trim would not increase during runup. Caused by failure of engine condition control box. □ (C series) No. 1 engine transmission pressure indicated zero and transmission oil pressure light came on. Caused by failure of oil pressure transducer. □ (C series) Transmission oil hot light came on. Caused by failure of cannon plug for aft transmission oil temperature sensing bulb.

Observation helicopters

OH-58 Class C mishaps □ (A series) Pilot was explaining instruments to a passenger and allowed his aircraft to descend too low. Aircraft hit one wire, which broke pilot's windshield and wrapped around right front door post before breaking. Aircraft then hit another wire, which cut through right greenhouse. Wire buckled upper fuselage skin and wrapped around right side of aircraft. Aircraft was then landed. □ (A series) Right passenger door came off in flight. Pilot felt yaw, noticed rpm loss, and entered autorotation. Aircraft landed hard and tail boom was damaged.

OH-58 Class E mishaps □ (A series) Pilot opened throttle to engine idle during start. N_1 rose to 20 percent, with a corresponding rise in engine oil pressure. Blades began turning at 25 percent N_1. Blades began to slow at 29 to 30 percent and pilot tried to abort start. He then noticed TOT rising to 927° C. Though starter was being motored, throttle was only half off, causing temperature to reach 927° C. for 2 seconds. Temperature then began to fall and pilot was told to exit aircraft because of a fire hazard at exhaust stacks. Failure to completely roll off throttle allowed fuel to remain in combustion chamber. □ (C series) Hydraulic and master caution lights came on during takeoff. Feedback was felt in controls. Caused by failure of hydraulic pump. □ (C series) Fuel filter light came on during hover. Contamination in fuel filter reduced fuel flow, causing light to come on.

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**3**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**23**	**15**

Fixed wing

C-12 Class E mishap □ (C series) Pilot and passenger smelled smoke during flight. Caused by overheated forward vent blower motor.

OV-1 Class E mishaps □ (D series) When autopilot was engaged, aircraft rolled rapidly to right. Caused by failure of attitude reference control. □ (D series) Flaps stuck in down position. Postlanding inspection revealed right flap actuator piston rod was fully extended and bent about 90 degrees. Orifices were blown out of both restrictor assemblies for left actuator, causing imbalance of flow between left and right flap actuators. □ (RV-1D) Pilot noticed unsafe nose gear down indication on wheel and flap indicator when gear was lowered. Pilot used emergency blowdown system and landed. Failure of indicator caused nose gear to appear unsafe.

U-21 Class E mishap □ (A series) No. 1 engine fuel boost pump light came on. All engine instruments indicated zero. Caused by failure of fuse on feeder line to engine instruments in right avionics compartment junction box.

Maintenance

UH-1 Class E mishaps □ (H series) Postflight inspection revealed oil on transmission oil pressure switch. Oil

(continued on back page)

The one with the toolbox

The trend to underrate the importance of the person with the toolbox is often evident in mishap prevention programs. These programs are almost always targeted at pilots because the pilot, statistically, is highest on the list of mishap cause factors. Does this mean that maintenance people make fewer errors, or that our statistics have a false view?

Let's take some examples:

• A pilot takes off in an aircraft with the ailerons rigged in reverse. Before he knows what hits him the aircraft is slow-rolling through the grass and shedding its wings. Who gets the blame? Theoretically the pilot—because he was the last member of the team who could have, and should have, noted this maintenance error. But no self-respecting mechanic would suggest that this approach presents the true picture.

• Another pilot takes off without checking the security of the oil filler cap because the crew chief told him that it was properly closed and safetied. An hour later the engine seizes because of oil starvation. The oil filler cap had not been properly secured. Who gets the error? The pilot of course.

But what happens to our team concept when pilots and mechanics can't rely on each other?

A crew chief who was injured in a helicopter mishap was questioned about the mishap while still in the hospital. After he had given a clear description of what happened, the investigator asked him if he could think of anything unusual about the aircraft that could have contributed to the crash. The way he looked convinced the investigator, too late, that this normally routine question had insulted the man's honor. He answered: "Sir, before I sign off for an aircraft, I ask myself: 'Would I let my kid brother fly this ship?' If the answer is no, I won't release it."

Here was a man who spoke with pride and confidence although he had just gone through a rough experience. His reference to the almost forgotten concept that we still are our brothers' keepers also showed that he was a conscientious team member.

For those mechanics who may have difficulties finding their place on the team, here are a few hints.

• Don't expect clear-cut orders for every move you must take. Your qualifications are recognized, but you are expected to know the limits of your experience. This means that not every time you lockwire a nut, or fill out a form, somebody will be looking over your shoulder. It also means that you must set all false pride aside and not hesitate to consult your supervisor whenever you have any doubt about the correctness of your work.

• Don't think that the world, or your career, has come to an end every time a tech inspector growls at you. He has to bear the responsibility for the work you have done, and he can't afford to be courteous about errors in a job that deals with human lives. He knows that soft-pedaling a minor mistake is a sure invitation to errors that scatter people and aircraft all over the countryside.

• Don't flatter yourself with the thought that what the school taught you is all you need for a successful maintenance career. To prove this point, talk to the gripers and the soreheads in your unit and find out why they failed. You'll find that these people don't have the get-up-and-go to increase their knowledge "beyond the call of duty."

• If you are sincere about succeeding and being a respected team member, deny yourself some of that high-level TV entertainment once in a while and read your manuals. Nobody can be blamed for not having all the answers at his fingertips, but you can only blame yourself for not knowing where to find them.

• Don't take it for granted that rank and position keep a person from making mistakes. On the other hand, don't think that the lower the job, the less the chance of serious blunders. There are plenty of cases where people performing what appeared to be unimportant jobs caused mishaps.

• In aviation, every error must be treated as though it will cause a mishap. A mechanic lost a ½-inch bolt while working on the control system under the cockpit floor. To save time, he got a replacement bolt and completed the job. A few weeks later the pilot of that aircraft had some anxious moments when he found the ailerons jammed during a stall recovery. Luck and a competent pilot kept the aircraft near enough intact to determine that the lost bolt cost the taxpayers $200,000 by finding its way into the aileron controls.

• Don't assume that just because a thing came apart in a certain way that it should be reassembled the same way. It might not have been put together correctly in the first place! Unless you know your tech orders by heart (and who does?) use them all the time.

• Finally, a word about the mechanics' trademark, the toolbox. You have undoubtedly heard it said that you can tell a maintenance person by the way he keeps his toolbox. This is so true that an old hand in this business can learn more about you by a quick glance in your toolbox than a head shrinker can find out in a week-long session on a couch. On a larger scale, the same applies to housekeeping in the hangar, on the flight line, and in each aircraft. A person who keeps his tools neat works neatly and thinks neatly.

The growing complexity of Army aircraft has given maintenance personnel a responsibility that is at least equal to flying personnel . . . and it is difficult, if not impossible, to decide which member of the aviation team plays the most critical role. ■

Mishap briefs

pressure switch O-ring was not installed. □ (H series) Loud noises were heard from engine and aircraft yawed. Caused by bent actuator rod for inlet guide vanes. □ (H series) Master caution and transmission pressure lights came on during takeoff. After landing was made, transmission temperature was about 1,000 degrees on gauge. Oil was seen leaking from cargo hook well. Wiring bundle chafed hole in tube assembly between transmission oil filter and oil cooler. □ (H series) Engine fire light came on. Caused by frayed wires to engine fire detection harness. □ (V series) Pilot noticed 200-225 rpm loss during landing. Droop compensator was out of adjustment.

AH-1 Class E mishaps □ (S series) Engine firewall near transmission came loose in flight and scored dust root cap of main drive shaft. Probably caused by incorrect installation. □ (S series) Transmission oil pressure reading was zero during landing. Caused by loose wire to transmission pressure sending unit.

CH-47 Class C mishap □ (C series) Postflight inspection revealed damage to drive shaft and lord mount. Aircraft was washed 2 days before. Incorrect washing procedure probably allowed water to be trapped in drive shaft, creating out-of-balance condition. Resilient mount failed and each spring was broken, allowing drive shaft to drop and hit bulkhead.

CH-47 Class E mishaps □ (B series) Flight engineer saw hydraulic fluid leaking from No. 2 flight boost hydraulic pump. Caused by incorrectly seated O-ring on flight boost pressure fitting. □ (C series) Flight engineer saw oil leaking from C-box area. Loop clamp teflon lining deteriorated, allowing metal-to-metal chafing.

OH-58 Class E mishaps □ (A series) Engine oil pressure exceeded upper limits during takeoff. Packing in engine oil check valve was installed incorrectly. □ (A series) Fuel filter and master caution lights came on. Caused by loose fitting on fuel pressure switch electrical connection. □ (C series) High frequency vibration in tail rotor pedals was caused by excessive wear on pitch change link bearing.

T-42 Class E mishap □ IP was demonstrating an approach to a landing stall at 5,500 feet msl. Throttles were at idle position. At first indication of a stall, IP lowered nose and applied full power on both engines. No. 2 engine did not respond and appeared to have failed. IP adjusted mixture and throttle and engine resumed running. Aircraft was landed. Main fuel metering valve was set too rich.

Messages received

- UH-60A information message on repair procedure for the stabilator right hinge fitting (192200Z Mar 82).

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

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 25 □ 7 Apr 1982

Rules of the game

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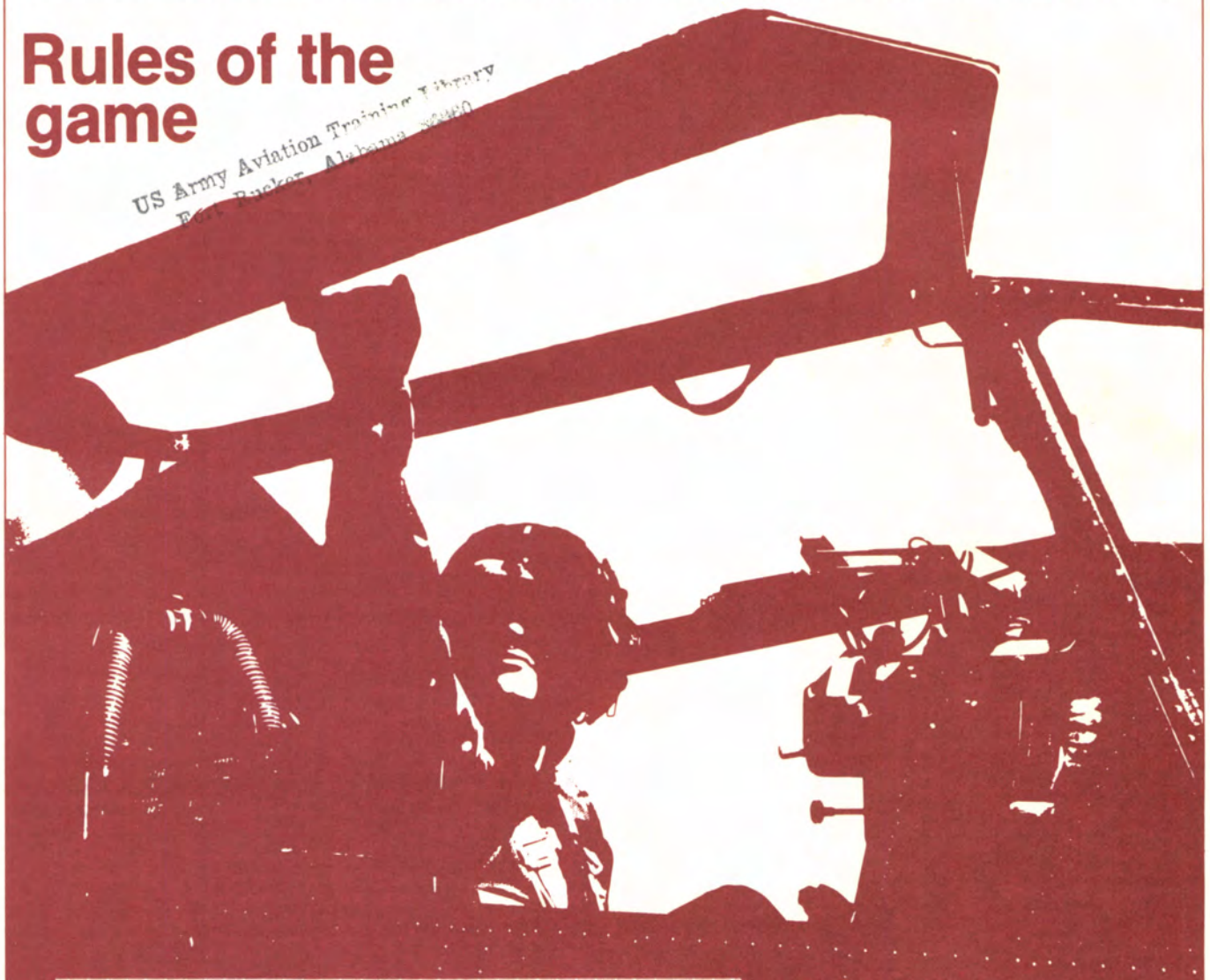
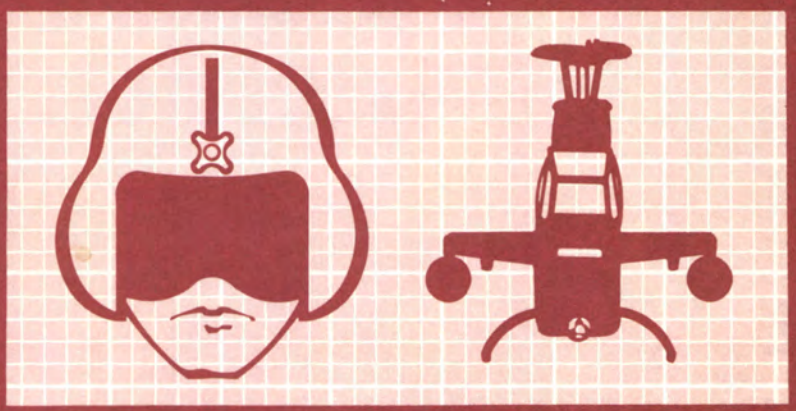




When I first started pilot training my brother, a sage military aviator, gave me a concise, accurate set of parameters designed to insure longevity in my aviation career. Basically, a simple set of rules, easy to remember—harder to practice—but ones that, when properly applied, will enable you to "live to fight another day!" I'm not saying that they will make you immortal in your aviation endeavors, but they **will** give you an "ace in the hole" when the stakes are the highest.

(continued on next page)

Rules of the game

Know your own capabilities

When you are just starting out, this is an evolutionary process. If your ego attempts to make you "run before you can crawl," you will surely violate this rule. The bottom line is: go slow, learn at your own pace. Don't try it because others can; don't let "peer pressure" force you into a situation beyond your capabilities (this is important for you "old heads," too). Learn to analyze your abilities before each flight.

Make sure that you are physically, mentally, and professionally prepared. Don't press your luck in any of these areas. No one but you can accurately assess all of these things. Mishap reports often speculate about shortcomings here, but again, only you truly know; and if you violate this rule, you may not be around to confirm the "real story." If it's beyond your present capabilities, admit it to yourself and others.

A little extra practice may be all you need to be the best (here, the best means being a consistently good aviator). As you progress in capability, don't be misled into believing that flying time equates to judgment. Experience does not either! The analysis of your experience is the key! If you make a mistake, and you will, analyze it, profit from it and **share it**—with a little "egg on your face"—with those who may find themselves in the same situation. Be realistic! Make it all work for you. Remember, Kamikaze pilots never get to brag at the bar and shoot down their hands; skilled survivors do!

Know your aircraft

This not only means knowing what makes it tick (flight manuals), but what you get when you mesh the capabilities of the aircraft with your own. Ideally, we would like our ability to match the "max" performance of the aircraft. However, this is an ideal situation, which few are likely to attain. So, knowing where to "stop pressing" becomes extremely important to your survival.

If you push yourself and your aircraft into a regime that you have never experienced before, you may find yourself flying or, more aptly put, a passenger in an aircraft totally new to you. But knowing the relationship of aircraft/aircrew capability will lessen the likelihood of this event. Remember, the performance capability of your aircraft if everything remains in working order does not change, but yours does! You are the variable. Human factors research is uncovering new facts about how pilots perform. However, this area is beyond the scope of this article.

But what if your aircraft has a "bad day" and does not work normally? Then you must be aware of what has happened, what the remaining capability of the aircraft is, and what you can do to modify or correct the difficulty. In severe cases, your recognition, analysis, and proper timely corrective action may save your life. You may only have a few seconds!

Know what the book says and stick to it. Don't try to rewrite it. Much exhaustive testing and experience went into it already! You may pay dearly for trying to add to it extemporaneously.

The training environment is the time to get your act together. Learn to make that training work for you. Don't be satisfied with just filling "the squares." (This is a subtle hint for managers as well.) Make sure you understand the rules of the game before you play against some of the best for "all the chips." ■

—adapted from FLYING SAFETY

The big little things

A recent mishap investigation revealed that during a 20-minute flight, the crew chief of a utility helicopter sat on the floor instead of a seat. He was not secured by a seat belt or any restraint system.

Before taking off, the pilot asked if everyone was ready in the rear. The crew chief said "Yes." The pilot did not visually confirm this. Luckily, the mishap did not occur during this part of the flight.

However, shortly after the passengers were let off at the field site, a mishap did occur. Fortunately, the crew chief had taken his seat and was properly secured.

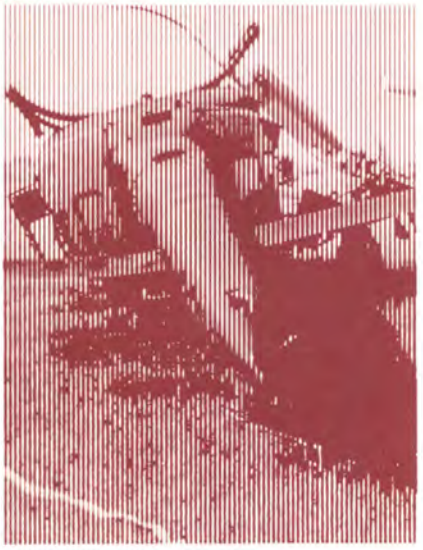
Pilots and crewmembers, not only is it required by regulation (AR 95-1), but it is just good sense to use all life support devices when operating aircraft. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) During simulated forced landing from a hover on sod, aircraft landed hard with left skid low and rolled over. Aircraft was held off the ground during the simulated forced landing until rotor rpm bled too low to cushion landing. 8235



UH-1 Class C mishaps □ (H series) Postflight inspection revealed damage to main rotor blades. Aircraft had been flying NOE. □ (H series) During rappelling demonstration at stable 100-foot agl hover, rappeller failed to make three brakes on descent. He attempted one brake, descended rapidly, landed hard, and broke his ankle.

UH-1 Class E mishaps □ (V series) Fire light came on during takeoff to hover. Caused by failure of fire control alarm box. □ (H series) Loud noise was heard, followed by moderate to severe vertical vibration. Piece of skin 5 inches wide had peeled back 3 inches from leading edge of main rotor blade. □ (H series) Crew heard loud bang from engine area, and aircraft yawed left. IP took control, identified an engine failure, and entered autorotation. Caused by failure of fuel control gear shaft. □ (H series) Master caution and hydraulic lights came on. Hydraulics pump then made grinding noise, and stiffness and feedback were felt in controls. Running landing was made. Caused by failure of hydraulics pump. □ (H series) Fuel filter light came on. Caused by malfunction of differential pressure switch.

UH-60 Class E mishaps □ Pitch bias fail light came on during runup. Caused by failure of SAS/FPS computer. □ No. 1 engine oil pressure light came on. Engine oil pressure dropped to 15 psi, torque dropped to zero, and N_1 dropped to 35 percent. Caused by malfunction of electrical control unit.

Attack helicopters

AH-1 Class E mishaps □ (S series) Autorotation was terminated with low rotor rpm and very little forward airspeed, causing aircraft to rock forward. Right viscous dampner bracket was broken. □ (G series) Airframe vibrated severely during flight. Caused by failure of No. 1 tail rotor drive shaft bearing. □ (G series) IP noticed hydraulic fluid on the ground. Caused by failure of roll SCAS solenoid elbow coupling O-ring. □ (S series) Master caution and 90-degree gearbox lights came on. Caused by failure of 90-degree gearbox assembly.

Cargo helicopters

CH-47 Class C mishaps □ (C series) Master caution and transmission lights came on. Caused by failure of aft transmission. □ (C series) No. 2 generator light came on. Caused by shorted wire on cannon plug. □ (B series) Malfunction of SAS amplifier caused hardover in yaw axis when No. 2 SAS was turned on. □ (A series) Aircraft yawed 20 degrees to left during approach. Caused by failure of No. 1 SAS yaw extensible link. □ (B series) Overhead panel began to vibrate during descent. Panel was held in place while aircraft was flown to home base. Vibration was caused by broken windshield post.

CH-54 Class E mishap □ (A series) Master caution and No. 1 rectifier lights came on. Caused by failure of voltage regulator.

Observation helicopters

OH-6 Class C mishap □ IP told rated student pilot (RSP) to initiate simulated engine failure at 1,300 feet agl directly over forced landing area. RSP reduced throttle to engine idle, reduced collective to full down position, and started 360-degree turn to left. At 180-degree point, IP told RSP that rotor rpm was increasing and moved his hand to apply collective. Rotor rpm immediately increased to more than 540. IP took control, further increased collective, opened throttle to full open position, and landed. Overspeed required replacement of main rotor hub and blade assemblies, tail rotor assembly, and main and tail rotor transmissions.

OH-58 Class E mishaps □ (A series) Pilot heard loud bang, followed by severe vibration. Tip end trailing edge of main rotor blade skin had separated on top and bottom of blade. □ (C series) Engine chip detector light came on. Check revealed small amount of metal on plug. Plug was cleaned and aircraft released. During another flight the same day, chip detector light came on again. Small amount of metal was found and aircraft was cleared for maintenance recovery to airfield. Maintenance test pilot ran engine for 15 minutes on the ground. He then flew aircraft to airfield, and chip detector light came on as aircraft approached landing pad. Test pilot hovered aircraft to parking area. As he arrived at parking space, engine failed. Caused by failure of compressor liner.

Fixed wing

C-7 Class E mishap □ Excessive power was required to taxi aircraft. No. 1 brake assembly hydraulic piston had stuck, causing brake drag.

C-12 Class E mishap □ (A series) No. 1 engine oil temperature gauge needle dropped to zero during takeoff, then returned to normal. Caused by malfunction of oil temperature indicator.

OV-1 Class C mishap □ (D series) Light jolt was felt and noise was heard. Pilot looked to left and saw cowling was missing. Failure of stud assembly front cowl latch permitted front part of cowling to catch airstream.

OV-1 Class E mishap □ (D series) Intermittent hydraulic pressure was felt in flight. Brake cylinder was leaking fluid.

T-42 Class C mishap □ Landing gear was not extended on downwind. Aircraft touched down on center line of runway and slid about 650 feet, damaging flaps, nose wheel well doors, belly, propellers, and engines. Crew did not do a before-landing check on downwind. IP did not call for final gear check and did not detect that gear had not been lowered. Crew was fatigued due to lack of sufficient rest the night before and extremely long work hours the previous week and a half. IP realized aircraft was not making a normal descent for the minimal power he had applied, but he did not realize until after touchdown that it was due to the reduced drag created by the retracted landing gear. IP's attention was mainly on demonstration and explanation of all aspects of power, airspeeds, altitudes, and distances to perform maneuver, which resulted in lack of necessary attention to before-landing check. Gear warning horn was inoperative and did not warn IP of retracted landing gear.

U-21 Class E mishaps □ (A series) Fuel was seen siphoning from left tank fuel cap during takeoff. Fuel cap was not seated correctly. □ (RU-21H) Right fuel gauge indicated 1400 plus pounds of fuel in total and nacelle positions. Max fuel load is 1200 and 370 pounds respectively. Caused by faulty fuel indicating system.

FY 82 Class A Mishap Countdown

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	February	4	6	February	**4**	**2**
	March	4	1	March	**6**	**3**
3rd Qtr	April	1	0	1-7 Apr	**3**	**0**
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**29**	**15**

Maintenance

UH-1 Class E mishap □ (H series) Loadmeter increased and acid started coming from battery vent during flight. Voltage regulator was adjusted too high for the temperature.

AH-1 Class E mishap □ (S series) Engine idle stop was set at 50 percent N_1 during runup. Serrated washer on flight idle stop cam was incorrectly positioned and torqued, allowing throttle linkage to creep.

CH-47 Class E mishaps □ (C series) Master caution, No. 2 hydraulic boost, and No. 2 SAS-off lights came on. No. 2 hydraulic boost pressure line was cracked. Caused by chafing. Crack allowed complete loss of pressure and fluid. □ (C series) No. 2 generator light came on during landing. Generator continuity relay had excess wire and numerous unnecessary splices and poor soldered connections. This allowed break in continuity, causing generator protection panel to shut off generator.

OH-58 Class E mishaps □ (A series) Master caution and tail rotor chip detector lights came on. Terminal lug attaching chip wire to detector chafed tail boom, causing short circuit on chip detector. □ (A series) Pilot felt high frequency vibration in antitorque pedals during takeoff. Tail rotor was out of balance.

C-7 Class E mishap □ Engine ran rough and backfired during takeoff. No. 7 cylinder intake valve rocker arm adjusting nut came loose, allowing valve clearance to be out of tolerance.

(continued on back page)

A position you can live with

Your chances of surviving a crash and escaping serious injuries are far greater if you assume a protective position which reduces flailing of the head, arms, and upper torso during abrupt deceleration. The protective crash position differs somewhat depending on where you sit, your restraint system, and type of aircraft.

If your restraint system is composed of a lapbelt and shoulder harness, the recommended crash position is to sit as nearly upright as possible, lapbelt snug, shoulder harness in manual lock, and without slack between the chest and the straps. With the shoulder harness locked, the body is relatively stabilized to spread crash forces over a longer, more tolerant area of the body when horizontal forces are generated. With vertical forces the locked shoulder harness insures a vertically erect, stable, and untwisted spinal alignment as well. This position is similar to that recommended for ejection, as in the OV-1, i.e., head and shoulders placed firmly against the back of the seat. The upright position permits the vertical impact to be absorbed by the spinal column in the direction in which it was designed to absorb impacts, the vertical axis. If you are not doing the flying, place your feet on the floor, not on the pedals, and keep your hands off the controls.

If your restraint system consists of a lapbelt only, assume the forward-folded knee-chest position. This position is attained by bending forward at the waist with the feet firmly on the floor and the chest resting on the knees. The position is held by folding and locking the arms around and behind the thighs with the hands and placing the head face down between the knees. This position will likely reduce flailing of the head, arms, legs, and upper torso during abrupt horizontal deceleration, thus preventing injury. It will prevent whiplashing of the spine, decreasing the possibility of fractures. Further it will tend to reduce the loads sustained by the occupant's seat and thus decrease the likelihood of seat failure. The forward-folded knee-chest position is recommended regardless of whether you sit facing forward, sideward, or rearward on present Army aircraft troop seats (except the Black Hawk, which has shoulder harnesses).

Sitting upright without a shoulder harness is not recommended because of the difficulty in remaining upright by force of muscles alone. The forward-folded knee-chest position prevents flailing of the upper torso and possible injury caused by forceful flexing, because the spine is already flexed and held in position by the locked arms. Finally, the forward-folded knee-chest position offers a smaller target for dislodged missiles within the aircraft or objects that may penetrate your livable space.

It doesn't matter whether the crash forces are vertical or horizontal. The crash position is the same. ■

Mishap briefs

Messages received

• Safety-of-flight message concerning one-time inspection of forward main gearbox support fitting for CH-54A and B aircraft (CH-54-82-03, 241903Z Mar 82). Summary: Recent field investigations revealed six forward main gearbox support fittings with cracks. A one-time inspection is considered essential to determine if any other aircraft have defective fittings. Contact: Mr. Michael West, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight message concerning one-time inspection of servo extension tubes (AH-1-82-02, 251500Z Mar 82). Depot team will visit all sites to inspect suspect tubes and determine need for corrective action or replacement.

• CH-54 maintenance information message concerning elimination of overhaul intervals on T73-P-1 and T73-P-700 engines on CH-54A and B aircraft (292045Z Mar 82).

• UH-60 information message concerning T700 turbine gas temperature limit increase (222000Z Mar 82). A change in the overtemperature operating limits for the T700-GE-700 engine has been authorized. The current edition of TM 55-2840-248-23 is scheduled to be replaced by a new edition about mid-1982. The new overtemperature limits will appear in a future change to this new edition and will read as follows:

a. 0 degree-775 degree C. - no time limit

b. 775 degree-850 degree C. - 30 minutes

c. 850 degree-950 degree C. - 12 seconds transient

d. Above 950 degree C. - no operation allowed

e. Engines operated above 950 degree C. must be removed from service for overtemperature inspection. Engines operated above 886 degree C. and below 950 degree C. for transient periods of 12 seconds or less require troubleshooting in accordance with TM 55-2840-248-23.

These limits will apply to operations above ground idle and also during start to ground idle and ground idle to shutdown.

Action has been taken to have TM 55-1520-237-10 revised to reflect these new overtemperature limits and will read as follows: "Maximum 12 second transient for all operations (red) 850 degree C.-950 degree C." All other turbine gas temperature limits in TM 55-1520-237-10 will remain unchanged.

This message may be considered as authority to implement these changes until printed changes to the manuals are received.

POC is Mr. Robert Clark, TSARCOM, AUTOVON 693-3300, commercial (314) 263-3300.

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

Changes to TMs

The following changes have been released:

• Change 4, dated 8 Feb 82, to TM 55-1520-214-CL, for OH-6A.

• Change 23, dated 22 Feb 82, to TM 55-1520-235-10, for OH-58C.

• Change 18, dated 18 Mar 82, to TM 55-1520-228-10, for OH-58A. ■

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 26 □ 14 Apr 1982

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Mishap review: loss of tail rotor effectiveness

Synopsis

An OH-58A, on a service support mission in mountainous terrain, lost tail rotor effectiveness when the pilot tried to make a 180-degree right turn. After about 160 degrees of the turn was completed, the tail of the aircraft pitched up. The OH-58 then spun to the right several times and crashed.

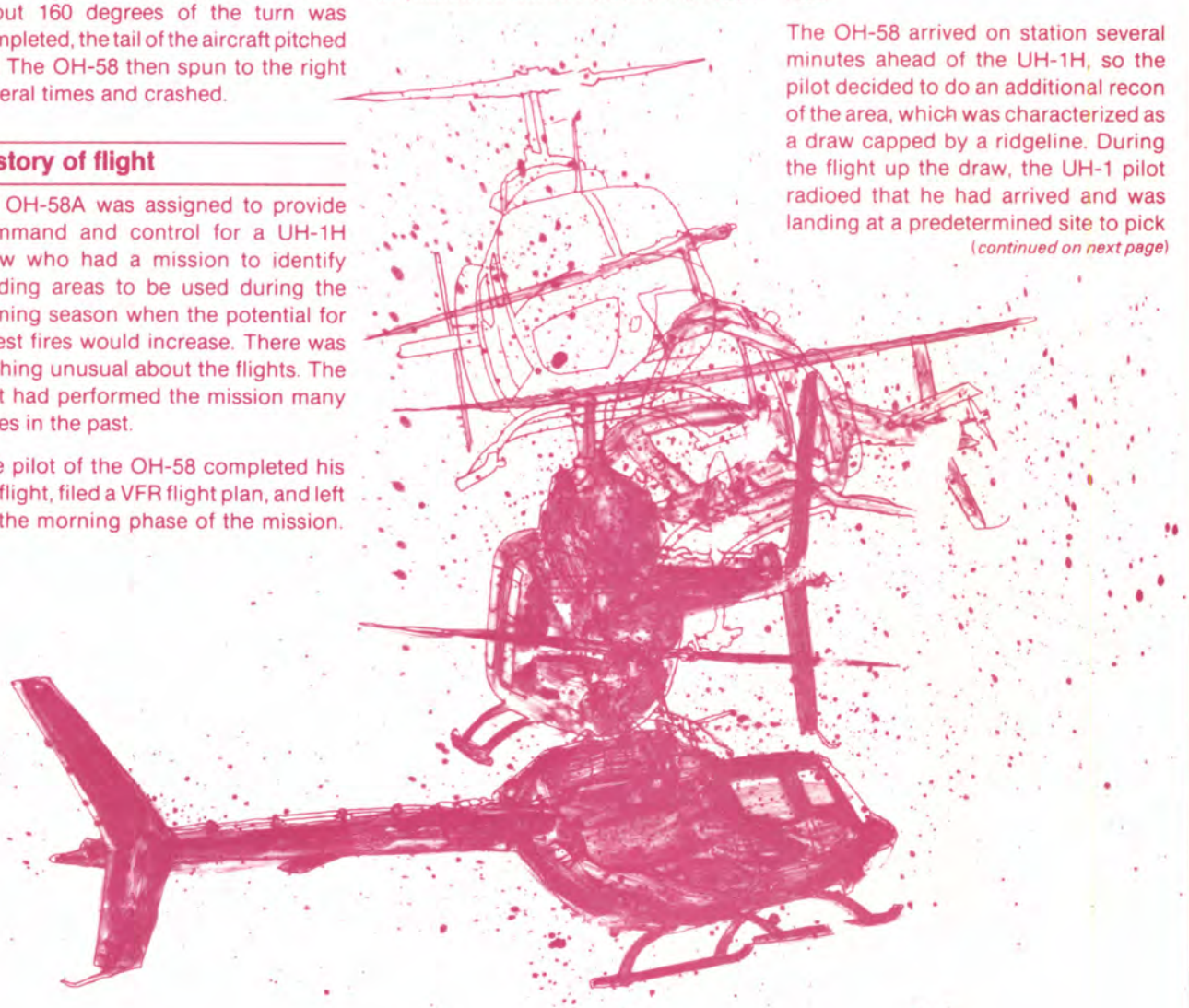
History of flight

An OH-58A was assigned to provide command and control for a UH-1H crew who had a mission to identify landing areas to be used during the coming season when the potential for forest fires would increase. There was nothing unusual about the flights. The unit had performed the mission many times in the past.

The pilot of the OH-58 completed his preflight, filed a VFR flight plan, and left on the morning phase of the mission. The flight was completed without difficulty and, as the noon hour approached, the crews of both aircraft returned to the airfield for fuel and food. After the lunchbreak, the pilot did a walk-around inspection of the OH-58 and then took off for the afternoon phase of the mission. Moderate turbulence had been forecast for the afternoon hours, with winds of 20 to 25 knots and density altitude expected to approach 5,000 feet.

The OH-58 arrived on station several minutes ahead of the UH-1H, so the pilot decided to do an additional recon of the area, which was characterized as a draw capped by a ridgeline. During the flight up the draw, the UH-1 pilot radioed that he had arrived and was landing at a predetermined site to pick

(continued on next page)



Loss of tail rotor effectiveness

up some cargo. The OH-58 pilot then decided to make a 180-degree turn down the draw to rendezvous with the UH-1.

As the pilot tried to turn right, airspeed was allowed to decrease from 60 to 20 knots, a 20- to 25-knot tailwind was encountered, and moderate turbulence was felt. After about 160 degrees of the turn was completed, the tail of the aircraft pitched up and the aircraft began to spin to the right. The pilot reduced collective pitch (power) and applied forward cyclic to try to stop the spin. The OH-58 began to descend and continued to spin. The spin was stopped a few feet above the trees, but the aircraft continued to fall to the ground. The pilot and observer escaped uninjured.

Crewmember experience

The 32-year-old pilot had about 900 hours of rotary wing flight time, with 600 hours in the OH-58A.

Commentary

During the turn, the pilot focused his attention on the terrain and other outside influences and did not detect the reduction of airspeed or give specific thought to the effect of a 20-to 25-knot tailwind. As a result, the aircraft was placed in an environment where effective translational lift was lost and additional power was required to maintain flight altitude. The pilot's demand for power exceeded the power available, so a bleedoff of rotor rpm could have occurred.

The power available was reduced because the coupling nut on the engine bleed air line was not correctly torqued or fitted during installation. This resulted in excessive wear between the line flare and fitting, which ultimately allowed bleed air to escape during engine operation. So the engine was not capable of developing full power during the mishap sequence. When collective pitch was applied during the 180-degree turn with low airspeed, maximum power could have been demanded from the engine at a significantly lower power setting than was expected by the pilot.

In this particular case, the aircraft had been operating with the incorrectly fitted coupling nut for quite some time. But it had not been a problem in the past because the aircraft had not been placed in an environment where maximum power would have been required. The possible maximum demand for power, combined with low airspeed, high density altitude (5,000 feet), and operation in a high tailwind condition, resulted in the loss of tail rotor effectiveness.

The OH-58A will be incapable of producing sufficient tail rotor control if the right combination of conditions in the operating environment are met. Before this mishap, the pilot had successfully flown this aircraft with no difficulties. The only thing different during this turning maneuver was that he let his airspeed drop below effective translational lift, which served as the catalyst to trigger the other conditions present.

All OH-58 pilots should be aware of the conditions in which loss of tail rotor effectiveness can occur and the recommended procedures for recovery.

A National Guard TV tape on OH-58 loss of tail rotor effectiveness is now available at your local Training and Audiovisual Support Center. This TV tape, 46-2, is titled "How Not to Crash—By the Book." ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps □ (H series) On first attempt at pinnacle landing, pilot ran out of left pedal and aircraft began to yaw to right. Go-around was made, followed by a second approach. Aircraft again ran out of left pedal and rotor rpm began to bleed off. Aircraft made one complete 360-degree right turn before IP got on the controls. Aircraft continued to spin, landed hard, and rolled onto left side. 8236 □ (H series) Aircraft hit wires, crashed, and burned. 8237

UH-1 Class C mishaps □ (H series) Crew encountered snow conditions and attempted 180-degree turn to fly out of snow. Visibility deteriorated and crew tried to set aircraft on ground. Attempt resulted in hard landing. □ (H series) Main rotor blades hit top of tree during approach to pinnacle. Both blades were damaged. □ (H series) Loud bang was heard from engine during climb. Aircraft yawed left and pitched up. Engine noise decreased, and rpm warning light came on. Aircraft was autorotated into 3 feet of water. Caused by engine failure.

UH-1 Class E mishaps □ (H series) Crew chief smelled fuel fumes and saw fuel running onto cargo compartment floor. Caused by failure of main fuel manifold nozzle seal. □ (A series) Low rpm audio and warning light activated as rotor tachometer needle dropped to zero. Caused by failure of rotor tachometer. □ (H series) Master caution and engine oil pressure lights came on. Engine oil pressure dropped to zero and engine oil temperature exceeded 125 degrees for 40 seconds. Caused by failure of engine oil pump. □ (H series) Main generator voltage regulator circuit breaker was reset during runup. Main generator came on line. Starter generator arced, burning a hole through brush cover and fire shield assembly. Caused by broken brush hold-down spring. □ (H series) During demonstration of hydraulics-off touchdown, cyclic abruptly moved to right front quadrant. After control was restored, hydraulic power was turned on. Postlanding inspection revealed cyclic centering spring that attaches to swashplate was missing. □ (H series) Severe vibration was felt, and aircraft was landed. Part of bonding on main rotor blade separated, allowing 6 inches of leading edge to peel back.

UH-60 Class A mishap □ Aircraft crashed. Details unknown. Mishap is being investigated. 8238

UH-60 Class E mishap □ When copilot retarded power control lever on No. 1 engine during HIT check before takeoff, he inadvertently pulled it past idle detent position. Engine-out audio and caution light activated. No. 1 engine was shut down. After tgt dropped below 275° C., another start was attempted. Pilot and copilot monitored instruments and noticed tgt slightly rising toward 850° C. Pilot's attention was then diverted for a second as he glimpsed spiking on torque gauge. Pilot immediately looked back to tgt as it registered 950° and then 1,000° C. Weak idle detent spring allowed inadvertent positioning of power control lever to off. No. 2 anti-icing valve was also known to stick.

Attack helicopters

AH-1 Class C mishap □ (S series) AH-1 had landed for fuel. Rotorwash from hovering UH-1 caused main rotor blade of AH-1 to flex and damage No. 4 tail rotor drive shaft.

AH-1 Class E mishaps □ (S series) Oil was seen dripping from underside of aircraft during runup. Caused by cracked elbow fitting on transmission oil line. □ (S series) Master caution and engine oil pressure lights came on. Caused by failure of engine oil pressure switch. □ (TAH-1S) Engine oil pressure fluctuated during landing. Caused by failure of engine harness conductor. □ (S series) Master caution and engine inlet air lights came on during takeoff. Caused by failure of master caution panel. □ (S series) Master caution and engine oil bypass lights came on. Caused by loss of oil due to failure of engine oil lubrication seal.

Mishap briefs

Maintenance

UH-1 Class E mishaps □ (H series) Pilot, on maintenance test flight, entered autorotation to check rpm. Rotor rpm exceeded red line before enough collective was applied to lower rpm. PIC links were set at nominal length. There is a possibility of zero pitch in blades. □ (H series) Fuel leak was detected during runup. Caused by loose clamp on fuel filter.

UH-60 Class E mishap □ Stabilator failed and would not reset during approach to LZ. Accelerometers were out of adjustment.

AH-1 Class E mishap □ (S series) Noise was heard and yaw SCAS channel became inoperative during landing. Master caution and No. 1 hydraulic lights came on. Aircraft yawed left. Running landing was made. Chafed hydraulic lines ruptured.

CH-47 Class E mishap □ (C series) Transmission oil hot light came on. Caused by loose cannon plug on combining transmission temperature probe.

OH-58 Class E mishaps □ (C series) Tail rotor chip detector light came on. Caused by bent chip detector receptacle.□ (A series) Before flight, pilot noticed transmission oil was low. Crew chief added oil. At completion of flight, pilot saw oil on left side of fuselage. Transmission filler cap was off. Crew chief left cap off after adding oil.

Messages received

• Safety-of-flight technical message on one-time inspection of CH-47B/C rotor blade shock absorbers (CH-47-82-02, 011630Z Apr 82). Summary: Rod end locking washer is manufactured from spring steel and heat treated. If jam nut is tightened with locking washer tang not engaged in the slot in the piston, or the washer reversed, the tang can be fractured and, although subsequently reassembled correctly, may fail in service. Separation of rod end from a rotor blade shock absorber may result in a blade strike on the fuselage upon shutdown. Rotor blade shock absorbers will be visually inspected for correct installation of locking washer. Contact: Ronald Desplinter, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

• CH-54 maintenance information message concerning elimination of overhaul interval on CH-54B intermediate gearbox assembly (MIM 82-54-5, 021750Z Apr 82).

• Message from DA concerning helicopter seat and seatbelt removal during combat assault training (292002Z Mar 82). Until further notice, seats and seatbelts will not be removed from helicopters for combat assault training. This restriction is not waiverable at any level. All other provisions of par. 3-25, AR 95-1, remain in effect. This policy will be included in the forthcoming revision of AR 95-1.

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

Change to TM

Change 19, dated 19 Mar 82, to TM 55-1520-228-10, has been released.

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Cargo helicopters

CH-47 Class E mishaps □ (C series) Transmission oil pressure gauge fluctuated during start. Caused by failure of pressure transducer. □ (B series) Copilot's control centering device would not release. Caused by failure of control centering switch. □ (B series) No. 1 engine fire light came on during landing. Caused by failure of sensing element.

Observation helicopters

OH-58 Class E mishaps □ (A series) Starter began smoking during engine start. Starter generator burned up. □ (A series) Nose of aircraft yawed left, rpm warning light came on, and low rpm audio activated. N_2 was 95 percent. Collective was partially lowered, throttle checked full on, and linear actuator beeped in the increase direction. Rpm increased to 100 percent. Running landing was made at airport. Maintenance checked fuel and pneumatic lines, engine, and power train. Runup and deceleration check was made. Aircraft was cleared for flight to maintenance facility. Aircraft performed normally during flight. □ (A series) During termination of approach, observer bumped cyclic and tail skid hit ground. □ (A series) Two attempts to start aircraft were unsuccessful. On third attempt, TOT gauge showed rapid rise in temperature. TOT peaked at 600°C. and quickly cooled to below 200°C. Crew chief told pilot there was a fire in exhaust stack. Pilot turned off fuel valve handle and fuel boost pump, checked to insure throttle was off, and motored starter in an attempt to blow out fire. This was unsuccessful. As a last resort, pilot discharged aircraft fire extinguisher into exhaust stack and extinguished fire.

Fixed wing

U-8 Class A mishap □ (F series) Crew was on instrument renewal evaluation flight. When landing gear was lowered, cockpit landing gear indicator revealed right main gear was not safely locked down. After gear was recycled, an unsuccessful attempt was made to pump it down. Attempt was then made to retract gear for gear-up landing. Gear did not retract. Tower personnel said gear appeared to be fully extended. On landing, gear held at touchdown. During rollout, right main gear collapsed, and aircraft slid off runway into ditch. 8239

U-21 Class E mishaps □ (RU-21H) Left brake began to drag and smoke during taxi for takeoff. Brake puck had come loose and wedged between another brake puck and brake disc. Resulting heat and pressure caused brake housing to crack. □ (A series) Landing gear handle was placed in down position during approach. When gear locked down, left main gear indicated unsafe, but landing gear handle light was not on. Landing gear was recycled. Gear was then pumped down manually and tower flyby was made for visual check of gear. Postflight inspection revealed failure of toggle switch.

C-7 Class E mishaps □ Right hydraulic low pressure light came on during taxi. Caused by failure of hydraulic pump. □ Right main gear did not fully retract after takeoff. Gear was recycled up. When gear was lowered for landing, it extended to almost down and locked position. Pilot made touch-and-go landing on left main gear and gently lowered right main gear to runway while applying right brake. Right main gear locked down. Caused by steel spring in right main gear dust cover boot failing at weld point. Broken spring worked out of worn boot and lodged between main landing gear strut housing and capsule, jamming gear at 15-degree retracted position.

(continued on back page)

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	1-14Apr	**6**	**6**
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**30**	**21**

Shortfax

Protect your night vision

Eyes are sensitive. Everyone knows the pain of a minute foreign object in the eye. But eyes suffer from things other than foreign objects.

Sunlight, that commodity that is generally so abundant in the summer, can be too much of a good thing for the eyes. The acceptance of the need for skin protection from the harmful rays of the sun is practically universal, but not so the need for eye protection from sunlight. The eyes are more sensitive and vulnerable than the skin. Shouldn't you afford them the same or greater protection?

Sunglasses act as a protective screen for your eyes. The best sunglasses should screen out at least 70 percent of incoming light, according to the American Optometric Association. The Army has sunglasses available to meet this requirement. Nonprescription sunglasses come from Central Issue Supply; prescription sunglasses come from the hospital.

Especially important for aviators and combat soldiers, sunglasses protect your night vision. A single prolonged exposure to sunlight interferes with night vision for several hours. Studies have shown that daily exposure to sunlight has a cumulative effect on night vision.

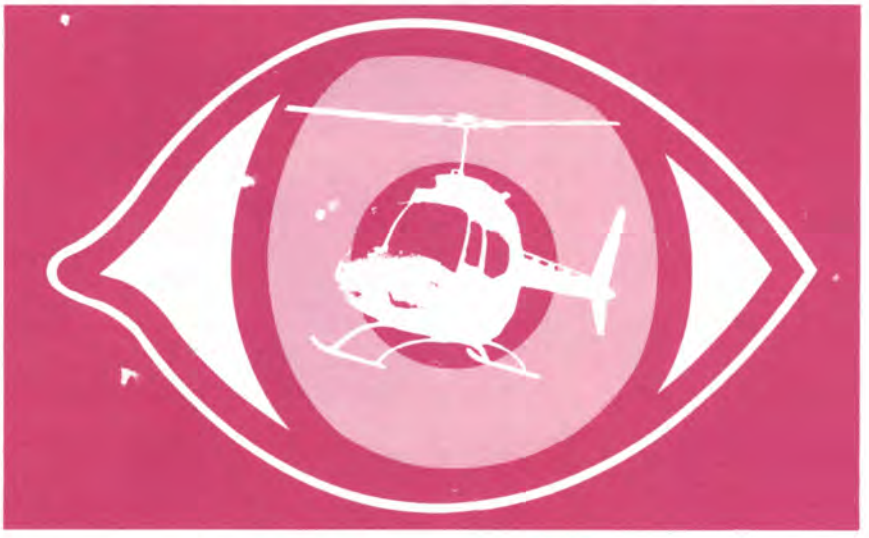
Daily exposure to sunlight without adequate protection—a few days at the beach or beside a pool, for instance—can cut night vision acuity in half, decrease range visibility by half, and decrease contrast discrimination by half.

Sound strange? It's not, really. There is a sound reason for this occurring. The underlying principle governing dark adaptation sensitivity is the quantity of rhodopsin available in the back of the eye. Rhodopsin is the light capturing molecule carried in the rod receptors of the retina. When light strikes the retina, the rhodopsin is bleached and must regenerate.

This takes time. As more rhodopsin is bleached—more exposure to sunlight—more time will be required to recover.

The simple way to prevent ill effects of exposure to sunlight is to wear adequate sunglasses, on duty or off. Your eyes will feel better during the bright day and your night vision will be protected.

Just a word of caution: Don't overdo a good thing. Sunglasses are not to be worn at dusk or after nightfall. Visibility doesn't need to be limited at night. ■



New TV tape

National Guard TV Tape 46-2, "How Not to Crash—By the Book," is available at your local Training and Audiovisual Support Center (TASC). This TV tape addresses the flight conditions and maneuvers associated with OH-58 loss of tail rotor effectiveness mishaps, the preflight performance planning process, new ATM (TC 1-137) procedures applicable to the subject, flight techniques to follow to avoid the condition, and corrective action to take if loss occurs.

The Safety Center highly recommends this 31-minute tape. Get it and show it to your rotary wing aviators. ■

The big little things

Quite often, aviators take for granted certain tasks which could mean the difference between no injury and serious injury or death should a mishap occur. For instance, passengers should always be briefed on the specifics of the mission, actions to be taken in the event of an emergency, and the location and use of life support equipment. Remember that everyone you transport will not be familiar with the characteristics of the aircraft you are flying.

Regulation requires a passenger briefing, and it is the duty of the pilot to insure that a briefing is done. That extra minute or two and the inconvenience of exiting the aircraft will be well worth it should a mishap occur.

Passenger safety is your responsibility. Accept it. ■

Flightfax

Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 27 □ 21 Apr 1982

Who causes the crash: supervisor, pilot, or both?

As commander of the Army Safety Center it is my job to assist commanders in preventing aircraft mishaps. To do this, I have a staff of safety professionals who continually review, study, and analyze the more than 23 years of aircraft mishap experience stored in the Safety Center's data bank. Analysis of this data continues to identify supervision—actually the lack of adequate safety supervision—as a major cause of aircraft mishaps.

Pilot error also continues as a major cause of aircraft mishaps. Almost always, in those mishaps charged to supervisory error, you will also find pilot error, e.g., faulty judgment, inexperience, overconfidence, improper motivation, etc. Conversely, a great number of the mishaps charged to pilot error also contain supervisory error.

Read the following six mishap briefs and decide for yourself whose error caused the crash.

Case 1

The unit was engaged in a field training exercise. The flight of nine Hueys took off for a night terrain flight in weather conditions below that required for night VFR. The air mission commander did not get a current weather briefing before the flight. The unit commander, who participated in the flight, did not monitor the activities of the mission commander to insure that required mission and preflight planning tasks were performed.

The pilot of the No. 2 aircraft, flying with an inoperative and possibly fluctuating attitude indicator, inadvertently placed his aircraft in a descending left turn after becoming spatially disoriented at an estimated airspeed of 40 knots and 100 feet agl over unfamiliar snow-covered terrain. The helicopter crashed, and the pilot, IP and crew chief were killed.

The pilot was on his second flight following a 45-day grounding and had done no instrument work since graduating from flight school 8 months earlier. The only weather time in his records was 2 hours as copilot during flight school.

The IP had been on duty at least 35 of the last 48 hours and was heard to complain of fatigue. The unit regulation required that maximum duty time not exceed 27 hours in a 48-hour period. Other qualified aviators were available for the mission.

Case 1

Case 2

The mission was a troop insertion during a field training exercise. Although the mission was received before the start of the training exercise, final details were not available until the morning of the mishap. The flight leader, in his haste to meet the requested departure time, did not provide route of flight data or adequate time for the other pilots to plot the coordinates before takeoff. When the flight leader began a deceleration and approach without warning to an area that did not coincide with any of the map coordinates he had given the flight, the rest of the flight was somewhat surprised.

The flight leader, unaware of the instructions in TC 1-12, led the four UH-1s in a close diamond formation to a landing in a snow-covered field, instead of spacing them out at 15- to 30-second intervals. During termination of the landing, rotor-induced blowing snow developed, and the pilot of the No. 3 aircraft lost outside visual reference with everything except the top of the tree line to his front. The aircraft drifted backward, rolled right, and came to rest inverted.

(continued on next page)

Case 2

Who causes the crash?

When the approach was initiated, the No. 3 pilot used a greater than normal decelerative attitude to regain and maintain position in the formation throughout the approach. This aft cyclic condition was probably present when the aircraft entered the rotor-induced blowing snow and resulted in the aircraft drifting to the rear once outside visual reference was lost by the crew. The copilot, concerned with landing at the wrong LZ, was engrossed in his map during termination of the landing and did not initiate a go-around. The pilots of the No. 2 and 4 aircraft did not land in the LZ after seeing the blowing snow induced by the first aircraft.

Case 3

A pilot and copilot were assigned a service mission in a CH-47C. Both aviators were inexperienced in CH-47Cs and this was the first time either aviator had flown a CH-47C equipped with T55-L7C engines.

A preplanned weight and balance form was prepared for the mission. When the aircraft was loaded, the weight and balance form was not checked for accuracy. Six people were aboard the aircraft.

Case 3

The crew was not aware of the power available or required for the operation of the aircraft because they had not prepared a performance planning card. During the takeoff, the pilot applied enough thrust to cause rotor rpm to bleed off. The copilot, who was monitoring the instruments during takeoff, did not know that an excessive power demand had been made on the engines because he was not aware of the maximum power available or required.

The CH-47 had reached an altitude of about 75 feet, flown through translational lift, and was approaching a tree line at the onset of the decrease in rotor rpm which was caused by an excessive demand for power from the engines. The pilot did not reduce thrust sufficiently to regain normal operating rpm.

While the copilot was trying to increase power from the engines, the pilot overflew a large clear area which could have been used as a landing area. The aircraft, which did not have sufficient power available to meet power required for the prevailing conditions, gradually descended because of main rotor bleed-off. By the time the pilot realized that further flight was impossible, a safe landing area was not available.

The bottom of the aircraft passed through the tops of two trees. The right rear wheel assembly hit the ground first, and the aircraft rolled on its right side.

Case 4

The crew was on a tactical training mission. They had been operating in a tactical environment from a field location for 2 weeks and had been living in tents. The weather was cold. The pilot had not been eating properly, resulting in a low blood sugar level. He was experiencing mental stress from personal problems and was undergoing

Case 4

psychological therapy. The unit commander was aware of the pilot's problems but unaware of their overall extent and effect on aviator performance. He did not refer the pilot to a flight surgeon or remove him from flight status pending resolution of his personal problems.

The crew 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. After sighting suspected aggressor tanks, the pilot hovered his AH-1 about 45 feet above the ground among several trees. The pilot was concentrating on the tanks, and the copilot was looking at the map, at the expense of maintaining aircraft control. The crew then heard a loud bang. The aircraft had hit a 50-foot tree. Antitorque control was lost, and the aircraft crashed.

Case 5

The training mission involved team gunnery tactics, using an OH-58A as the scout aircraft and two UH-1Ms as gunships. The pilot of the OH-58 had not received adequate individual training in terrain flight missions or terrain flight maneuvers. His last tactical/NOE evaluation was 2 years before and involved a different aircraft and different mission. The unit SOP did not contain guidance on aircrew duties, procedures, and responsibilities in the terrain flight mode for the unit's attack helicopter mission.

While flying toward rising terrain, the OH-58 pilot, looking out the left side of the aircraft, completed a downwind turn at 30 knots and 100 feet agl. When he looked forward again, he thought the aircraft was descending. It was not. It was probably climbing, but the elevation of the terrain increased about 150 feet in a 200-meter distance along the flight path. Also, groundspeed had doubled from 20 knots to 40 knots because of the turn to downwind.

The pilot interpreted the perceived descent as an indication of power loss. He was unfamiliar with the conditions necessary for settling with power and how this differs from a loss of power. As a result he reduced collective to see if that would improve the situation. This caused the aircraft to descend faster and confirmed the pilot's belief that there was a loss of power.

The pilot selected a forced landing area and continued a power-on approach. The helicopter touched down on a snow-covered slope and slid into some trees.

The pilot did not fully use his observer to accomplish the mission. He concentrated his attention on an observation task at the expense of his primary duty, which was flying the aircraft.

Case 5

Case 6

The OH-58 service mission was scheduled to be flown single pilot in marginal VFR conditions during the hours of darkness with several aircraft discrepancies (lack of a radio magnetic indicator, inoperative console light rheostat, and badly scratched windshield). Weather conditions included a 400- to 500-foot ceiling, light drizzle, and fog. There was a scattered layer of scud at 100 feet.

Shortly after takeoff, the pilot inadvertently entered IMC and became disoriented. He called flight following and told them he was changing frequencies, indicating a lack of familiarity with instrument recovery procedures. No further transmissions were received from the pilot. During the conversation, the aircraft began a sustained right turn to the south. Shortly afterward, control was lost and the OH-58 slammed into the ground, killing the pilot and two passengers.

Case 6

The pilot had logged about 300 hours in rotary wing aircraft. He had 14 hours in the UH-1 SFTS, only 1 hour of hooded flight in the OH-58, and 5½ hours of night flying in the past 6 months.

Typical cases

These cases are typical examples of tragic crashes caused by unreasonable action or inaction on the part of aircrews and supervisors. Remember, no one yet has come up with a new or unique way of crashing aircraft—we still do it the same way we did 20 years ago. The real tragedy is that it's a people problem, and that means it can be corrected.

How do we prevent these human-error crashes? Supervisors have to prevent them, and the first guy in the chain is the pilot in command. Then comes the air mission commander, ops officer, company commander, and battalion commander. And who is the most important person in this chain? In my opinion it is the battalion commander. I am convinced that we can reduce or even eliminate the so-called "dumb" accidents if battalion commanders will get, and stay, actively involved—if not already—with the flight operations of the companies, and, more importantly, pay attention to what the safety officer is saying. Therefore, I am also convinced that the key to success for accident-free hours of flying lies squarely on the shoulders of battalion commanders. While mission accomplishment is paramount, the mission is never accomplished unless the aircrews and aircraft return safely to fly again another day—and the battalion commander is the one individual who directly influences mission accomplishment.

Every person in the chain of command must establish an atmosphere within their organization that leaves no doubt that all hands are expected to prepare themselves professionally and execute their missions with integrity and discipline. There can be no approval of corner cutting and expediency to get the job done. It is a proven fact that most people will perform the way they think they are expected to perform. If commanders demand professionalism, sound airmanship, and flight discipline, they will get it.

All too often, aircrews are ready and willing to try to do more than they are capable of successfully accomplishing. This can-do attitude must be tempered with experience and sound judgment, and that's the job of those in supervisory capacities. Commanders must know the capabilities and limitations of their aviators. Aircrews must be carefully selected and paired, and their abilities, experience, and training must measure up to the mission they are assigned.

On the other hand, the guys with their hands on the aircraft controls have a safety responsibility to their commander. And that calls for professional flight discipline . . . operating the aircraft in strict accordance with established procedures . . . following SOPs and command directives, regulations, and operators manuals. To not do this is a flagrant violation of the trust and confidence placed in aircrews.

Who caused the crash?

In most cases the blame is shared equally by the supervisor and the pilot, just as both share equally the responsibility for the safe completion of the mission. A successful flight safety program protects the people it involves, and the people involved protect the safety program. It's a two-way street.

All too often, I run into warrant officers who are trained safety officers who state: "I wish my battalion commander would just listen and take my advice." In this connection, let me share with you a few quotes from one battalion commander who wrote me recently:

"I have said many times in my 27 months . . . of battalion command that as battalion commander, I am also the battalion safety officer."

"I demand a safety officer who will also get out into the battalion's business and take positive, dynamic action in behalf of safety."

"I have clearly gone on record as stating I won't stand for protocol or parochial reluctance to take direct/immediate corrective action. I can always sort out injured feelings later; but I cannot change the finality of death, serious injury, or loss of our equipment resources."

This battalion commander has an impressive 30,000 plus accident-free hours of flying in his unit.

As of this date, the Army has had 30 Class A mishaps and 21 fatalities this fiscal year. We can ill afford such a record and only **you** can get it stopped. Think of it in these terms: If we only count the Class A mishaps where materiel failure or maintenance was the cause, we would only have two Class A mishaps and two fatalities so far this fiscal year.

As a final note, remember that all aviation crewmembers, PICs, IPs, air mission commanders, operations officers, and commanders must constantly remain aware of their responsibility for the safe operation of the aircraft entrusted to them and the safety of the people under their span of control and influence.

Colonel Joseph R. Koehler
Commander, U.S. Army Safety Center

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	1-21Apr	**6**	**6**
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**30**	**21**

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (V series) Aircraft was participating in a search mission in mountainous terrain. Flying at 12,300 feet msl, pilot allowed aircraft to slow to 20 to 30 knots while in a 20- to 30-knot downwind condition. Aircraft encountered downdraft condition and pilot tried to stop sink rate with additional collective pitch. Demand for power exceeded that available and engine/rotor rpm bled down. Aircraft spun to right and crashed on the side of a mountain. Pilot, copilot, crew chief, medic, and technical observer were injured. Pilot had received no mountain flying training. 8240

UH-1 Class C mishaps □ (H series) Copilot, with sun in his eyes, started approach to jungle LZ. Approach was excessively steep and fast. Pilot took controls and decided to try to complete approach rather than go around. Approach was still too steep. Pilot ran out of left pedal. Aircraft hit ground left skid low, cracking saddle mount. □ (H series) Copilot was preparing to take off from refueling point. There was a direct tailwind of 20 to 25 knots because of the location of the refueling points. As aircraft was brought to hover, it began rotating left and sliding toward refueling nozzle brackets which were about 3 feet high. Copilot felt he could not control aircraft and was going to hit refueling nozzle. Collective was lowered, and aircraft touched down while rotating left, spreading both cross tubes. □ (H series) Aircraft on maintenance flight vibrated slightly. Crew landed to make adjustment to correct vibration. After aircraft was shut down, mechanic found that right engine cowling was open and damaged. Lower left latch showed no indication of failure, but appeared to be incorrectly closed.

UH-1 Class E mishaps □ (H series) Compressor stall occurred during emergency governor operational check. Caused by malfunction of fuel control. □ (H series) Squealing sound was heard from rear of aircraft during climb. Hydraulic light came on and hydraulics were lost. Running landing was made. Caused by ruptured hydraulic hose. □ (H series) Master caution and hydraulic lights came on. Caused by failure of caution control panel. □ (H series) Transmission oil pressure light came on. Caused by failure of transmission oil filter gasket.

UH-60 Class C mishap □ When crew tried to start APU, master caution and APU lights came on. Postflight inspection revealed fire damage in APU compartment. APU combustor housing cracked where fuel drain check valve attaches.

UH-60 Class E mishaps □ Smoke and fumes were present in cockpit. Windshield wiper switch had been left in low position, causing motor to overheat. □ Loud whine was heard from No. 1 engine during runup. Second-stage compressor section received FOD.

Attack helicopters

AH-1 Class C mishap □ (G series) Tail rotor blades hit tree branches during OGE hover.

AH-1 Class E mishaps □ (S series) Transmission external filter button popped. Caused by failure of transmission oil filter assembly. □ (S series) Engine oil pressure fluctuated. Caused by failure of oil pressure transducer.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Utility hydraulic pressure gauge dropped to 1500 psi during runup. Caused by failure of utility hydraulic pump. □ (C series) Crew chief saw hydraulic fluid leaking in vicinity of No. 1 hydraulic flight boost manifold. Caused by deterioration of washer. □ (C series) No. 2 engine oil pressure went to zero during start. Caused by failure of oil pressure indicator. □ (C series) Engine began surging, then dropped off line. Caused by N_1 actuator failure.

Observation helicopters

OH-6 Class C mishap □ Aircraft touched down right of runway center line during termination of standard autorotation with left quartering tailwind. Pilot applied full left pedal to try to stop aircraft. IP took controls and followed right turn with cyclic. Aircraft slid off runway and rolled on right side.

OH-58 Class A mishap □ (A series) Pilot was flying 20 to 25 feet above trees. Winds were reported at 10 knots gusting to 25 knots. As airspeed dropped below 5 knots, aircraft began to drift to right and then spin to right. Pilot applied full left pedal and forward left cyclic. Spin accelerated and aircraft fell through 50-foot trees, coming to rest on left side. 8241

OH-58 Class C mishap □ (C series) Aircraft was flying at 80 knots and 30 feet agl. Crew's attention was diverted to right side of aircraft. When pilot looked to front, he saw trees at rotor height and initiated cyclic climb with power. Aircraft hit trees, knocking out chin bubble. Antitorque pedals were also damaged.

OH-58 Class E mishaps □ (A series) Deceleration check took less than 2 seconds to reach lower limits. Caused

(continued on next page)

Mishap briefs

by malfunction of fuel control. □ (A series) Smoke entered cockpit during runup. Caused by burned-out flasher unit. □ (A series) During start, N_1 generator would not come on line after reaching 62 percent. After generator was reset, it came on line and engine quit. Clicking noise was heard during coastdown. While noise was being investigated, blades stopped. N_1 would not go above 10 percent. GPU was used to attempt another start. Start button was pressed and then released. N_1 continued to pop. Caused by malfunction of ignition switch.

Fixed wing

C-12 Class E mishaps □ (A series) Door-open light came on during flight. Caused by failure of microswitch. □ (C series) No. 2 engine oil pressure fluctuated and slowly decreased. Caused by malfunction of oil pressure transmitter.

U-21 Class E mishaps □ (F series) When flaps were placed in approach position, right inboard flap failed to extend, causing aircraft to roll right. Flaps were retracted and no-flap landing was made. Ninety-degree worm gear in right inboard flap actuator failed after extending about 5 degrees. □ (A series) When flaps were raised from full down position after landing, flap motor burned out. Up-limit switch would not shut off motor.

Maintenance

UH-1 Class E mishaps □ (H series) Master caution light came on during flight. Rust and water were found on transmission chip detector probe. □ (H series) Master caution and transmission oil pressure lights came on. Improperly seated cannon plug caused erroneous indications. □ (V series) Fire light came on during hover. Bleed band actuator was not adjusted correctly, and fire warning cannon plugs were dirty.

CH-47 Class E mishap □ (C series) No. 2 transmission oil pressure dropped during flight. No. 2 engine was secured and running landing made. No. 2 transmission oil reservoir was empty, combining transmission reservoir was low, and oil covered area. Oil lines on combining transmission had not been tightened during maintenance.

U-21 Class E mishap □ (A series) Power was reduced to check new flap rig. No. 1 engine torque would not read below 600 pounds. Engine oil vent line was not clamped securely. Wind blast allowed line to move and bind on N_1 control rod.

Messages received

- OH-58 maintenance information message concerning special inspection flight-hour interval tolerances (MIM-82-58-01, 061930Z Apr 82).
- UH-60 information message concerning change to previous message (222000Z Mar 82) on T700 turbine gas temperature limit increase (092030Z Apr 82).

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

Changes to TMs

The following urgent changes to TMs have been released:

- Change 8, dated 5 Jan 82, to TM 55-1520-228-CL, for OH-58A.
- Change 11, dated 22 Feb 82, to TM 55-1520-235-CL, for OH-58C.
- Change 1, dated 8 Mar 82, to TM 55-1520-228-PMD, for OH-58A/C.
- Change 11, dated 12 Mar 82, to TM 55-1520-228-CL, for OH-58A.
- Change 25, dated 8 Apr 82, to TM 55-1520-235-10, for OH-58C. ■

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Mishap review: maintenance error

Synopsis

The OH-6 was approaching a tactical landing site. About 25 feet above the ground, the pilot flared and increased collective pitch. The aircraft yawed right, and the rate of descent increased. The pilot increased the flare attitude and applied full collective pitch at or near ground impact. The OH-6 came to rest in an upright position.

History of flight

The unit was on a field training exercise. The OH-6 pilot was assigned a support mission to fly three passengers on a firing battery inspection. While hovering for takeoff, the pilot noticed engine torque at 65 psi. A performance planning card was not completed. After a short flight, the pilot located the battalion area but could not find the command post. He decided to land and ask directions to the command post.

The pilot selected a landing site located near a large, open range area. He then flew around the site three times. During the third orbit, a landing pattern was established and a prelanding check was done on downwind. Everything appeared normal, and the pilot descended to about 150 feet agl. Airspeed was reduced on base leg.

An approach was started into the wind. About 25 feet agl, the helicopter was in a decelerative attitude, with the airspeed probably a little slower than normal. The aircraft then began to settle. A small amount of collective pitch was applied, but the increasing rate of descent was not stopped. A right yaw was interpreted by the pilot as a partial loss of engine power. Existing collective pitch was maintained and the flare attitude increased to prepare for the landing on the rough terrain. Positive collective pitch was applied just before the aircraft hit the ground.

The lower vertical stabilizer and tail skid hit the ground first and were torn off. The tail came up and was severed by the main rotor blades. The fuselage pitched forward about 45 degrees, and the aircraft then came to rest upright.

The pilot and two passengers were able to exit unassisted. The left rear seat passenger had to be helped from the aircraft. Two of the passengers sustained minor injuries.

Crewmember experience

The 50-year-old pilot had more than 1,500 rotary wing flight hours, with almost 900 in OH-6s.

Commentary

The PR (pressure reference) air line between the fuel control and governor was cracked at the flared connection to the governor. This tube had failed with indications of high cycle, low stress fatigue. These multiple fatigue mechanisms originated at the inside diameter of the flare end of the tube. Signs of heavy fretting and galling were present near a preexistent circular mark on the outside diameter of the tube. The probable cause of the failure of the PR line was incorrect installation, resulting in misalignment of the collar and elbow connection. This misalignment resulted in preloading of the line. The preloading, in connection with normal engine vibrations, created a fatigue stress riser which resulted in the eventual cracking of the line.

The line was removed during a phase inspection which was completed 17 days before the mishap. Failure of the line would cause the N_2 to overspeed to about 100 percent, which would account for the right yaw of the aircraft, and then would trip the overspeed switch, reducing engine fuel flow, and continue to repeat this cycle.

See page 2 for more information on T63 air leaks. ■

T63 air leaks a problem

Leaking air lines continue to cause loss of power and, in some instances, failure of T63 engines. The culprits are the stainless steel lines located between the governor and the fuel control unit along with the tubing that connects the bleed air valve to the scroll.

The two main causes of air leaks are loose lines and defective flares. Loose lines usually occur from incorrect torquing of the B nuts during initial installation or from abnormal engine vibration during flight.

Defective flares, on the other hand, are not necessarily the result of improper manufacturing procedures, although they could be. Usually, the flares are bent or damaged from carelessness or improper handling. Further, they can become worn and unfit for use as a result of improper installation. For example, insufficient torquing of a B nut will allow engine vibration to cause wear to the flared portion of the tubing. This will further loosen the line and, in turn, will allow engine vibration to cause more wear, setting up a vicious cycle capable of producing engine problems in a hurry.

When problems with air lines arise, the common remedy is to torque any loose B nuts and replace any damaged tubing. Often, such corrective measures bring only temporary relief. When vibration is severe enough to cause wear damage to the flared portion of a line, it will also damage the nipple of the flared tubing fitting. Consequently, if you replace such a damaged line without also replacing its fitting, an inadequate seal will result.

When an air leak is noted, a health indicator test (HIT) must be accomplished following corrective maintenance. This action is necessary to insure that the HIT base line was not established during the time the air leak was in progress.

The brunt of the responsibility for insuring the integrity and security of these air lines and fittings rests with maintenance. So it is important for mechanics to check these lines frequently and thoroughly.

When a loose line is discovered, the line should be removed and the flares inspected for feathered edges, wear, dents, bends, and any other type of damage. Similarly, the attaching fittings—especially the nipple portion—should be carefully checked for wear and any other possible damage. The use of a small metal straight-edge is recommended when checking the fitting nipple to detect the possible existence of a groove (see accompanying photo). Usually, if the tubing must be replaced because of a worn or damaged flare, its fitting should also be replaced.

Sometimes it is difficult to visually detect damage to these components, particularly minute damage to the fitting nipple. If in doubt as to the serviceability of either of these items, call on your TI for assistance.

When air lines are removed and are not to be reinstalled immediately, the exposed fittings should be capped and the lines plugged with appropriate threaded plastic plugs to prevent damage.

Since excessive vibration not only can cause lines to loosen but also can damage both flares and fittings, a vibration check should be performed any time severe engine vibration is noted or suspected.

Toward this end, the pilot should perform all cockpit and operational checks as required and remain alert for any excessive vibration that may occur during flight. He should also note and record any instrument readings that might indicate a loss of power.

Unlike aluminum tubing which is soft enough to change its shape somewhat to conform to that of its fitting, stainless steel is hard and tough and must mate almost perfectly with its fitting if air leaks are to be prevented. However, pressure testing a stainless steel line and its fitting for leakage by using a liquid medium such as hydraulic fluid is of little value. While the seal formed by the mated surfaces may be effective enough to prevent the leakage of a liquid, it may not be able to stop a gas from escaping.

If any fuel system control air tubing is removed or disturbed during maintenance, check the control air tubing for leaks in accordance with TM 55-2840-231-24 or TM 55-2840-241-23.

Maintaining these air lines and fittings in good condition and insuring their security is a must for the safety of personnel and equipment. Make sure you give these components the attention they demand. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft crashed during emergency procedures training. Four fatalities. 8242

UH-1 Class E mishaps □ (H series) Crew smelled unusual odor and crew chief saw smoke coming from rear ICS box. Caused by electrical failure of ICS control panel. □ (H series) Master caution and transmission oil hot lights came on. Caused by failure of transmission thermostatic switch. □ (H series) Crew heard loud knocking sound in main transmission area during hover. Transmission oil pressure dropped to zero, and master caution and oil pressure lights came on. Postflight inspection revealed failure of main transmission oil filter gasket, resulting in replacement of main transmission and mast. □ (M series) No. 2 hydraulic light came on during landing. Caused by ruptured hydraulic line. □ (H series) Two UH-1s were maneuvering in the NOE mode between two heavily vegetated tree lines. Pilot of lead aircraft tried to turn around to move to another position without telling the pilot of the second aircraft what he intended to do. Pilot of second aircraft had to move from the flight path of the lead aircraft. The only option was to immediately climb straight up out of the confined area. Pilot applied collective pitch and diverted his attention from torque gauge to clear the other aircraft and trees. Pilot suspected overtorque and landed. Inspection revealed no damage.

UH-1 aviation-related mishaps □ Driver of fuel truck drove too close to UH-1. Truck hit and damaged aircraft tail rotor assembly. □ Six blades on two helicopters were damaged beyond repair when crews tried to remove ice from blades with a hammer. □ M-60 machinegun was malfunctioning, and mechanic thought something might be wrong with the flash suppressor. Mechanic put his right hand over the end of the barrel and told another mechanic to pull the trigger. As a result, mechanic sustained powder burns and lacerations to his hand.

Attack helicopters

AH-1 Class A mishap □ (S series) Witnesses reported that tail boom separated from aircraft, followed by transmission and rotor system. Aircraft fell from about 2,500 feet and exploded on impact. Two fatalities. Main rotor pitch change link failed due to fatigue, resulting in loss of control and violent vibrations. 8243

AH-1 Class E mishaps □ (G series) Transmission oil bypass and oil pressure lights came on during takeoff. Caused by failure of transmission internal filter gasket. □ (S series) Transmision oil pressure fluctuated, then dropped to zero. Caused by failure of oil pressure gauge.

Cargo helicopters

CH-47 Class B mishap □ (C series) No. 1 engine transmission failed/burned during ground runup for maintenance operational check. 8244

CH-47 Class C mishap □ (C series) Crew chief noticed during flight that ramp door was missing. Door was probably not fully locked. Crew chief said door was vibrating during flight and he could see light around edge of door.

CH-47 Class E mishaps □ (B series) Aircraft was slingloading a UH-1 involved in a Class A mishap. Load was oscillating back and forth extensively. Sling was attached to aircraft structure at the lift link. Transmission had been removed. Lift link or box beam broke because of oscillations, causing load to drop. □ (C series) Transmission oil and master caution lights came on. Caused by failure of transmission pressure selector switch. □ (B series) Utility hydraulic pressure dropped to zero during landing. Caused by failure of utility pump. □ (B series) No. 2 engine oil pressure dropped to 30 psi when engine was pulled to ground during simulated engine failure. Caused by failure of pressure transmitter.

Observation helicopters

OH-58 Class A mishap □ (A series) Aircraft was taking off from field site. As aircraft cleared trees at an altitude of about 50 feet agl, pilot lowered nose to accelerate forward, and aircraft began to turn to right around mast. Pilot lowered collective in an attempt to fly out of the spin. Spin accelerated and aircraft made five complete turns around the mast before hitting the ground 30 to 40 meters from takeoff point. Three injuries. 8245

OH-58 Class E mishaps □ (A series) Low rpm audio was heard as aircraft was hovering from POL point. After

Mishap briefs

landing, N_1 continued to decrease past engine idle. Engine failure was caused by water in fuel. FARE system operator did not monitor gauge on filter separator. ☐ (A series) Gas producer fluctuated rapidly during flight. Caused by broken wire.

OH-58 aviation-related mishaps ☐ As aircraft was being ground handled from hangar to flight line, main rotor blade hit main rotor blade of parked aircraft. ☐ While T-handles were being attached to main rotor hub, rotor blade slipped from support and hit cement floor.

Fixed wing

C-7 Class E mishaps ☐ Excessive oil was seen on right side of aircraft and No. 2 cowling after landing. Oil filler cap was loose. ☐ When crew tried to start left engine, propeller would not rotate. Caused by engine oil seeping past piston rings in No. 8 cylinder.

U-21 Class E mishaps ☐ (D series) Fuel siphoned from cap during takeoff. Cap was not seated correctly. ☐ (A series) Cockpit filled with acrid smell and smoke during taxi. Caused by malfunction of axial fan motor.

OV-1 aviation-related mishap ☐ Mechanic began removing bolts from wheel and tire assembly without first releasing air pressure. When half of the bolts had been removed, tire exploded, sending half of the wheel through the air. Wheel hit mechanic, causing head, arm, and hand injuries.

Maintenance

UH-1 Class E mishaps ☐ (H series) Loud squeal was heard during landing, followed by control stiffness and illumination of master caution and hydraulic lights. Hydraulic fluid was lost because of chafed left lateral cyclic servo hydraulic return line. ☐ (H series) Battery acid and fumes were seen coming from top battery vent hose during landing. Clogged vent tube prevented proper venting.

AH-1 Class E mishaps ☐ (S series) Damage to drive shaft cover was discovered during inspection. Pair of pliers was left in tail boom of aircraft. Pliers slipped into drive shaft clamps and hanger bearing mount and were pushed into drive shaft cover. ☐ (S series) Master caution and generator lights came on during takeoff. Voltage regulator was set incorrectly.

CH-47 Class E mishap ☐ (C series) Flight engineer saw hydraulic fluid leaking in vicinity of No. 2 flight boost manifold. Flex line chafed against hydraulic line, causing leak.

U-21 Class E mishaps ☐ (A series) Sparks and smoke were seen coming from nose section vents on left side of No. 2 engine. Ice boot wires were disconnected and shorted out against lower cowling. ☐ (A series) Right main landing gear light did not illuminate when gear was extended. Tower personnel said both gears appeared to be down. Landing was made without incident. Right main gear toggle switch was out of adjustment.

Messages received

• Safety-of-flight emergency technical message on one-time inspection of AH-1 pitch change tubes (AH-1-82-04, 152200Z Apr 82). Summary: A recent mishap involved fatigue failure of the pitch change tube. Incorrectly maintained rotor heads and control systems can contribute to increased flight loads. Operating units should insure they are operating in accordance with maintenance inspections. All installed AH-1 pitch change links will be inspected in accordance with this message. Contact: John Morris or Jim Simon, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

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

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
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	November	5	4	November	**2**	**0**
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2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	1-28 Apr	**7**	**6**
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**31**	**21**

Shortfax

Teardown and analysis important to safety

Do you want to improve overall unit aircraft readiness for years? If you suspect a component or part caused a mishap, submit it for teardown and analysis (TD&A). Call AUTOVON 558-3842/3943 and appropriate recommendations will be given for submission of the component or part. When a component is selected for TD&A, a Safety Center control number will be issued. This control number is used to track the component during shipment and throughout the analysis to keep up with the status of the component. A letter containing shipping instructions and mailing labels will be sent to the person requesting the analysis. AR 95-5, par. 10-5, states that the commander, USASC, and the commander, TSARCOM, are the final authorities on components selected for teardown and analysis.

Recently some items selected for teardown and analysis have been sent to Corpus Christi Army Depot less some "bits and pieces." When an item is selected for TD&A it is very important to send all pieces of the item (e.g., broken case pieces, bearings and cages, gears and shafts, turbine blades, etc.). It is sometimes impossible to determine the failure mode of an item unless all parts of the item are examined. Determination of why items failed and their correction prevent future failures and insure more reliable, safer systems for you to operate. So, next time you send an item for TD&A, be sure you send all the "bits and pieces."

There are two other ways to have a component analyzed. The first is through the Army Oil Analysis Program (AOAP). This is done by taking oil samples as specified in AR 750-22, TM 38-750, TM 43-0106, and TSARCOM Supply Letter 3-82 when a component or assembly has been removed as a result of the local AOAP laboratory recommendation. When removing the oil from the component, strain the oil through cheesecloth and try to catch any particles. Place these in an envelope and attach them to the component for shipment.

The second way is through the Quality Deficiency Report/Equipment Improvement Recommendation Program. TM 38-750 tells when and how to fill out the required forms. SF 368 is the authorized means for users of Army materiel to report the following:

- Equipment faults in design, operation, and manufacturing.
- Suggested improvements in Army materiel.
- Unsatisfactory new equipment received which is a direct result of below-quality workmanship in accordance with AR 702-7 and AR 702-7-1.

Appendix B, TM 38-750, gives addresses for mailing Equipment Improvement Recommendations. ■

Declaring an emergency

In a recent conversation with a representative of the Army Communications Command, Fort Huachuca, it was learned that some Army aviators are reluctant to call air traffic control and declare an emergency. This is a sad state of affairs when the whole air traffic control community is available to assist pilots in trouble.

Aviators don't hesitate to call in a precautionary landing or even a forced landing, but for some reason they just don't like to declare an emergency. It is as easy as saying "Mayday" into the microphone or "Army Zero Five Six Seven is declaring an emergency because the engine quit," or whatever reason there is for declaring an emergency.

When an aviator finds himself in trouble, he should get the aircraft under control, if possible, and then declare an emergency. Declaring an emergency gives the aviator the right of way over all other traffic. It alerts air traffic controllers that the aviator might need help. If there is time, give the location of the aircraft. The crash rescue people are then notified just in case they may be needed. When the aircraft is operating under an IFR flight plan, the radar controller may be able to vector the aircraft to a suitable landing site. There are several things going for the aviator who declares an emergency when he really needs to.

Don't hesitate to call in a real emergency. Too many of these turn into mishaps. Alert the people around you to your problem and get all the help you can. That's why they came up with the international distress call, "Mayday." ■

Wrong hydraulic fluid being used

Some units are putting fire resistant hydraulic fluid MIL-H-83282 in their fixed wing aircraft. The only fixed wing aircraft designated in TB 55-1500-334-25 for conversion to MIL-H-83282 is the OV-1, and only the main hydraulic system of the OV-1 is to be converted. Servicing instructions for the other fixed wing aircraft specify hydraulic fluid MIL-H-5606. ■

Stacom

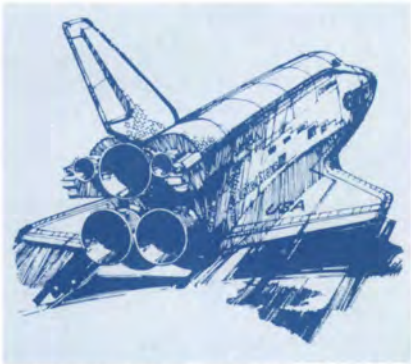
Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 79 □ 28 Apr 1982

You think you have weight and balance problems

The National Aeronautics and Space Administration (NASA) discovered that they were using the wrong weight and balance data for the first two shuttle launches. The errors were probably uncovered when the thrust (torque pounds) and the acceleration (rate of climb) did not agree with the forecasted performance (PPC). The gross weight of the shuttle orbiter was found to be in error by more than a ton.

Not being a military organization, they did not appoint a weight and balance officer, but went to the logical source of the problem—the scales. With the new set of scales, the weight was corrected and the sterling performance of launch No. 3 was assured.

Army aviators also have problems in this area. DES representatives continue to report unsatisfactory weight and balance procedures being used by operational units. Mishaps continue to occur because of operations attempted with overloaded aircraft. Problems also occur when aviators flying aircraft which are marginally within weight and balance limits find themselves in adverse conditions.



Density altitude higher than forecast, change in direction or force of wind, gusts of wind, and rough handling of controls all have an adverse effect on aircraft performance. Any one, or a combination of the above conditions, can have the effect of changing gross weight that is marginally within limits to one that is effectively overgross. As an example, an OH-58 PIC with three passengers on board would do well to reconsider a requirement to perform in an NOE mode in the middle of summer.

Unlike NASA, the Army aviator cannot solve his performance problems with a new set of scales. He must rely on correct weight and balance information and a professional appraisal of performance planning data. ■

ARNG safety conference

Kudos to Army National Guard safety personnel! The tenth annual Army National Guard safety conference was successfully completed 7 April 1982 at Camp Robinson, Arkansas. The three-day conference was attended by safety chiefs and specialists representing more than 400,000 personnel from every state in the union, plus Puerto Rico and the Virgin Islands. It was a very productive and professional conference.

MG Emmett H. Walker, Jr., Director of the Army National Guard, was the keynote speaker. Professional presentations were offered by Army National Guard safety specialists, plus representatives of the U.S. Army Safety Center and the USAAVNC, Directorate of Evaluation and Standardization.

The sessions were well planned, well run, and indicative of a most professional safety outlook by more than 170 attendees. ■

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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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 29 □ 5 May 1982

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Mishap review: no margin for error

Synopsis

The CH-54A, with a 10,300-pound slingload and simulated failure of the No. 2 engine, was on final approach to a confined area. The approach became shallow and low, and the slingload went through some trees and then hit the ground. The main rotor blades then hit the trees and the helicopter crashed.

History of flight

The mission was a transition training flight. An IP and two related student pilots (RSP) did their flight planning. A performance planning card was not completed.

Because of a temporary weather hold, the aircraft was cleared to hover to the slingload area located about 600 yards southeast of the parking ramp. The IP was in the left (copilot's) seat, one of the student pilots was in the right (pilot's) seat, one of the student pilots was in the aft-facing pilot's seat, and the crew chief was in the aft jump seat. The RSP in the aft-facing seat practiced hovering in the slingload area. The No. 2 engine fire warning light came on, and the aircraft was landed. The crew chief got out and checked for evidence of a fire. There was none. Because this was a common problem in this aircraft, especially during rainy periods, the IP continued the flight training with the fire light illuminated. Continued flight with the light negated the fire warning system had an actual fire occurred.

After a short period of slope landing and takeoff practice, the aircraft was positioned over a preselected slingload. The slingload was an aircraft engine shipping container partially filled with concrete and rigged with steel cables. The can weighed 10,300 pounds. The IP requested and was granted a special VFR clearance. The aircraft left the field with the slingload suspended 26 feet below the landing gear.

As the aircraft was en route to a confined area, weather improved to VMC, and the fire warning light went out. Arriving at the confined area, the crew proceeded south along the east side of the area and made a shallow right turn back to the north. This positioned the aircraft on a wide, right downwind, west of the intended landing site, at an altitude of 600 feet

(continued on next page)

No margin for error

agl. The aircraft turned final to a heading of about 165 degrees, which aligned the approach with the short, north-south, axis of the confined area.

As the aircraft was established on the final approach leg, with the RSP in the pilot's seat at the controls, the IP initiated a simulated single-engine emergency procedure by beeping the No. 2 engine off line, using the No. 2 engine N_2 speed trim switch. As the aircraft reached short final, the approach was lower and slower than normal. The student pilot flying the aircraft said he thought the slingload was going to drag through the trees. The pilot flying then said he would try to get the slingload through a low spot in the tree line. The IP said "Fine."

The load hit the trees, and the crew chief yelled to the aft-facing RSP to release the load. When he did not react immediately, the crew chief tried to reach the release but was restrained from doing so by his lap-belt. The load then hit the ground and was rolled onto its side by the pull of the sling which was still hooked to the helicopter. The aft-facing RSP then released the load. The main rotor blades were in the trees, and multiple tree strikes and severe main rotor damage occurred as the aircraft settled to the ground. As the aircraft chopped its way through the trees, a fragmented section of main rotor blade hit a tail rotor blade. The tail rotor blade broke, and the unbalanced tail rotor and gearbox assembly were torn free of the aircraft. The aircraft came to rest with the main fuselage upright and the tail boom lying across the slingload.

The IP and RSP flying the aircraft were killed. When the aft-facing RSP saw what was happening, he bent over, head down, in a crash position. He survived with minor injuries. The crew chief sustained severe injuries.

Crewmember experience

The 36-year-old IP had almost 1,900 rotary wing hours, with more than 700 in CH-54s. The 39-year-old pilot flying the aircraft had almost 1,500 rotary wing hours, with 21 in the CH-54. The 35-year-old pilot in the aft-facing seat had almost 2,000 rotary wing hours, with 19 in the CH-54.

Commentary

The IP directed an approach with a slingload to a confined area, with one engine at idle, to simulate a one-engine-inoperative emergency procedure. This maneuver, not required in any course of instruction nor included in the Aircrew Training Manual, exceeded the power available to safely terminate at the selected landing site. 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. And he may have been overconfident in the student pilots, who had displayed above average flying skills and knowledge of the aircraft. The STACOM column in the 24 Oct 79 and 20 Feb 80 issues of FLIGHTFAX and "DES Report to the Field" in the January 1980 U.S. ARMY AVIATION DIGEST caution IPs about overloading students with multiple emergencies. The same philosophy applies to the random combination of prescribed flight maneuvers and emergencies.

When the approach became so shallow that the load was lower than the trees and the airspeed was below effective translational lift, the IP did not jettison the load, terminate the approach short of the barrier, or restore the engine power in time to recover. When it became obvious the load would touch the ground before termination of the approach in the landing area, neither the IP nor the student pilot took any action to jettison the load. Teardown and analysis of the engines indicated that both engines were at military power on impact. It is likely that the IP tried to recover but the damage to the rotor system prevented resumption of flight.

The IP did not prepare a performance planning card as required by TC 1-139. As a result, he and the student pilot were not aware of the power required to place the load on the ground with zero airspeed. The IP's normal routine included preparing a performance card with his students before each flight. It is not known why he did not do it this time.

The IP, in his premission briefing, did not address procedures and responsibilities of individual crewmembers during in-flight emergencies. Specifically lacking was the aft-facing pilot's responsibility to jettison the load in the event of an emergency.■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) While pilot was setting aircraft down from a hover, rear cross tube failed and aircraft started to settle to ground. Pilot brought aircraft to hover. Sandbags were placed under aircraft and aircraft was landed on bags. Fatigue or metal failure of cross tube occurred. □ (H series) Aircraft was flown NOE to a field site in a small box canyon. Copilot saw ground guide to right of aircraft and immediately started right 360-degree turn to align aircraft for landing. As turn progressed through 90 degrees, rpm audio activated, left pedal control was lost, and aircraft started to descend to rugged terrain. Copilot increased collective and rpm decreased below 5500 before aircraft hit ground nose first and then rocked back on tail rotor. Aircraft became airborne and pilot took control and flew to a level area one-half mile away. Aircraft was being flown with high gross weight and density altitude conditions.

UH-1 Class E mishaps □ (H series) Master caution and transmission oil lights came on and transmission oil pressure gauge indicated zero. Cockpit filled with smoke. Power-on landing was made. Transmission oil temperature bypass valve stuck in closed position, resulting in transmission oil gasket blowing out. □ (H series) Popping sounds were heard from engine. Aircraft yawed left and N_2 and rotor rpm decreased. Caused by severe compressor erosion. □ (H series) Loud noise was heard from main rotor blade area. Blade skin separated on underside. □ (H series) Master caution and transmission oil pressure lights came on and oil pressure dropped to zero. Caused by loss of main transmission oil through quill assembly. □ (H series) Fire warning light came on. Caused by broken wire in back of fire warning light relay. □(H series) Transmission oil temperature hot light came on during landing. Caused by failure of pressure relief valve.

UH-60 Class C mishap □ Aircraft was landed on stump at night. Landing zone contained tall grass and weeds.

UH-60 Class E mishap □ Backup pump would not shut off in auto mode. Caused by failure of K19 relay.

Attack helicopters

AH-1 Class B mishap □ (G series) Aircraft started to rotate counterclockwise, on the ground, during maintenance operational check. Tail rotor hit maintenance technician standing nearby, causing severe injuries. Tail boom was buckled, and tail rotor blades, turret fairings, and underside of ammunition bay were damaged. 8246

AH-1 Class E mishaps □ (S series) Egt rose to 900° C. during hover. Engine inlet was plugged by sugar cane husks. □ (G series) Aircraft rolled about 20 degrees left and then 20 degrees right. Pilot disengaged roll channel of SCAS and rolling stopped. Caused by malfunction of roll channel. □ (S series) Transmission oil bypass and master caution lights came on. Caused by failure of transmission oil bypass switch.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Crew smelled oil odor during flight. Ramp check revealed oil leak in vicinity of aft transmission. Caused by failure of oil filter O-ring. □ (A series) No. 2 hydraulic pressure line from No. 2 filter to pressure reducer in flight control closet cracked, causing No. 2 hydraulic system and SAS to be inoperative. □ (A series) Copilot was unable to match engine torques during hover. Slingload was released. No. 2 engine torque then went to 75 percent. Copilot tried to decrease No. 2 engine by using emergency engine beep. Pilot increased thrust to maintain rotor rpm in the green area. Engine was slow to respond. Minimum beep resistor shorted out, causing N_2 high side beep failure.

Observation helicopters

OH-6 Class E mishaps □ Engine failed during practice autorotation. □ Loud sounds from main rotor were heard during takeoff. Feedback was felt in cyclic and pilot landed. Protective tape from main rotor blade leading edge came loose, affecting aerodynamics characteristics of blade.

OH-58 Class E mishaps □ (A series) Deceleration check was made four times during hover/taxi. Each time was less than 2 seconds to lower limit. Caused by failure of fuel control. □ (A series) Transmission oil pressure light came on. Caused by failure of oil pressure switch. □ (A series) Rated student pilot lowered nose too much during takeoff. Wire strike prevention system hit the ground, breaking off tip of system. □ (A series) Transmission chip detector light flickered during landing. Caused by loose chip detector warning. □ (C series) Fuel boost pump light came on during takeoff. Caused by failure of pump.

Training helicopters

TH-55 Class C mishap □ During first approach on second supervised solo

flight, training officer told student pilot to slow aircraft's ground speed. Aircraft slowed and approach was normal until about 30 feet agl. Aircraft yawed to left 90 degrees. Student lowered collective pitch and aircraft hit the ground slightly left of runway centerline. Landing gear, engine basket, cockpit section, and power train were damaged. Student hit overspeed device three times between 100 feet and 30 feet.

Fixed wing

C-7 Class E mishaps □ Right engine began backfiring and rpm fluctuated during takeoff. Engine maintained partial power. At 300 feet agl, low oil level light came on. Engine was feathered and aircraft landed. Caused by internal failure of engine. □ With landing gear handle down and red warning light out, left main gear safe light did not indicate safe. Uneventful landing was made. Caused by broken ground wire.

C-12 Class E mishaps □ (A series) Cabin pressurization control was adjusted to field elevation plus 650 feet during descent. Cabin rate of descent went to 6,000 fpm. Adjustment with rate control knob had no effect. Caused by malfunction of pressurization controller. □ (D series) During climb, aircraft would not pressure past a max differential of 3.2 psi. Postflight inspection of environmental system revealed insulation material, used in construction of aircraft, in pressurization safety valve, not allowing it to fully close.

OV-1 Class E mishap □ (D series) While performing ATM stall maneuvers, IP noticed unsafe right main landing gear indication. During gear retraction, right gear indicator failed to display gear in up position. IP recycled gear several times, with the same results. Gear was blown down and aircraft landed. Erroneous indication was caused by stuck gear-up switch.

U-3 Class C mishap □ When gear handle was activated on downwind leg, only nose wheel green light came on. Gear was recycled. Tower operator said gear appeared to be down. Manual gear extension was made, with no change in indicator lights. Gear was touched lightly on ground to check for solid feel, and landing was made. During taxi to ramp, right main gear collapsed and aircraft settled on right wing. Gear did not lock in down position because of broken torque link bracket.

U-21 Class E mishaps □ (RU-21A) Crew smelled electrical smoke during takeoff. Caused by short in fan vane axle. □ (RU-21H) Master caution and right generator-out lights came on. Voltage meter indicated zero. Caused by failure of voltage regulator.

Maintenance

UH-1 Class E mishaps □ (H series) Hydraulic pressure light came on. Caused by loose cannon plug. □ (H series) Daily inspection revealed loose dzus fastener lodged beneath No. 2 tail rotor drive hanger bearing. Fastener lodged beneath aft collar in flight, gouging collar and punching hole in drive shaft base plate. Fastener was left behind when maintenance was performed.

Messages received

• Safety-of-flight message concerning one-time inspection of CH-47 connnecting link clevis fitting (CH-47-82-03, 212150Z Apr 82). Summary: Two control link clevis fittings have been found cracked. Both were found during routine inspections. All fittings will be inspected for cracks. Contact: Ronald Desplinter, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

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

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	1-5 May	**1**	**0**
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**32**	**21**

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 2 Sep 81 issue (8155) ☐ During an unauthorized high-speed, low-level flight over water, pilot applied power without making a corresponding change in aircraft attitude to stop a descent. Aircraft hit the water at 95 knots and was destroyed. Both crewmembers escaped with minor injuries, but the passenger drowned.

UH-1 Class B mishap in 2 Sep 81 issue (8156) ☐ No. 1 bearing assembly failed for unknown reasons, resulting in engine failure. Pilot was forced to autorotate to an uneven area. Collective pitch was applied to slow the descent and clear trees in the approach axis. Rotor rpm decayed, and aircraft landed hard.

UH-1 Class B mishap in 16 Sep 81 issue (8159) ☐ As pilot was picking up sling-loaded OH-58, he made a right pedal turn under a high power setting to align himself with the runway. Pilot tried to slow the turn by adding left pedal, which was ineffective because it was applied to the forward stop. Aircraft continued to turn to the right. Pilot overtorqued the aircraft and it dipped nose down. PIC took the controls and applied left cyclic, which temporarily corrected the condition. Load was then jettisoned and aircraft was brought under control.

8201

UH-1 Class B mishap in 21 Oct 81 issue (8201) ☐ Student pilot tried to take off to a hover with excessive right cyclic. Aircraft pivoted about the heel of the right skid. Dynamic rollover situation developed with a rapid right roll. Both main rotor blades hit the ground, causing aircraft to pitch up. Right synchronized elevator, tail skid, and tail rotor blades hit ground, resulting in loss of tail rotor thrust and separation of vertical fin. IP applied left forward cyclic and lower collective pitch full down. Fuselage bounced several times and landing gear collapsed. Aircraft came to rest upright.

Attack helicopters

AH-1 Class B mishap in 2 Dec 81 issue (8211) ☐ With rated student pilot at the controls, aircraft touched down with an excessive vertical rate of descent during standard autorotation. IP tried to make a power recovery as aircraft bounced about 5 feet into the air. Tail rotor authority was insufficient to compensate for the sudden increase in engine torque, and aircraft spun to right. Both main rotor blades and tail boom hit asphalt surface before IP could land aircraft. Aircraft continued to spin to right about 130 degrees and came to rest upright.

AH-1 Class A mishap in 9 Dec 81 issue (8214) ☐ Aircraft was on night tactical training mission, flying at 100 knots and 100 feet above the highest obstacle. Pilot's night vision goggles failed because of premature battery failure. Before controls could be transferred, aircraft hit trees and crashed.

Observation helicopters

OH-58 Class B mishap in 28 Oct 81 issue (8204) ☐ While flying about 100 feet agl, pilot started a right turn, which placed the aircraft in a tailwind condition. Airspeed was slowed below effective translational lift. Aircraft began to settle because of low forward airspeed, reduction of lift due to right bank, high gross weight of 2,961

(continued on back page)

8156

8211

Followups

pounds, and the tailwind. Pilot increased his demand for power, which exceeded power available, resulting in bleedoff of main rotor rpm. Pilot was unable to stop descent. Aircraft enter uncontrollable spin as tail rotor became ineffective because of low rotor rpm. Aircraft hit trees and settled to the ground.

OH-58 Class A mishap in 11 Nov 81 issue (8208) ☐ Aircraft was lead of a flight of six hovering to a parking area at an airport. Pilot was told by tower personnel to hold short of one runway, which was active, and to clear another runway. Pilot misinterpreted the instructions and told copilot to cross the active runway. As aircraft approached the runway at 30 to 40 knots of speed, tower personnel told him to hold short. Copilot placed aircraft in a nose-high decelerative attitude, causing main rotor blades to strike and sever tail boom. Aircraft spun right several times and landed hard.

OH-58 Class A mishap in 2 Dec 81 issue (8213) ☐ Flight jacket blew out of aircraft and hit tail rotor system, causing loss of both tail rotor blades and gearbox. After losing antitorque control, pilot initiated an altitude-over-airspeed cyclic climb and allowed airspeed to decrease below that required for directional control. Aircraft began uncontrollable turn to right. Pilot closed throttle and autorotated into trees.

OH-6 Class B mishap in 2 Dec 81 issue (8212) ☐ IP entered autorotation at 80 knots and 500 feet agl. He began his deceleration about 30 to 35 feet agl instead of 50 feet agl and applied initial collective pitch higher than the 10 feet agl specified in TC 1-137. Although he held collective pitch in that position, aircraft settled and main rotor rpm decayed rapidly. About 3 feet agl, IP applied remaining collective pitch in an attempt to cushion the touchdown. Main rotor blades flexed down and severed tail boom. IP's judgment may have been affected by environmental conditions of transitioning from daylight to dusk, causing him to improperly interpret visual cues with respect to height above the ground and rate of closure.

8212

Fixed wing

OV-1 Class A mishap in 11 Nov 81 issue (8209) ☐ Pilot was on VFR photo mission. About 400 feet agl, pilot began right turn by applying 30 degrees of bank. In the turn, pilot increased bank angle to about 90 degrees and allowed aircraft to assume nose-low attitude. Turn, in excess of ATM bank standards, was made in an attempt to align aircraft with target area and avoid further penetration of restricted airspace. Aircraft was returned to a wings-level attitude with a high vertical sink rate just before impact. Pilot and technical observer were killed.■

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Army aircraft
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Published by the
United States Army Safety Center
Fort Rucker, Alabama 36362

Volume 10
Number 3
14 October 1981

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Fort Rucker, Alabama 36360

No place for shyness

If there is an emergency in the aircraft or you see someone committing an unsafe act, are you going to remain silent? And if you do speak up, will you make sure you have gotten your message across?

AR 95-1 gives the pilot-in-command authority for all aspects of technical operation of the aircraft. But there is no room in the aircraft for servility, and true loyalty and crew coordination means speaking up at the first sign of trouble regardless of whether it's the pilot, copilot, crew chief, or a passenger.

Consider the following. A UH-1 crew was on an emergency medical evacuation mission. The copilot was on the controls and flying at 1,400 feet and 110 knots. Suddenly, an unusual vibration was felt. About 2 to 3 seconds later a second vibration was felt, the rpm warning light came on, and the low rpm audio sounded. The copilot lowered collective and scanned the engine instruments. They were normal. As power was applied to level the aircraft, the copilot realized he had a tail rotor problem. At this time the pilot took control and the copilot told him of the tail rotor problem. For some unknown reason, the copilot's warning did not register. So rather than autorotate, the pilot contacted GCA and advised that he was making a power-on precautionary landing to a large field.

Still unaware of a control problem—and with no further word from the copilot—the pilot began a series of "S" turns to lose altitude and align the aircraft for final approach. Reaching 200 feet agl, the pilot decelerated to about 50 knots. To maintain the approach angle, he applied power and the aircraft yawed to the right. Application of left pedal failed to correct the yaw and the pilot realized he had lost all tail rotor thrust. The aircraft then spun right, hit some trees, and crashed.

When the pilot contacted GCA for the power-on precautionary landing, the copilot should have realized the pilot had not gotten his message concerning the tail rotor problem. Knowing the problem and the proper emergency procedures, the copilot should have spoken up.

Another crew took off on a night VFR round robin training mission. After flying for about 20 miles, the pilot turned back to fly around the local area because of deteriorating weather. While en route to the local area, he entered clouds at 3,000 feet msl and descended to 2,000 feet to avoid IMC. Reaching the airfield, he made a wide downwind leg to land, encountered light scud, went on instruments, and made a 180° descending turn back toward VMC. At this time he experienced vertigo, but rather than tell the copilot and ask for assistance, he allowed the aircraft to reach 500 feet before realizing his altitude. The copilot, who had been looking for smudge pots on the airfield and did not know the pilot was in trouble, suddenly realized how low they were and told the pilot to pull pitch. The pilot pulled pitch but too late to prevent the crash.

There is a strong possibility that the copilot could have saved the aircraft if the pilot had just spoken up when he first experienced vertigo.

In another instance, a pilot landed at a drop zone to pick up some parachute club

jumpers. After takeoff and climb to altitude, the jumpmaster released a wind drift indicator, determined the wind velocity was too great for parachuting, and aborted the paradrop. As the aircraft descended through 1,200 feet agl, a parachutist's reserve chute deployed out the door and the aircraft yawed sharply to the right, pitched down, and rolled right.

Unaware that the parachute had deployed the pilot interpreted the emergency as tail rotor failure and autorotated. He decelerated the aircraft at 60-75 feet. However, downwind conditions, load, and the deployed chute limited the effectiveness of collective pitch and the aircraft landed hard, with the main rotor blade severing the tail boom.

Neither the crew chief nor the jumpmaster told the pilots what had happened. The jumpmaster was concentrating on the jumpers and trying to fasten his seatbelt for landing. The crew chief had seen the copilot look toward the right rear door and assumed he realized the problem. Furthermore, the crew chief was reluctant to say anything over the intercom as he felt it would be distracting to the aviators. Although there is no established procedure for this type emergency, the aviators should have been told what was happening within the aircraft.

True, the decision of the pilot-in-command is not subject to the approval or disapproval of other crewmembers or passengers. But pretending that all is well or is going to be well may kill you!

An in-flight emergency is no time for shyness . . . on anyone's part. Speak up loud and clear when you see something wrong—and make sure you're understood. ■

Selected mishap briefs

uh1 **Class C mishaps** ☐ (H series) IP gave pilot simulated forced landing. During approach, radio malfunctioned and IP and pilot were unable to communicate. IP got on the controls with the pilot, and simulated forced landing was terminated at 3-foot hover. Pilot, thinking IP was flying aircraft, then took his hands off the controls to adjust radio switch. IP thought pilot was flying the aircraft and took his hands off the controls, also. Aircraft drifted to rear, and tail skid hit ground. IP took control and checked for vibrations and control problems. He noticed nothing unusual. Aircraft was refueled and flown an additional 2 hours. On shutdown at airfield, IP was told tail skid and synchronized elevator were damaged. IP wrote up damage on DA Form 2408-13 but did not report it to crash control or division safety officer as required by local regulation. ☐ (H series) Aircraft was at flight idle awaiting arrival of cargo. Jeep was driven too close to aircraft, and FM antenna hit main rotor blade.

Class E mishaps ☐ (H series) Aircraft was on maintenance test flight. As ground recon was being made for suitable area to conduct hovering control response check, nose of aircraft hit wire. Wire went under aircraft as pilot applied collective pitch, caught on skid, and broke. Aircraft was not damaged. ☐ (H series) Master caution and emergency governor lights came on during landing. Caused by defective panel assembly. ☐ (H series) Pilot noticed burning odor in cockpit. Caused by thermal runaway of battery. ☐ (H series) When throttle was reduced to flight idle during simulated forced landing, needles did not split. Rotor rpm quickly dropped to 250 and would not build until throttle was increased. Caused by sprag clutch failure. ☐ (H series) Aircraft yawed right and nose tucked during flight. Feedback was felt in cyclic. Caused by failure of 90-degree gearbox quill mounting stud.

Aviation-related ☐ SM was cleaning helicopter windscreen. As he adjusted workstand closer to aircraft, he misjudged clearance and allowed workstand to hit and break left chin bubble. ☐ Landing gear maintenance was being performed on UH-1 positioned on jacks, with a 5-ton wrecker crane being used as a secondary lifting device. Crane operator inadvertently lifted aircraft off front jacks. When maintenance crew and crane operator left to alert their supervisors and get help, winch hydraulics drooped enough to settle aircraft back down on jacks. Skin was punctured when aircraft missed jack pads.

ah1 **Class C mishaps** ☐ (S series) Copilot was hovering aircraft in firing position. As he applied collective and forward cyclic to get away from opposing tank, torquemeter reached 70 pounds. Pilot told copilot of overtorque, and aircraft was landed. ☐ (G series) Postflight inspection revealed small hole in main rotor blade. Caused by rocket mortar debris.

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	1-14 Oct	**3**	**1**
	November	5	4	November		
	December	1	1	December		
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**3**	**1**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

Class E mishaps ☐ (G series) As power was increased to trim aircraft during takeoff, left pedal remained deflected 1-1 ½ inches. Pilot could not move pedals to neutral position, and running landing was made. Tail rotor silent chain had stretched 1-1 ¼ inches, causing it to bind on silent chain sprocket and guard. ☐ (S series) Master caution light came on and pilot heard loud squeal. Caused by failure of alternator. ☐ (S series) Aircraft was being refueled at field site from 500-gallon drum. As fuel was dispensed, engine flamed out because fuel was contaminated with water.

ch47 **Class E mishaps** ☐ (A series) Aircraft developed high frequency vibrations in vicinity of No. 6 drive shaft. Caused by broken lord mount spring. ☐ (A series) Crew chief noticed leaking cylinder during takeoff, and utility pressure dropped 200 psi. Caused by defective ramp actuating cylinder.

oh6 **Class E mishap** ☐ Transmission chip detector light came on during flight. Caused by failure of main transmission.

oh58 **Class E mishaps** ☐ (A series) Pilot took evasive action to avoid midair collision. Rotor rpm increased to 400, causing rotor overspeed. ☐ (A series) Transmission chip detector light came on following standard autorotation. Caused by failure of transmission. ☐ (A series) Master caution and engine chip detector lights came on during flight. Caused by internal failure of engine.

Aviation-related ☐ Truck was parked 20 feet to left front of aircraft. Driver got out of truck and left it in reverse. Truck rolled backward into aircraft. ☐ As aircraft was being ground handled down a sloping portion of the parking ramp, nose pitched down, tail pitched up, and aircraft picked up speed. Toe of left skid hit uneven concrete, causing left braking action. Aircraft turned left and hit parked OH-58.

u21 **Class E mishap** ☐ (RU-21H) Fuel was seen coming from left nacelle tank after level-off. Fuel cap was not seated correctly.

Maintenance

ah1 **Class E mishaps** ☐ (G series) No. 1 hydraulic light came on during shutdown. Pressure line had chafed on transmission assembly, causing loss of hydraulic fluid. ☐ (S series) Postflight inspection revealed swashplate support was gouged. Inner ring of swashplate had dropped or slipped to the point that the drive links were hitting the star assembly on each rotation. Caused by incorrect maintenance procedure.

ch47 **Class E mishaps** ☐ (C series) On shutdown, flight engineer told pilot fuel was coming from No. 1 engine cowling. Caused by chafed fuel line. ☐ (C series) Master caution and transmission oil pressure lights came on, accompanied by excessive oil leak in vicinity of aft transmission. Inspection revealed aft transmission oil supply line elbow tube had come out of aft transmission, causing loss of oil. Transmission housing boss threads were stripped where elbow tube connects.

oh58 **Class E mishaps** ☐ (A series) Transmission oil temperature light came on while aircraft was at OGE hover. Caused by loose transmission oil cooling duct assembly. ☐ (A series) After landing, pilot noticed high amp indication and saw battery was venting. Voltage regulator was set too high.

t42 **Class E mishap** ☐ When landing gear handle was placed in down position, nose gear position indicator moved one-quarter of the way down and stopped. Postlanding inspection revealed malfunction of nose gear position indicator. T-42 Aircraft Problems/Corrective Action Letter No. 11, dated 7 Aug 74, had not been complied with.

u8 **Class E mishap** ☐ (F series) Right main gear indicated unsafe. Safety switch was out of adjustment.

Messages received

- Safety-of-flight maintenance notice concerning inspection of fitting on AH-1 helicopters (AH-1-81-28, 281230Z Sep 81).
- Safety-of-flight maintenance notice concerning retorquing the generator/alternator V-band clamp on AH-1 helicopters (AH-1-81-29, 281300Z Sep 81).
- Safety-of-flight maintenance notice concerning AH-1 transmission oil line (AH-1-81-30, 011300Z Oct 81).

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

When go should have been no go!

The pilot heard a "bang," noted that the transmission chip light illuminated, and made a precautionary landing in a farmer's field 15 miles from his destination. After a cursory external examination of the helicopter in which no additional visible conditions were noted by the crew, the pilot took off again and continued to his destination with the chip light still glowing. Postflight inspection revealed four of the five transmission system segment chip lights located behind the transmission access panel were illuminated. Metal chips were found on the chip sensors. The decision by the pilot to continue the flight did not win him any award for exceptionally good judgment.

The following comments on the incident and philosophy expressed are germane to all who fly, not just the helicopter community.

Night was rapidly approaching and the crew was on its fourth leg of the day. They knew that another aircraft was inbound to their destination to pick them up and take them home. During their brief external inspection the aircrew did not find any discrepancies and all cockpit gauge indications were normal after the precautionary landing, but the chip light remained on. The trap was set for what could have been a catastrophic mishap.

The questions raised are: What prompted an experienced pilot and aircrewman to depart and continue this flight after making the initial sound decision to execute a precautionary landing in a farmer's field? What prompted this crew, after responding to a primary indication of a transmission chip light and the secondary indication of a loud thump or bang, to disregard all previous professional and safety training, to violate unit SOP, and to violate their own personal minimum standards and good common sense?

On their external examination of the helicopter after the precautionary landing, the crew was looking for a secondary indication of an impending transmission failure when they already had such an indication—the loud bang. Apparently they were hoping not to find it. They either did not check the five individual transmission system segment chip lights behind a rear access panel, or if checked, the aircrew convinced themselves that the cockpit chip light was erroneous and that the accompanying bang must have been imagined. Therefore, they concluded that there was no reason to discontinue the flight any longer; the flight could be continued to destination before it got any darker. Also in their thoughts was the knowledge that their homeward transportation would be waiting.

By its very nature, a detachment operation is somewhat unique: repetitive strange field landings, aircrew maturity in making daily decisions normally reserved for upper command echelons, and the limited exposure of aircrews to continual command presence while operating away from home base. These are but a few of the daily traps waiting to be set for this type of unique operation. Unique? No more unique than any other aviation command with its associated mission-related pitfalls that may have different community titles but surface as the same end results . . . complacency, nonexistent operational stress, get-home-itis, flathatting. You name it!

What with SOPs, safety doctrine, etc., already existing in the command covering all facets and aspects of independent and detachment operations, it would have been easy and convenient to attribute this mishap, which could just as well have been a multi-fatality accident, to the oft referred to syndrome "We buy you books and all you do is eat the covers."

Command responsibility has been and always will be a subject for discussion. Despite this crew's obvious lack of judgment, the commander succinctly described his own version of command responsibility in these words: "In reality the fact that an experienced crew could allow this particular trap to be set can only be attributed to a lack of proper operational, safety, and command leadership originating at the highest level. This command is presently conducting a major review of all aspects of its safety and operational disciplines to prevent this type of incident from recurring." ■

—adapted from Naval Safety Center WEEKLY SUMMARY

The season for the common cold

Over the course of an entire year, most adults will get two to three colds. If you have children at home, you're likely to catch six colds annually. So it's safe to say that almost all aviators must often deal with runny noses, scratchy throats, sneezing, and other cold symptoms, especially during fall and winter. But while the discomforts may be relatively minor, the common cold can cause pilot incapacitation during flight which may result in an aircraft mishap.

Two commonly held misconceptions can cause Army aircrewmembers to disregard the common cold as a significant hazard in helicopter flying. First, it is erroneously assumed that the common cold is a minor illness and only a first class "gold brick" would let a cold keep him from flying a low altitude mission. Second, since we fly close to the earth and altitude changes during flight are relatively small, the physiological effects of altitude are minimal.

The cold is no minor problem in aviation. Swollen lymph tissue and mucous membranes can block sinuses as well as ears. This can cause incapacitating pain and pressure during descent which may result in vertigo and loss of control of an aircraft. Additionally, infection of the inner ear by various cold and flu-like viruses can produce severe vertigo which makes straight and level flight impossible.

A Preliminary Report of Aircraft Mishap reported that, following cruise flight at 4,000 feet msl in a UH-1H, a student pilot (SP) and instructor pilot (IP) descended to 700 feet msl in an ILS approach. The SP experienced middle ear discomfort and on final, when a missed approach was declared, developed ear pain. The IP took control of the aircraft, landed, and referred the SP to the flight surgeon. The SP was treated for an ear infection.

It is true that at 4,000 feet msl hypoxia is not a problem. However, atmospheric pressure increases more rapidly with altitude change as one approaches the earth's surface.

The point to remember is that change in atmospheric pressure, rather than change in altitude, is the important factor.

Another problem with the common cold is the tendency of individuals to treat themselves with home remedies or medications which do not require a prescription. The cold capsules your wife took to keep her feeling well enough to clean house, prepare your meals, and drive the kids to school are forbidden when flying. Most of these medications contain antihistamines and carry a warning that they may cause drowsiness and should not be used while driving a motor vehicle or operating heavy equipment, not to mention flying an aircraft. AR 40-8 prohibits aircrewmembers from flying for 24 hours after taking antihistamines prescribed by a flight surgeon. A flight surgeon may treat minor nasal congestion without ear and sinus involvement with nasal sprays and decongestants which do not contain antihistamines, and permit an individual to fly. However, that is the flight surgeon's decision to make, and only after he has made an adequate examination.

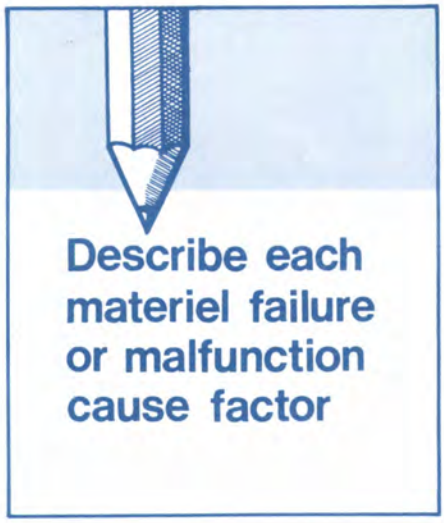
If you have the sniffles, see your flight surgeon. Don't take a chance on being incapacitated at a critical time during your next flight. ■

PRAM info needed

From time to time, we send out a cry for help to those responsible for preparing and submitting PRAMs. Usually, we are looking for more complete flight-related information concerning aircraft mishaps. Not this time. Our problem now concerns materiel failures. Lately, we've been getting more and more PRAMs that contain less and less information—information we desperately need to help us identify problem areas.

Bear in mind, the information provided by PRAMs is fed into computers which, in turn, enable us not only to determine problem areas but also to identify the source where corrective measures are needed.

Granted, in some instances, the inclusion of certain information on a PRAM may seem to be an unnecessary waste of time and effort. However, this may not be the case. For example, you might question the value of knowing the manufacturer's identity when a part failure results from some maintenance error. After all, it's not the manufacturer's fault. Maybe and maybe not. It all depends. If a computer readout shows additional instances in which similar components failed because of the same kind of maintenance errors, the problem could be one associated with design. It might be that although the component functions as it should, a design deficiency may allow it to be easily damaged during routine maintenance. In such a situtation coordination with the manufacturer would be necessary to effect a fix.



This is merely one example of the variety of ways the information you provide us can be used. However, the subject is far too complex to be fully treated in a few short paragraphs. So, for now, take our word for it. When preparing a PRAM after some component has failed, we need you to properly fill out **every** applicable information block related to materiel failure. Your help in this area will, in turn, help us to help you.

Should you have any questions as to how a PRAM should be completed, refer to AR 385-40, appendix C, item 14. ■

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 30 □ 12 May 1982

Thunderbumper time

US Army Aviation Training Library
Fort Rucker, Alabama 36360

If it weren't for thunderstorms, pilots could begin to look forward to some easygoing summer flying. But the months having the highest frequency of storms—June, July, and August—are just ahead.

Can you honestly say you know enough about the weather—particularly in your operating area—to be the kind of safe aviator Army aviation requires? There are pilots who do not devote enough time to the study of weather, shrug off weather warnings, and go blissfully off. These are the pilots who learn the hard way.

Obviously, thunderstorms must be avoided, but that's not always easily done. All over the world each day there are approximately 45,000 thunderstorms, and at least 1,800 of these are in progress at any given moment. That adds up to a lot of lightning bolts, high winds, rain, hail, vicious turbulence, and what have you. These thunderstorms may be either airmass or frontal type. While airmass thunderstorm cells usually build up over land during the heat of the day and break up in the early afternoon or evening, either airmass or frontal type thunderstorms may be encountered at any time. And their incidence increases during the summer months.

Few aircraft mishaps occur because pilots deliberately tried to fly through a thunderstorm. Inadvertence is another matter. One of the best protections against encountering thunderstorms in flight is being forewarned of their existence. If available weather data hints at thunderbumper possibilities, if your weather forecaster confirms your suspicions, and if those clouds in the distance begin to look boiling, think again before making the "go" decision.

The best safeguard against thunderstorm flying is a thorough preflight weather briefing. It's a command responsibility to see that this type of briefing is available, and it is a pilot responsibility to get it. But pilot responsibility for avoiding thunderstorms does not end with the preflight briefing. It continues with constant in-flight weather observations and an open ear for radio weather advisories along the route.

Study the clouds. When billowy white "puffs" begin to increase in number and size, take heed. These clouds can change in form and become cumulonimbus, with varying degrees of turbulence, rain, lightning, and, sometimes, hail. A towering cumulus can change into a raging thunderstorm in just a few minutes. Excessive radio static may also indicate that a storm is approaching.

One positive sign of a thunderstorm is the squall or roll cloud that extends downward from the main base of the storm. This highly turbulent cloud is located along the front and bottom of a violent thunderstorm. Its appearance means plenty of severe weather lies within the storm. An aircraft flown too close to the roll cloud could be inadvertently hurled into the storm. The possibility of this happening is greatest at night or when the roll cloud is hidden behind other clouds surrounding the storm. While radar can provide the pilot with a picture of what lies ahead, it is important to

(continued on next page)

Thunderbumper

remember that clear air outside the clouds can contain severe turbulence that even radar cannot detect.

Unwary aviators who don't know about the roll cloud have been known to try to avoid a storm by hedge-hopping under it. They've also been known to have been flattened by the turbulence they whammed into long before they thought they were close enough to a storm up ahead for it to reach out for them.

When thunderstorms are associated with a frontal system, they may be organized in long bands that progress ahead of the front. These are commonly referred to as squall line thunderstorms and are the most intense thunderstorms imaginable. Squall lines usually appear in the late afternoon and last until darkness or longer. No attempt should be made to climb over, slip under, or penetrate a solid squall line. No procedures exist that can guarantee safe flight through a thunderstorm, including those found in aircraft operators manuals.

In addition, gusty surface winds and downdrafts that precede a thunderstorm can be exceptionally violent and have caused fatal mishaps. Trying to take off or land when a thunderstorm is approaching an airfield is an extremely hazardous practice.

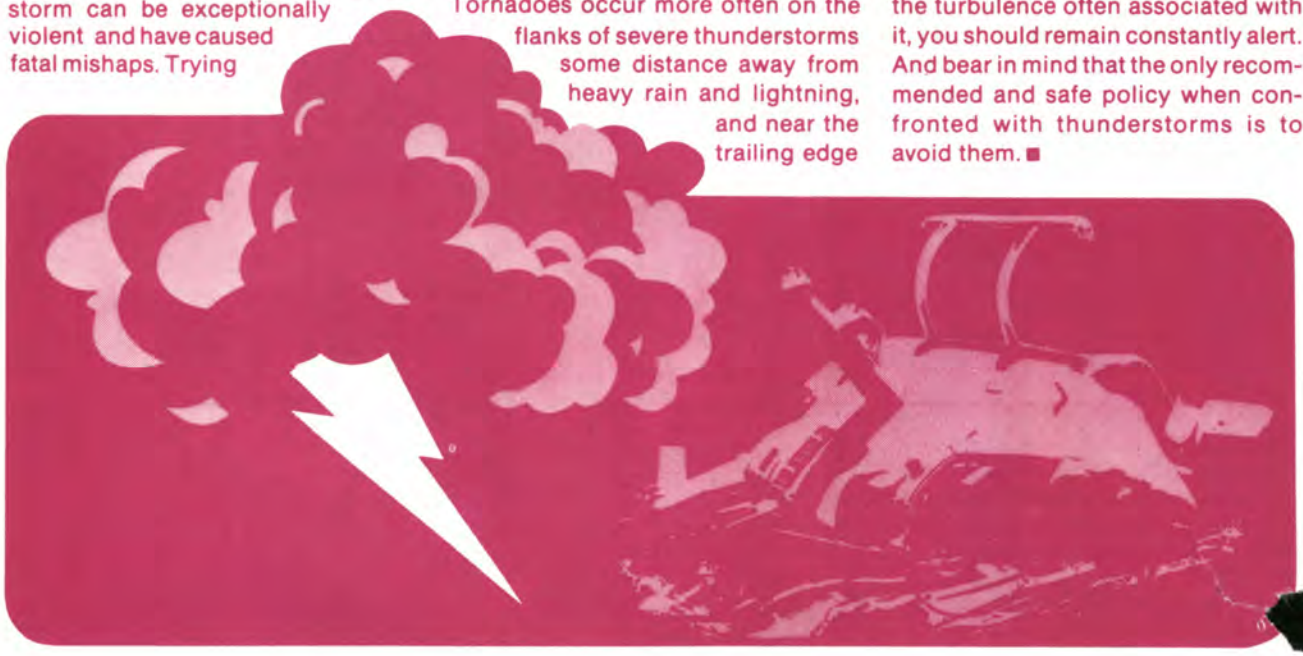
Vortices, or tubes, of tornadic or near-tornadic intensity may be encountered in and under innocent-looking lines of clouds extending from thunderstorms. These vortices are invisible and may exist as far as 20 nautical miles from the associated thunderstorm. Sometimes their presence can be detected by noting dust-whirls over land areas or swirls on the surface of water.

Another important aspect of this hazard is the great distance from the associated thunderstorm at which these tubes may exist. Avoidance must be based on knowledge of the presence of thunderstorms with which these cloud lines and tubes are often associated and flight procedures to avoid the cloud lines. A general rule is to suspect tornadic vortices any time a thunderstorm forecast includes the possibility of tornadoes, whether the thunderstorm is of an airmass or frontal system type.

Tornadoes occur more often on the flanks of severe thunderstorms some distance away from heavy rain and lightning, and near the trailing edge of a squall line. The greatest hazard lies on the flank of severe thunderstorms where invisible tornadic vortices are occurring below the base and within innocent-appearing clouds. These vortices produce no radar returns and usually have a common base with the thunderstorm at distances that range more than 20 miles from the rain and lightning beneath the storm. The only indicator to alert the pilot to this invisible destruction force is his knowledge of how near a storm cloud or system he can expect to encounter a tube. This bit of knowledge also provides him his only defensive action—avoidance.

When faced with deteriorating weather during flight, deciding the best course of action is not always easy. Can you safely circumnavigate the storm? Should you land at an alternate airfield? Or should you turn back? If you are to head for an alternate field or make a 180-degree turn, the time to do it is before you become caught inside a storm. Once trapped, you are committed to continue.

When it comes to summer flying and the turbulence often associated with it, you should remain constantly alert. And bear in mind that the only recommended and safe policy when confronted with thunderstorms is to avoid them. ■



Shortfax

Four 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.

Broken Wing Award Recipients

CW4 James M. Adkins
White Sands Missile Range,
New Mexico

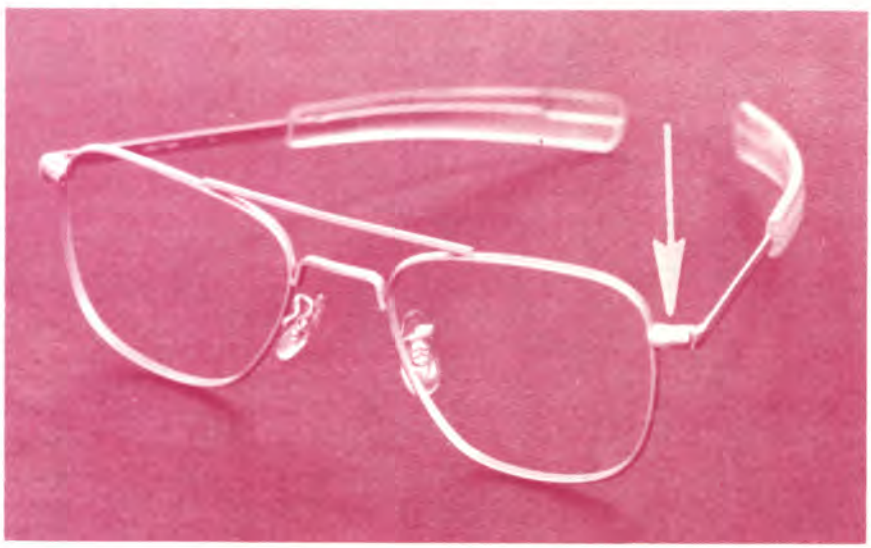
Robert L. Pearce, DAC
Army Materiel Development and
Readiness Command,
Alexandria, Virginia

CW3 Harold J. Thomas
158th Military Intelligence Company,
Georgia Army National Guard,
Dobbins AFB, Georgia

CW3 James R. Ward
Company A, 3d Aviation Battalion
(Combat), APO New York 09036

The big little things

The other day a group of us were discussing the pros and cons of operating helicopters in NOE, low level, and contour modes of flight. During the discussion, a comment was made regarding the hazards of downwind flight. When queried about such hazards, the person who had made the comment replied "Everybody knows what the hazards of downwind flight are." I must admit I could only think of a possible increased power requirement and antitorque control difficulties. I asked several aviators to tell me some of the hazards of downwind flight. I soon learned that everybody **does not know** the hazards of downwind flight. Do you?■



Defective flight glasses

Some of you may be wearing the new dull-finish chrome spectacle frame shown here. These frames were first dispensed the latter part of last year when the gold frames ran out. As indicated by the arrow, some of the frames have broken just below the temple hinge. Lenses have also been known to shatter. Either event could have serious complications if you happen to be flying an aircraft at the time.

Regulations require individuals who need corrective lenses to fly with a spare pair. With the new glasses it is even more important that the spare pair be readily available in case yours break or fall off your face. ■

Recap of TSARCOM messages

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

AH-1-82-01 Rigging throttle control idle stop adjustment

AH-1-82-02 Inspection of servo extension tubes

General 82-02 Safety check for AN/ALQ 144 IR jammer

UH-1-82-01 Inspection of collective and left/right cyclic connecting links

AH-1-82-03 Safety-of-flight message concerning one-time inspection of AH-1 servo extension tubes

CH-47-82-01 Safety-of-flight maintenance message notifying maintenance personnel of an inspection change on CH-47A/B/C aircraft forward and aft transmissions

CH-54-82-01 Safety-of-flight maintenance message clarifying use of MIL-H-83282 hydraulic fluid in CH-54A/B

CH-54-82-02 Safety-of-flight maintenance message advising inspection of CH-54B main landing gear

CH-54-82-03 Safety-of-flight message concerning one-time inspection of CH-54A/B forward main gearbox support fitting

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

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (H series) Hydraulic flight control system became erratic during flight. Caused by crack at upper fitting of hydraulic tube assembly input line to hydraulic filter assembly. □ (H series) Rpm warning light came on during hover. Caused by failure of tachometer generator. □ (H series) Low fuel light came on. On final, left fuel boost light came on. Caused by electrical short in wire to fuel boost pump. □ (H series) Fire warning light came on during start. Caused by frayed wiring in fire detection system. □ (H series) Crew smelled unusual odor and saw smoke coming from upper battery vent. Caused by overheated battery. □ (M series) Master caution and left boost pump lights came on. Caused by failure of boost pump. □ (M series) High frequency noise was heard during flight. Caused by failure of main generator shaft bearings.

UH-60 Class C mishap □ On short final, with fuel drum slingload, pilot felt aircraft lurch and then heard loud popping sound. Crew chief told pilot slingload had fallen clear. Cargo hook malfunctioned.

Attack helicopters

AH-1 Class A mishap □ (S series) Aircraft was engaged in low level "return to target" type maneuver. Pilot allowed excessive speed and high rate of descent to build up and was unable to stop descent before hitting trees. Aircraft rolled on left side. 8247

AH-1 Class C mishap □ (S series) Aircraft was at NOE hover when copilot heard unusual noise. Postflight inspection revealed damage to both main rotor blades because of tree strike.

AH-1 Class E mishaps □ (S series) Transmission bypass light came on and transmission oil pressure dropped during hover. Caused by failure of O-ring on internal transmission oil filter. □ (S series) Aircraft was on final approach in trail formation with copilot on controls. Copilot requested landing light remain off. Rate of closure increased, and copilot flared aircraft, then decreased collective, developing excessive rate of descent in tail-low attitude. Pilot took controls and increased collective to avoid hitting the ground or obstacles. □ (S series) IP smelled fumes during approach, and alternator rectifier light came on. Caused by failure of alternator.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Transmission oil temperature rose to 150° C. and oil hot light came on. Caused by failure of oil temperature sensing probe. □ (B series) No. 1 engine had high side governor failure in flight. Caused by defective beep switch. □ (C series) Crew attempted No. 1 engine start four times. No. 2 engine was started and aircraft was taxied into the wind. When No. 1 engine start was attempted again, crew chief told pilot engine was on fire. Aircraft was shut down and fire bottle was discharged into No. 1 engine. Gusty and variable winds, along with rotor downwash, may have contributed to spreading tail cone flames, giving a false impression of engine fire. Crew was aware of the possibility of residual fuel fire because of earlier start attempts and may have overreacted.

CH-54 Class C mishap □ (A series) With No. 1 engine at 100 percent N_2 during runup, rotor brake disc split and sheared retaining bolts. Disc separated from aircraft and hit No. 1 engine exhaust extension and left landing gear cowling.

Observation helicopters

OH-58 Class E mishaps □ (A series) Main rotor blade hit small tree limb

(continued on back)

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	1-12 May	**2**	**0**
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**33**	**21**

Real to reel accidents

The use of motion pictures and television video tapes, depicting actual aircraft cases, at unit safety meetings is one of the best ways to increase safety awareness.

Graphically presenting lessons learned from actual accidents followed by group discussion of the various causes and cures can make for an effective and stimulating meeting.

With the onset of hot weather operations and summer field training exercises, the following four films—available at your local Training and Audiovisual Support Center—are particularly appropriate for showing now.

These short films were designed to be used to open safety meetings, generate an awareness of the conditions and circumstances which set the stage for an accident, and trigger group discussions about similar accident-producing conditions which might be present in the unit.

• **Helicopter Performance and Weight and Balance Planning** (TF 46-6207). This film follows a pilot through the flight planning procedures for three cargo-carrying missions—morning, midday, and afternoon—during a summer field training exercise. The film stresses the safety-critical need for careful performance and weight and balance planning and gives tips that make the job easier.

• **Loss of Visual Cues—With Eyes Wide Open** (TF 46-6209). Examines situations where Army helicopter pilots lose all visual cues—night landings, in blowing dust, in sun glare. It stresses the importance of anticipating and recognizing situations when loss of visual cues is likely and gives correct procedures to follow in loss of visual cues situations.

• **Trust Your Instruments, Not Your Senses** (TF 46-6217). Recreates accidents caused by pilots who didn't believe their instruments. Shows that going back and forth between gauges and visual references can lead to disorientation and disaster when flying in and out of clouds in broken conditions.

• **Wire Strikes** (TF 46-6208). Examines wire strikes caused by unauthorized, unplanned terrain flight. Stresses that high airspeed at low level is the main killer in wire strike accidents. Shows that most wire strikes occur during contour and that 9 out of 10 occur outside the authorized NOE environment.

Confusion on film distribution

Judging by the number of questions we receive from ASOs, there is some confusion on how to get aviation safety films. Here's how the system works.

The Safety Center is the proponent for all Army safety training films. However, **we do not distribute, stock or loan films.** Your local Training and Audiovisual Support Center (TASC) is the only organization authorized to stock and loan Army training films and audiovisual materials and equipment. They can provide you with aviation safety training films and the equipment needed to show them. If your TASC does not have the film you're looking for, they can order it. This includes Navy and Air Force films as well as Army. TASC can also provide you with a complete catalog listing of all Army training films. Aviation safety films are distributed in 16mm and video tape and are identified by catalog number TF 46- or MF 46-.

Special service

If demand by other units creates a lengthy delay in getting the film you need, or if for some reason the films are not available through your local TASC, here's what you can do. Send a 3/4-inch color video recording cassette (available through normal procurement channels) to: Commander, USASC, ATTN: PESC-CA, Fort Rucker, AL 36362. When we get your tape we will record your film request—provided there are no legal constraints on duplication rights—and return it to you. Allow a couple of weeks for this service. Be sure the cassette you send is the correct length for the film requested (10- to 60-minute cassettes are available). Most of our safety films are 10 to 20 minutes in length and fit nicely in a 50-minute safety meeting.

ARNG distribution

USASC aviation safety films, in video tape format, are distributed to ARNG units through the Army National Guard's Fort Rucker based Multi-Media Program. The video tapes go to a network of 80 aviation learning centers located at ARNG flight facilities throughout the states, District of Columbia, and Puerto Rico. These learning centers are equipped with closed circuit television systems, projectors, and tape recorders.

In addition to USASC safety films, the Guard Media Program provides catalogs to Guard units on available Air Force, FAA, DOL, and DOT audiovisual materials. Guardsmen should contact their local flight facility or call the Fort Rucker Multi-Media Group at AUTOVON 558-2520, commercial (205) 255-2520, for additional information.■

Mishap briefs

during NOE hover. □ (A series) Transmission oil pressure light came on. Caused by failure of pressure switch. □ (A series) IP entered autorotation and started left turn. Rotor rpm was 360. IP did not check rpm during last 90 degrees of turn. Rolling out on final, IP noticed rotor rpm at 410. Recognizing overspeed condition, IP rejoined needles and landed. □ (A series) Maintenance test pilot was operating engine at max rpm for maintenance operational check after engine flush. UH-1 hovered by, causing cowling near aircraft to be blown into tail rotor. Pilot did not insure cowling was secure before MOC. □ (A series) Aircraft had just been fueled. As throttle was being advanced from engine idle, engine flamed out. Fuel tanker awaiting maintenance had been partially filled with water. All employees were not so advised, and tanker was not marked as unserviceable. Part-time employee refueled aircraft with 31 gallons of water.

Fixed wing

U-8 Class E mishap □ (F series) Right engine ran rough when power was reduced to cruise setting at 4,500 feet agl. As power was increased, roughness decreased. All gauges were normal except right engine cylinder head temperature, which read low. When power was reduced for landing, engine ran rough again and failed on 1-mile final. Caused by failure of fuel injection pump on right engine, allowing mixture to go to full rich.

C-12 Class E mishap □ (A series) Crew had just leveled aircraft at 19,000 feet when noise was heard. Pilot noticed outer panel of side cockpit window had cracked.

U-21 Class E mishap □ (RU-21H) Heater quit during flight. Outside air temperature was -20° C. Caused by failure of spark plug igniter.

Maintenance

UH-1 Class E mishaps □ (M series) Crew smelled fuel, and pilot of trail aircraft reported fuel was spraying from UH-1. Postlanding inspection revealed fuel line from fuel filter to fuel control had come loose at fuel control unit. □ (H series) Crew smelled fuel odor and landed. Caused by loose fuel line under cargo floor.

UH-60 Class E mishap □ Stabilator caution light and No. 2 fuel low light came on, and stabilator horn sounded. Crew chief smelled smoke in cabin area. Caused by wire bundle to No. 1 stabilator amplifier chafing against cargo hook control box.

AH-1 Class E mishap □ (S series) Fuel gauge fluctuated and then went to zero. Caused by loose wire on fuel quantity test switch.

OH-58 Class E mishap □ (A series) Engine oil bypass light came on during landing. Caused by stripped threads on line fitting mount.

Messages received

- Safety-of-flight maintenance message concerning one-time inspection of UH-60 pilot/copilot seat rubbing bar (UH-60A-82-06, 291600Z Apr 82). Summary: Two upper torso restraint straps from the crew seats failed under load at the point where the strap passes through the rubbing bar in the armor plating of the seat back. Rubbing bar installation was reversed and upside down on those seats. Contact: Lyell Myers, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

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

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Respect for rules

Saying that the Army has a lot of rules on what one should and should not do with an aircraft is akin to remarking that a porcupine has lots of prickly quills. Everyone knows that.

But what some aviators apparently fail to recognize and appreciate is the fact that—like the porcupine's quills—most aviation rules were created for the protection of the species.

Many of the rules Army aviators fly by—or should fly by—are the direct result of an accident. And most of these rules were written in blood.

Someone went out and destroyed an aircraft and killed himself and his passengers, then someone sat down and wrote a rule to prevent recurrence. These rules, based on lessons learned, are the result of a lot of hard-earned and very costly experience.

Unfortunately, the Army aviation record for learning from the mistakes of others is not one we can point to with pride. Pilots continue to disregard regulations and procedures, kill themselves and their passengers, and rack up millions of dollars in destroyed and damaged equipment.

The safe operation of an aircraft—or the crashing of an aircraft—is the result of many factors, one of which is professional respect for safety rules.

You can almost always pinpoint a specific and easily avoidable cause for any accident which happened because regulations or established procedures were overlooked or, worse, deliberately avoided. The following are typical:

■ **The rule:** *"A copilot, with current instrument qualification in category and properly briefed for the flight, is required for all flights in known or forecast IMC." AR 95-1*

"Whenever weather conditions in the flying area are such that inadvertent IMC may be encountered by an aviator while performing a specific mission, unit commander will not permit that mission to be performed under VFR unless. . .aviators are instrument qualified." Unit SOP

The violation: The PIC of a UH-1H requested and received a special VFR clearance to depart the control zone toward forecast IMC. The PIC knew the pilot did not have a current instrument rating. After a few minutes in flight, because of rising terrain and patchy fog, the PIC requested a climb through the overcast to VFR on top. Clearance was granted, and the aircraft ascended into the overcast. Some time during the climb, the pilot experienced vertigo and asked the PIC to take the controls. The PIC could not recover and the aircraft crashed.

Because of his lack of knowledge of the SOP, the unit commander authorized the mission in weather that was conducive to inadvertent IMC.

The result: One fatality, three major injuries, and one destroyed aircraft.

■ **The rule:** *"When hovering, watch for and avoid. . .tents or loose debris (rotor ingestion and damage.)" FM 1-51*

The violation: An OH-58, with an IP, pilot, and passenger on board, was on a range sweep. The IP and pilot, deviating from the authorized mission, decided to pick up some flare parachutes with an improvised hand-held hook. One chute was blown up into the rotor system, causing the control tubes to be severed. The aircraft rolled over on its right side.

The result: One destroyed aircraft and one minor injury.

■ **The rule:** *"No person will operate an aircraft in a careless or reckless manner which would endanger life or property." AR 95-1*

The violation: The platoon was participating in a field training exercise. The platoon leader left the field site in an OH-58, flying about 10 to 15 feet agl and 40 to 60 knots. There was also an observer and passenger on board. As the pilot approached a road running

(continued on next page)

Respect for rules

north and south, he spotted a jeep going south at about 30 to 40 mph. The pilot chose to exceed mission requirements and initiated a shallow left turn, as well as a slight descent, to place the aircraft on a converging path with the jeep.

As the aircraft approached the jeep, the pilot realized he would pass too close and applied power and aft cyclic to gain altitude. As the aircraft passed over the rear end of the jeep, the tail boom hit the jeep's antenna and both tail rotor blades hit the antenna mount and separated. The helicopter then crashed and came to rest on its right side.

The result: One fatality and one destroyed aircraft.

■ **The rule:** *"No person may operate an aircraft in acrobatic flight. . .below an altitude of 1,500 feet above the surface . . . ." FAR 91.71*

"Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:. . . Over other than congested areas. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In that case, the aircraft may not be operated closer than 500 feet to any person, vessel, or structure." FAR 91.79

The violation: The mission was a routine training flight for the OV-1D pilot to get some hood time for ATM requirements. The pilot and technical observer took off and flew toward the pilot's house. About 5 minutes after takeoff, the Mohawk was seen making an extremely low-level pass over the pilot's house. The aircraft then crossed a highway, reportedly flying about 100 feet agl. It then entered a steep climb to a near vertical position and, at the highest point in the climb, rolled to an inverted nose-down position and crashed.

There were strong indications that the pilot was violating federal aviation regulations and unit policies on low-level flight just before the climb. The climb itself was a violation of these policies since it met the definition of aerobatic flight. There was insufficient altitude to recover when the pilot inadvertently stalled the aircraft during the steep climb.

The result: Two fatalities and one destroyed aircraft.

■ **The rule:** *"When weather conditions encountered in flight prohibit compliance with VFR, the pilot will choose one of these plans: (1) Alter the flight to maintain visual flight conditions. (2) If all requirements for instrument flight can be satisfied, maintain visual flight conditions, request weather and NOTAM information, and obtain an ATC clearance to make the flight under IFR. (3) Land at the nearest suitable military or civil airfield. Helicopters may land at other locations as necessary." AR 95-1*

"This aircraft is restricted to visual flight conditions. Flight into instrument meteorological conditions will be conducted on an emergency basis only." TM 55-1520-228-10

"A copilot, with current instrument qualification in category and properly briefed for the flight, is required for all flights in forecast IMC." AR 95-1

"For all flights into known or forecast IMC, aircraft will have the following operational equipment and lighted instruments, with all vacuum or electrical sources for the flight instruments operational: . . .Radio navigation equipment compatible with the navigation facilities used during flight." AR 95-1

The violation: An OH-58 pilot, flying alone, was on a service mission. En route, he was told by air traffic control that his landing area was IFR. When the controller asked the pilot what his intentions were, the pilot replied that he would "go in under the clouds." A short while later, he requested an IFR clearance although he was flying an aircraft restricted to VFR flight. He accepted the IFR clearance intended for an ILS approach in an aircraft not ILS equipped. After entering IMC, the aircraft was seen coming out of a low (300 feet agl) cloud layer, apparently out of control. The OH-58 then crashed.

The pilot had less than 40 hours of experience in the OH-58, none of which were instrument or hood. Although instrument rated, the pilot was marginal to below average in instrument flying proficiency.

The result: One fatality and one destroyed aircraft.

■ **The rule:** *"Single pilots in observation helicopters are limited to operating down to 50 feet above the highest obstacle during daylight hours." MACOM regulation*

"Flights in the wire environment (below 300 feet agl) must be avoided when not required by essential and/or supervised nap-of-the-earth (NOE), contour or low level flight training or field exercises." Company wire strike prevention policy

The violation: Flying about 350 feet agl, the OH-58 crossed a valley and then passed over higher terrain. The pilot accelerated from 40 knots to 55 knots and had traveled about 400 yards at 35 feet above the ground when he saw some electrical cables in front of his aircraft. He banked steeply to the left to try to miss the cables, but the aircraft hit three of the seven cables. The aircraft rolled to the right as it passed through the cables and crashed almost inverted, coming to rest on its right side.

The pilot said he knew he should not have been as low as he was but he was confident in his ability to avoid hazards because of the clear weather and unlimited visibility.

The result: One destroyed aircraft and two major injuries.

■ **The rule:** *"No person will operate an aircraft in a careless or reckless manner which would endanger life or property." AR 95-1*

"Before beginning a flight, the aircrew will acquaint themselves with mission procedures and rules. Preflight action for all flights will include an evaluation of the following:. . .takeoff and landing performance data." AR 95-1

The violation: During an unauthorized high-speed, low-level flight over water, near personnel, boats, and other property, a UH-1 pilot applied power without making a corresponding change in aircraft attitude to stop a descent. The descent was not stopped, and the aircraft crashed into the water.

The pilot did not prepare a performance planning card. Apparently unaware of the maximum torque available for the existing density altitude, the pilot exceeded the aircraft's power limitations in an effort to recover from the descent.

The result: One fatality, two minor injuries, and one destroyed aircraft.

How can accidents like these be prevented? By discipline. Pilots violate procedures and ignore regulations because commanders allow them to get away with it.

Suspending pilots and IPs for procedure violations, recording unsafe acts and violations of regulations, and relieving aviators from flying duty with forfeiture of flight pay for flight discipline infractions—these are positive actions commanders can take to improve the discipline and professional performance of aircrews.

Professionalism is the most essential safety ingredient. Any job done professionally is inherently safe. But if there is no professionalism, there is no safety.

The real professional knows what rules are made for and he respects them. He follows them to the letter every time, knowing that his own safety and that of a considerable number of other people are dependent on conscientious compliance with regulations and established procedures.

Commanders must take immediate and positive action with any and all pilots at the first sign of a breach of flight discipline. . .at the slightest deviation from approved missions. There can be no deviations from sound and prescribed operating procedures.■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (H series) Engine oil temperature rose during flight. Caused by failure of engine oil bypass valve. □ (H series) Transmission oil pressure gauge dropped to zero during landing. Caused by failure of gauge. □ (H series) Crew heard grinding noise from hydraulic pump area, and hydraulic light came on. Controls became stiff, and running landing was made. Caused by broken hydraulic line. □ (H series) Engine oil temperature climbed to 150° C. during flight. Caused by failure of thermostat flow control.

UH-60 Class C mishaps □ During hot refueling operation, crew chief noticed that rear tail rotor drive shaft cover was open. Dzus fasteners came loose in flight, and unsecure cover pounded against fuselage. Half of the cover was missing. □ Large bird flew up through rotor system. Severe vibration was immediately felt in aircraft. Main rotor blade tip cap was damaged.

UH-60 Class E mishaps □ Pilots heard strange noise during takeoff. Postflight inspection revealed left transmission oil cooler compartment door was open. Caused by broken rear latch. □ Low rotor horn sounded during takeoff. Caused by broken wire.

Attack helicopters

AH-1 Class C mishap □ (S series) Test pilot was performing ground runup test using Vibrex machine. Cord, hanging down over front canopy, hooked on emergency governor switch in front seat. As cord was pulled, it threw switch into emergency, causing rotor tachometer to surge to 100 percent for 2 seconds. Main rotor hub was replaced.

AH-1 Class E mishaps □ (S series) Master caution and transmission oil lights came on. Caused by failure of transmission oil bypass manifold. □ (G series) N_2 rpm fluctuated during hover check. Caused by faulty N_2 rpm indicator. □ (S series) Aircraft was at 50-foot OGE hover. IP was looking through TSU. Rated student pilot, practicing indirect fire technique, pitched aircraft nose up and pulled excessive power to maintain position above ground. IP was unable to stop excessive application of collective, resulting in engine overtorque of 106 percent.

Cargo helicopters

CH-47 Class A mishap □ (C series) Aircraft was on shallow approach from low-level flight with externally loaded M198 howitzer. When pilot realized he was landing in the wrong LZ, he aborted the approach by turning upslope. Howitzer became tangled in trees, and crew jettisoned load. 8248

CH-47 Class E mishaps □ (C series) Flight engineer told pilot transmission oil was leaking around combining transmission. Caused by failure of transmission oil cooler core. □ (C series) Combining transmission oil pressure went to zero. Caused by broken wire on combining transmission cannon plug. □ (B series) During ground wait with engines in ground idle and slight tailwind, crew reported smoke in cargo compartment. Smoke was seen coming from utility oil cooler fan area. Smoke stopped when aircraft was shut down. Oil residue on tail cone of No. 2 engine caused smoke, which was blown into aircraft by tailwind. □ (C series) No. 2 engine N_1 gauge went to zero during climbout. Caused by failure of tachometer generator.

Observation helicopters

OH-6 Class E mishap □ Crew heard unusual noise and felt vibration during takeoff to hover. ADF sensing antenna had broken and hit tail rotor blade.

OH-58 Class E mishaps □ (A series) Fuel boost pump light came on during NOE flight. Caused by failure of boost pump. □ (A series) Transmission oil pressure light came on during hover. Caused by failure of transmission oil pressure switch. □ (A series) On termination of simulated antitorque failure landing, student pilot allowed aircraft to rock forward, breaking off tip of lower wire cutting device. □ (A series) Low rpm audio and light came on. Rotor tachometer went to zero and hydraulics were lost. Running landing was made. Caused by failure of input drive shaft on tachometer generator.

Fixed wing

C-12 Class E mishaps □ (A series) When pilot advanced power for takeoff, master warning and left fire warning handle illuminated. Caused by faulty fire detector sensor. Aircraft had been parked on ramp for 5 hours in intermittent rain before takeoff. Moisture may have contributed to faulty indications. □ (A series) When gear handle was brought to up position after takeoff, gear would not come up. Gear had been extended manually during previous training flights and engage handle may not have been disengaged completely.

OV-1 Class E mishaps □ (D series) Wheel and flap indicator gave unsafe gear indication on right main gear during landing. Pilot used emergency system and confirmed gear was down. Caused by failure of wheel and flap indicator.□ (D series) Right main landing gear gave unsafe indication. Caused by failure of down-lock switch.

U-8 Class C mishap □ (JU-8F) Right main landing gear gave unsafe indication during prelanding check. Tower flyby revealed right main gear was about half extended. Gear was electrically retracted and decision was made to return to home base before trying to manually extend gear. When

(continued on next page)

Mishap briefs

gear were manually extended, right main gear again gave unsafe indication. Tower flyby revealed right main gear was retracted. Aircraft was flown to an Air Force base with 7,000 feet of smooth asphalt runway. Aircraft touched down with both engines shut down and feathered and landing gear retracted. Propellers, inner wing flaps, and underside of fuselage were damaged. Caused by mechanical malfunction.

U-8 Class E mishaps □ (F series) Engine ran rough and misfired during flight. Caused by broken valve stem on No. 4 cylinder on right engine. □ (F series) Shortly after takeoff, No. 2 engine chip detector light came on, followed by increase in cylinder head temperature and loss of oil pressure. Oil was seen on side and top of engine cowling. Engine surged several times and then failed.

U-21 Class E mishaps □ (RU-21H) After 3 hours of flight, left loadmeter was not indicating any electrical load. When left generator was reset, left generator-out light came on. Caused by failure of voltage regulator. □ (RU-21H) No. 1 engine oil pressure fluctuated during flight. Oil cap was not secured correctly during preflight.

Maintenance

UH-1 Class E mishaps □ (H series) Large puddle of oil was seen on runway after termination of straight-in autorotation. Transmission oil pressure hose was chafing on another hose fitting, causing hose to rupture. □ (H series) Muffled bangs were heard from rear of aircraft during turbine engine analysis check. Caused by incorrect variable inlet guide vane rigging procedures. □ (H series) Egt gauge fluctuated, then failed during runup. Caused by failure of safety wire cannon plug. Plug worked loose.

OH-58 Class E mishap □ (A series) Transmission oil hot light came on during landing. Caused by loose wire on temperature bulb.

OV-1 Class E mishap □ (D series) When pilot raised gear on takeoff, wheel/flap indicator showed nose gear in transit. Pilot lowered gear and indicator showed all gear down and locked. Aircraft was landed without incident. Nose gear door striker was out of adjustment.

U-8 Class E mishap □ (F series) Engine misfired and ran rough during climb. Fuel injector pump flow adjustment was set incorrectly, causing rich fuel mixture.

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	1-19 May	**3**	**0**
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**34**	**21**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

Messages received

- Message concerning maintenance support of Vibrex balancing kit (281830Z Apr 82).

Changes to TMs

The following changes to TMs have been released:

- Change 20, dated 16 Mar 82, to TM 55-1520-228-23-1, OH-58 Maintenance Manual. Outlines procedures for tracking/balancing main rotor/tail rotor blades with Vibrex.
- Change 12, dated 1 Apr 82, to TM 55-1520-235-CL, OH-58C Operator's and Crewmember's Checklist.

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

Check Density Altitude...First!

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Mishap review: U-3 proficiency check

Synopsis

A simulated single-engine landing was initiated on the traffic pattern downwind leg. Appropriate procedures were performed, but the pilot let the U-3 get too low on base leg to safely complete the landing. The IP decided to continue the approach on two engines. Necessary power could not be restored to the No. 1 engine. The IP took control and landed to the left of the intended runway.

History of flight

The mission was a flight proficiency check in a U-3A. Several takeoffs and landings were made. The IP then initiated a simulated engine failure on the downwind leg of the traffic pattern by retarding the mixture lever on the No. 1 engine. The pilot correctly identified the simulated inoperative engine and performed the proper emergency procedures. The IP immediately removed the prop lever from the feather position as soon as the pilot placed it there and then returned the mixture lever to the forward position, restarting the engine. The engine was set to zero thrust by placing the prop lever at the detent and the throttle to about 12 inches of manifold pressure.

The pilot completed the before-landing check, including extending the flaps to 15 degrees. He did not lower the landing gear. As the 180-degree point was passed, the aircraft was about 1,100 feet indicated (traffic pattern altitude was established at 1,200 feet) and 120 mph. The pilot started a shallow, continuous turn from downwind to final. The IP suggested the power on the No. 2 engine be reduced since it was still at full power, where it had been placed on downwind while the pilot was identifying the simulated inoperative engine.

The IP told the pilot the aircraft was too low on the base leg and to make a two-engine landing. He said he would return the No. 1 engine to normal operation. The pilot lowered the landing gear and then advanced the No. 2 throttle as the IP advanced the No. 1 prop lever and started the No. 1 throttle forward. The aircraft was in a turn to final, 600 to 700 feet msl, 105 mph (below best single engine rate of climb

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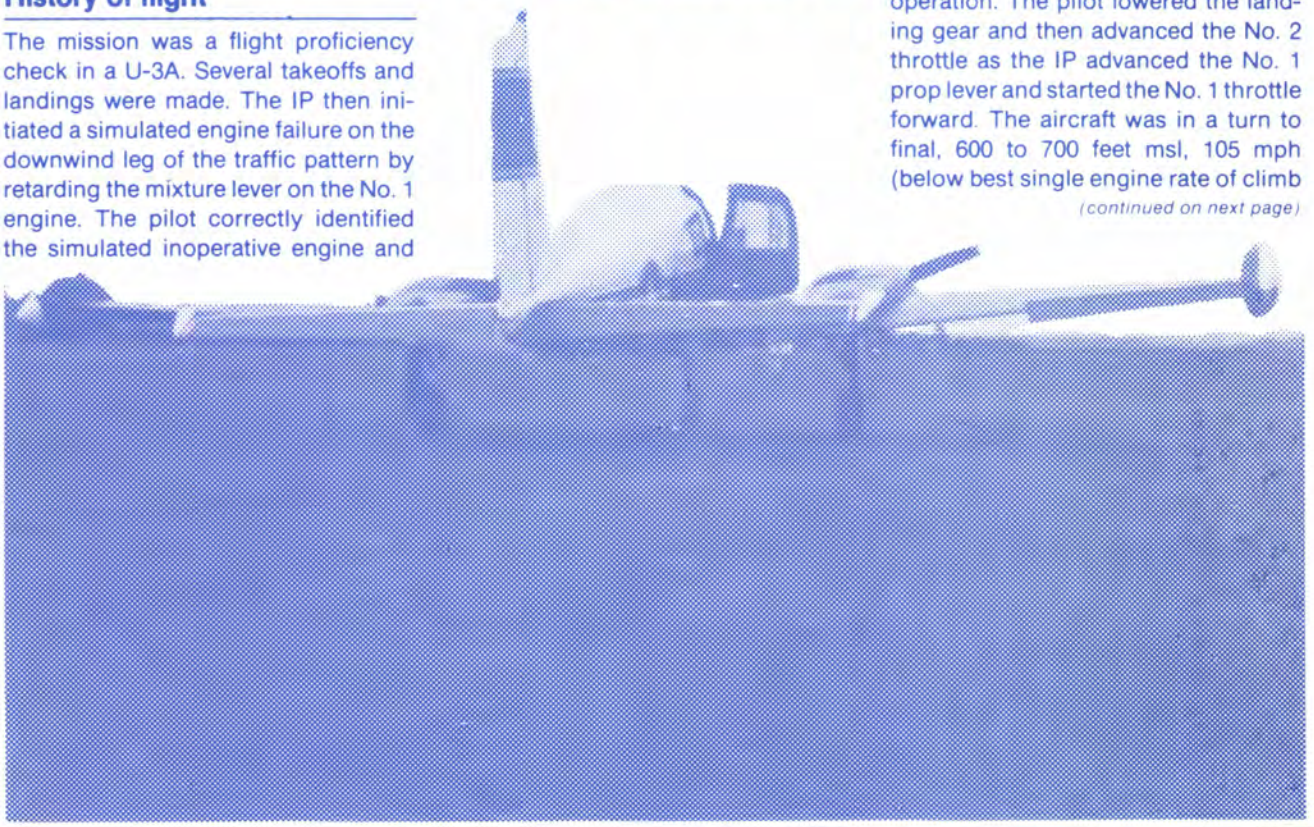


U-3 proficiency check

airspeed), and approximately one-half mile from the approach end of the runway. The pilot continued to add power to the No. 2 engine as airspeed dropped to 100 mph. The rate of descent increased and the IP tried to regain full control of the No. 1 engine, which would not accelerate beyond 1500 rpm. Aircraft configuration at this point was gear down, 15 degrees of flaps, 95 mph, and 400 to 500 feet msl.

The IP took control when it became apparent the aircraft might land short of the runway. He continued the approach with the gear down, still believing the runway could be reached. Because of the low altitude and slow airspeed (150 to 200 feet agl and 95 mph), the IP felt that a go-around was not practical and that he could still make the runway. About one-fourth mile from the approach end of the runway, the IP realized the aircraft was going to land short. To miss the approach lights of the runway, he turned the aircraft slightly to the left, hoping to land on another runway.

As the IP flared the aircraft and retarded the throttles, the U-3 hit the ground 10 feet to the right of the runway, left wing low and left main gear first. The left main gear hit the lip of the runway and was damaged. The aircraft crossed the runway and came to a stop on the grass about 1,000 feet from initial point of contact with the ground. Damage was confined to the left wing and left main landing gear.

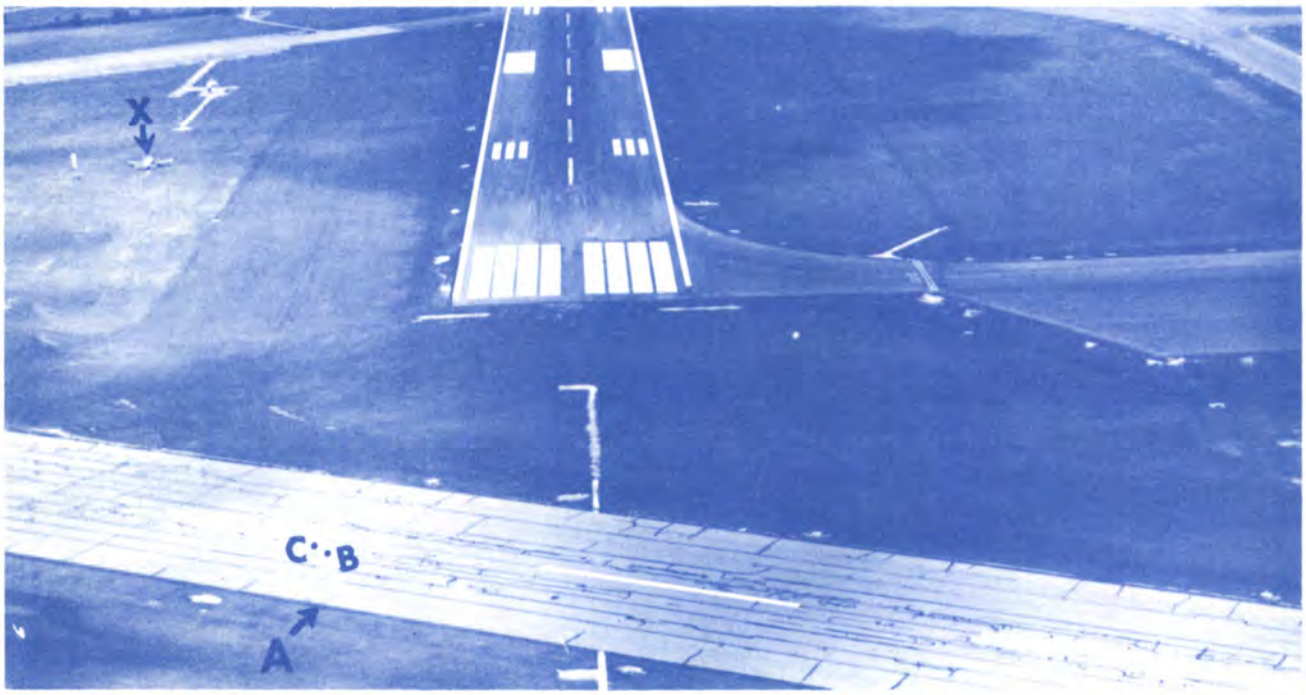
Crewmember experience

The 36-year-old IP had more than 2,100 fixed wing hours, with more than 100 hours IP time in the U-3A. The 36-year-old pilot had more than 100 fixed wing hours, with more than 60 hours in the U-3A.

Commentary

After it was determined the No. 1 engine propeller was not functioning properly and that the runway could not be reached under existing conditions, the IP did not initiate a single-engine go-around nor did he retract the landing gear or feather the malfunctioning propeller. Either of these actions would have increased the probability of a successful landing. The IP used a nonstandard procedure for bringing an engine at zero thrust back on line. He believed the U-3 would not fly on one engine, even though the operators manual states that it will.

The cause of the No. 1 engine propeller malfunction could not be determined. The symptoms could not be duplicated during an operational test and evaluation. Similar conditions had developed with the aircraft on two other occasions before this mishap. ■



A Initial impact point of left main gear
B Initial impact point of right main gear
C Initial impact point of nose wheel
X Aircraft final resting place

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) During night troop insertion, No. 3 aircraft in formation of five hit electrical wires. Tail boom was replaced. □ (H series) After aircraft was landed, tower personnel told crew an object had fallen from engine. The object was a diffuser cap. Cap hit tail rotor drive shaft cover and then hit tail rotor blade.

UH-1 Class E mishaps □ (H series) Master caution light came on and transmission oil pressure dropped to zero during takeoff. Oil filter gasket ruptured, causing loss of all transmission oil. □ (H series) Tail rotor chip detector and master caution lights came on during landing. Caused by failure of 90-degree gearbox. □ (H series) N_2 speed dropped to 6000 rpm during landing. Caused by failure of overspeed governor. □ (H series) Engine oil pressure dropped to 75 psi during landing. Caused by failure of engine oil pump. □ (H series) Fine mist sprayed on windshield from top battery vent. Crew smelled battery fumes. Caused by internal failure of battery. □ (H series) Rotor tachometer went to zero during hover. Caused by failure of tachometer generator.

UH-60 Class C mishap □ As aircraft was on short final for landing, sand obscured pilot's vision and he lost sight of landing zone. Aircraft drifted into small tree, damaging main rotor blade tips.

UH-60 Class E mishaps □ Crew noticed slight vertical vibration. Postflight inspection revealed main rotor dampner had broken off where it attaches to hub. □ Squealing sound was heard during flight. Caused by failure of main module. □ Loud bang was heard during climbout. No. 2 engine-out light came on and oil pressure was low. Caused by failure of No. 2 engine.

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	1-26 May	**5**	**0**
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**36**	**21**

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) Transmission oil temperature gauge dropped below 50° C. Caused by failure of transmission thermostat switch. □ (S series) Aircraft was being refueled at refueling point. Three fuel tanks weighing about 3,500 pounds each were located on a slight incline 100 feet from aircraft. Tanks were chocked in position with large rocks. Two tanks were in use. Rotorwash from a hovering CH-47 caused the third tank to roll over the chocks and start downhill toward the AH-1. AH-1 pilot was out of the aircraft overseeing the refueling operation. Copilot saw tank begin to move and immediately brought engine to operating rpm. The noise attracted the ground personnel and they moved away from aircraft. Copilot brought aircraft to a hover so tank could pass underneath. Tank rolled directly down fuel hose which was still attached to aircraft. Tank hit right rear part of skids, cracking fairing and tearing hose from side of aircraft. Aircraft was landed with no further incident.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Oil was seen leaking from forward transmission oil filter O-ring during hover. O-ring was replaced. □ (C series) Rotor tachometers fluctuated and dropped to zero on final approach. Caused by failure of rotor tachometer generator.

Observation helicopters

OH-58 Class A mishap □ (A series) Because of severe weather warning, aircraft was secured to landing pad (PSP) with manilla rope at all four points where skids are attached to cross tubes. Pilot knew this and untied three of the ropes. Pilot picked aircraft up to a

hover, made 90-degree clearing turn, and moved to right, clearing the pad. As he was making second 90-degree right turn, nose pitched up. Pilot lowered collective and nose continued up, causing tail to hit the ground. Aircraft then rotated around the tail and came to rest on left side. 8249

OH-58 Class E mishaps □ (A series) Master caution and engine oil bypass lights came on. Caused by loose oil cap. After oil sample was taken, cap was not secured correctly. □ (A series) Smoke filled cockpit during takeoff. Failure of tube assembly metal nut resulted in melting of plastic air duct elbow by direct bleed air. Resulting smoke was ingested into cockpit. □ (C series) Aircraft would not start. Wire leading to starter trigger on collective was broken.

Fixed wing

C-7 Class E mishap □ Aircraft was taxied from taxiway onto main parking ramp. Pilot turned aircraft left and slowed down to taxi between a C-141 and a C-7. Pilot and copilot cleared their respective wing tip and verbally reassured wing tip clearance on their side of the aircraft. Right wing tip hit wing tip of parked C-7. Right wing tip of taxiing aircraft overlapped wing tip of parked C-7 about 9 inches. There was about 7 feet of clearance between wing tips on left side of aircraft.

C-12 Class E mishaps □ (A series) No. 2 engine torque dropped and tgt climbed during flight. Caused by blocked high bleed valve orifice. □ (D series) Oil pressure rose during taxi for takeoff. Caused by failure of oil pressure sensing transducer for No. 1 engine.

OV-1 Class E mishaps □ (D series) Right engine egt exceeded 760° C. during takeoff. Caused by malfunction of signal converter. □ (D series) Hydraulics failed during approach for landing. Caused by cracked hydraulic line to right outboard gear door actuator.

U-21 Class E mishaps □ (A series) No. 2 engine lost power on takeoff. Caused by failure of fuel control unit. □ (A series) Copilot saw oil siphoning on takeoff. Pilot had failed to secure oil cap after taking oil sample.

Maintenance

UH-1 Class E mishaps □ (H series) Hydraulic system failed during landing. Right input line to hydraulic cyclic servo irreversible valve had ruptured. Metal cover for line failed due to chafing against adjacent line cover. □ (H series) Engine rpm increased during landing. Main pitch change links were adjusted incorrectly. □ (H series) Total hydraulic failure occurred during flight. Running landing was made. Hydraulic pressure line located just below sight glass in transmission well was ruptured because of chafing against transmission main oil line. □ (H series) Cockpit filled with smoke, master caution and hydraulic lights came on, and feedback was felt in controls. Caused by incorrect installation of hydraulic hose, which chafed on lower control tube of left cyclic servo.

AH-1 Class E mishap □ (S series) Pitch SCAS hardover occurred during hover. Stinger hit ground and was bent during recovery. Pitch channel SCAS was out of adjustment.

CH-47 Class E mishap □ (C series) During ground operation, crew chief saw a mist of JP4 coming from No. 1 engine. Caused by chafed fuel line.

OH-58 Class C mishap □ (A series) While increasing collective for takeoff to hover, pilot heard a noise and noticed torque at 40 psi, TOT at 860-880, and N_1 at 104-106. Incorrectly installed machine screw worked loose and fell into engine compressor.

OV-1 Class E mishap □ (D series) Right main landing gear would not retract after takeoff. Pilot recycled gear and gear locked down. Caused by overservicing of main gear struts.

Messages received

• Safety-of-flight message concerning inspection of CH-47B/C rotor blade nose caps (CH-47-82-04, 111815Z May 82). Summary: Main rotor blades should be visually inspected for cracks in the nose caps. Blades with cracks as well as blades with nose cap patches (except patches on the outboard 10 inches) should be removed from service. Contact: Michael West, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight maintenance mandatory message concerning installation and inspection of new AH-1 pitch control tubes (AH-1-82-06, 112045Z May 82). Summary: New pitch control tubes, painted black, are now being issued on a priority basis. Message lists new inspection criteria for tubes. Contact: John Morris, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance advisory message concerning use of the AN/ALQ-144 IR jammer (GEN-82-05, 112050Z May 82). Application of MWO 11-5865-200-50-1 removes the potential safety hazard on this equipment and upgrades the system to a safe, serviceable, and operational condition.

• Maintenance notice concerning clarification of CCAD hot line use (141905Z May 82).

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

TM changes

Change 14, dated 19 Apr 82, to TM 55-1520-235-CL, for OH-58C, has been released. ■

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL36362 □ STACOM 80 □ 26 May 1982

Operators Manual and Checklist update

Listed below are the effective dates of the current aircraft operators 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	3, 6 Nov 80	Jul 78	1, 14 Jan 81
204-10/3	OV-1B	9 Mar 79	2, 25 Mar 81	Feb 79	
204-10/4	OV-1C	10 Apr 79	3, 31 Mar 81	Apr 79	
208-10	T-42A	27 Feb 79	1, 7 Jan 82	Feb 79	1, 7 Jan 82
209-10	U-21A	25 Mar 77	7, 23 Nov 81	Feb 77	7, 27 Nov 81
209-10-1	RU-21A/D	28 Feb 77	8, 25 Nov 81	Mar 77	6, 23 Nov 81
213-10	OV-1D/RV-1D	4 Aug 78	6, 24 Feb 82	Nov 78	2, 8 Apr 81
214-10	RU-21B/C	15 Mar 77	9, 30 Nov 81	Apr 77	7, 23 Nov 81
215-10	U-21G	11 Mar 77	6, 23 Nov 81	Apr 77	5, 23 Nov 81
215-10-2	RU-21H (GR-V)	29 Dec 78	4, 27 Nov 81	Dec 78	3, 27 Nov 81
216-10	U-3A/B	11 Dec 78	1, 3 Jul 80	Dec 78	1, 9 Feb 82
	C-12A	8 Jan 80		Jan 80	
	C-12C	1 Dec 78	1, 31 Oct 79	Jan 79	
T01C-7A-1	C-7A	1 Oct 70	10, 11 Jan 80	Oct 70	13, 11 Jan 80
	C-12D	28 Mar 80		Mar 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	2, 21 Aug 81	Dec 78	1, 2 Feb 79
210-10	UH-1D/H	18 May 79	15, 25 Feb 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	2, 1 Oct 80	Mar 77	2, 10 Oct 79
217-10-2	CH-54B	15 Apr 77	2, 10 Oct 79	Mar 77	2, 22 Aug 79
219-10	UH-1B	16 Jan 69	17, 11 Feb 81	Dec 68	8, 11 Apr 79
220-10	UH-1C/M	8 Sep 80	9, 14 Jan 82	Sep 80	2, 11 Jan 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	9, 30 Oct 81	Nov 79	2, 9 Apr 81
228-10	OH-58A	7 Apr 78	20, 30 Mar 82	Jul 78	11, 12 Mar 82
233-10	TH-55A	30 Sep 76	2, 14 Jul 78	Oct 76	4, 17 Oct 78
234-10	AH-1S (MOD)	17 Nov 76	13, 5 Feb 82	Nov 76	3, 30 Nov 79
235-10	OH-58C	7 Apr 78	25, 8 Apr 82	Jul 78	14, 19 Apr 82
236-10	AH-1S (PROD)	11 Jan 80	2, 20 May 80	Jan 80	1, 2 Apr 82
237-10	UH-60A	21 May 79	13, 11 Jan 82	Dec 78	10, 23 Feb 82

DES is aware of the fact that -10 and CL changes have not generally been sent to the field at the same time. TSARCOM, with the cooperation of TAG, has taken action to finalize -10 and CL changes simultaneously and have them remain together through printing and distribution. Users can expect simultaneous delivery in the future.

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

Information needed on materiel failures

We continually receive Preliminary Reports of Aircraft Mishaps (PRAM) that are incomplete when known or suspected materiel failures are cause factors. Chapter 13 of AR 95-5 previously governed PRAM submission. The only required information for known or suspected materiel deficiencies (paragraph 14 of the PRAM) was national stock number, part number, nomenclature of the failed component, and the name of the publication from which this information was obtained. However, if engine failure was a factor, complete historical data (time since new, time since overhaul, serial number, overhaul facility, date of last overhaul, previous storage history, etc.) was required to be submitted on the PRAM.

AR 385-40, effective 1 October 1980, supercedes chapter 13 of AR 95-5 concerning data required on a PRAM. Paragraph 5-13(5) of AR 385-40 states: "The PRAM will provide information required by the sample worksheet for preparing a PRAM." Historical data for **all** major components that contributed to the mishap is now required in paragraph 14 of the PRAM. A note preceding these instructions in AR 385-40 states that if this data is not known within 24 duty hours of the mishap, the data will be provided via a supplemental report as soon as it is known.

Historical data for a major component that contributes to a mishap is essential information which is used by the Safety Center for various reasons. Reviewing periodically the status of materiel failures of major components in each aircraft system can identify definite failure trends. Several factors can contribute to a component failure. Following are a few:

- Defective materiel used during manufacture.
- Improper maintenance procedures used at overhaul facilities and in the field.
- Inadequately established TBO or inspection intervals.
- Improper application of MWO, either in the field or at depot level.

A more accurate failure trend analysis can be done if the component's historical data and serial numbers are known. So the next time you have to submit a PRAM and a major component is a suspected or known cause factor, be sure to complete paragraphs 14a through q. Taking the extra time to complete this section could help identify problem areas, which, in turn, could help prevent other mishaps. ■

Water purification tablets

The following lot numbers of water purification tablets are unsuitable for issue and use. These tablets should be destroyed.

Lot No.
0416-0600
0416-604
2007-650
2007-652
2007-662
2007-673

The following water purification tablets have been found suitable for issue and use.

Lot No.	Retest Date
1093	Feb 84
1098	Feb 84
10912	Feb 84

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 33 □ 2 Jun 1982

What you should know about disorientation accidents

As aviators getting your first ride, you were cautioned about disorientation, illusions, vertigo and all the other weird things that can happen to you in flight. You've been fed information on disorientation with a fire hose since entering the aviation program. Still year after year, disorientation accidents continue to occur. Eleven Class A and B mishaps resulting from disorientation causes occurred during FY 80 and 81. Eight people were killed and 12 were injured in these mishaps, which cost the Army almost $5 million.

Accident experience indicates that aviators are still unable to anticipate and recognize the conditions that can cause disorientation.

What do we mean by a disorientation accident? A disorientation accident is any accident in which the pilot's perception of the motion and attitude of his aircraft differs from the true motion and attitude and he **accepts** his perceptions as accurate; in other words, any accident resulting from the pilot's incorrect perception of his true motion and attitude.

Accident data indicates that the problem of disorientation is particularly crucial in rotary wing aircraft. A study of disorientation accident experience has yielded some facts you should be aware of:

- Strange as it may seem, disorientation occurs most frequently in straight-and-level flight.
- Landing is the most frequent phase of flight for major disorientation accidents, especially during conditions of poor visibility. This is because of the increased hazards, such as fog and dust, normally encountered near ground level.
- The age of the aviator is not a factor in disorientation. Older pilots with more flight experience are as likely to experience mild, moderate, or severe disorientation as younger pilots with less experience. In addition, the pilot's age has no apparent effect on his susceptibility to disorientation episodes in which fatigue was a factor.
- Frequent instrument flight training appears to lessen the severity of disorientation experience and provides a realistic environment in which the rotary wing aviator can learn to avoid becoming disoriented.
- Familiarization with conditions and circumstances conducive to disorientation can help you to cope with disorientation.
- The aviator's frame of mind, including his ability to recognize clues to impending disorientation, seems to determine his performance in a disorientation environment.
- Fascination with some object outside the aircraft appears to be a subtle but common cause of disorientation.
- Disorientation frequently occurs when pilots rely on some outside visual reference rather than on instruments.
- Both frequency and severity of disorientation accidents increase at altitudes below 100 feet due to the additional hazards at these altitudes.

As an aviator, you should be especially aware of the potential for disorientation when:

- You are relaxed and looking straight ahead.
- You are switching from instruments to contact.
- The horizon is partially or completely obscured.
- You are flying straight and level with visibility less than CAVU.
- You are flying in formation.

(continued on next page)

Disorientation accidents

• You are using a single light or star as a guide.

• You begin to tire.

• Reflected light interferes with your vision.

• You encounter fog and dust at low altitudes (less than 100 feet).

• You take off and land under anything less than conditions of ideal visibility.

• You descend from high altitude to NOE.

• You focus your attention on some object outside the aircraft.

• You move your head to tune your radio, etc.

In addition, you will be more likely to recover from disorientation without an accident if:

• You undergo frequent instrument flight training.

• You rely on your instruments rather than on outside references in your effort to recover.

• You are not too confident in your capability and are willing to turn the controls over to your copilot.

These facts, gleaned from the experiences of many rotary wing pilots, should bettter prepare you to avoid a disorientation accident.

Disorientation accident briefs

Read the following disorientation accident briefs. Maybe they will help you to be able to anticipate the conditions which set the stage for a disorientation accident.

• An OH-58 pilot, on a night service mission, called flight following and said he had entered instrument meteorological conditions and was climbing straight ahead. He then acknowledged a transmission from flight following indicating a frequency change. No further transmissions were received from the pilot. The aircraft crashed, killing the pilot and two passengers.

The pilot lost control of the aircraft because he was unable to transition from flight under VMC to flight under IMC. He called flight following immediately after perceiving himself to be in instrument meteorological conditions instead of performing the five C's in the correct order (control the aircraft, coordinate, clearance or climb, course, and then call.)

Existing weather conditions, although marginal VFR, included a 400- to 500-foot ceiling, light drizzle, and fog. There was a scattered layer of scud at 100 feet.

• A UH-1H PIC, seated in the left seat and performing copilot duties, requested and received a special VFR clearance to depart the control zone toward forecast IMC. The pilot did not have a current instrument rating. A few minutes later, because of rising terrain and patchy fog, the PIC requested an IFR climb to VFR on top. During the climb, the pilot became spatially disoriented and asked the PIC to take control. The PIC could not recover and the aircraft crashed.

• The OH-58 pilot completed a turn to a downwind condition at 30 knots and 100 feet agl while looking out the left side of the aircraft. When he looked forward again, he thought the aircraft was descending and decided to make a forced landing. The landing on a 90-degree cross slope was successful, but the aircraft slid into some trees.

• Within 2 minutes after starting a climb into IMC in an aircraft restricted to VFR flight, an OH-58 pilot called air traffic control and declared an emergency. The aircraft was seen to descend out of a low cloud base at a high vertical rate of descent and crash. The pilot accepted an IFR clearance intended for an ILS approach in an aircraft not ILS equipped. There was not an instrument qualified copilot on board.

• The flight leader led four UH-1s in a close diamond formation to a landing in a snow-covered field, instead of spacing them out at 15- to 30-second intervals. This resulted in enough rotor-induced blowing snow for the No. 3 pilot to become disoriented. His aircraft crashed and rolled inverted. The pilots of the No. 2 and 4 aircraft did not land in the LZ after seeing the blowing snow induced by the first aircraft.

• The flight took off in weather conditions below that required for night VFR. As a result of the .6 nautical mile visibility, the pilot of the No. 2 aircraft unexpectedly lost sight of the lead aircraft. The pilot, flying with an inoperative and possibly fluctuating attitude indicator, inadvertently placed the aircraft in a descending left turn after becoming spatially disoriented at an estimated airspeed of 40 knots and 100 feet agl over unfamiliar snow-covered terrain. Ambient light was minimal and the aircraft had just cleared a well lighted village, resulting in a loss of night vision. The aircraft crashed and the pilot, IP, and crew chief were killed.

The pilot had done no instrument work since graduating from flight school 8 months earlier. The only weather time in his records was 2 hours as copilot during flight school.

• An OH-6 pilot lost outside visual reference because of blowing dust after liftoff to a hover. The helicopter drifted to the right, hit a tree, and came to rest on its left side. The pilot did not take immediate action to remedy his loss of outside visual reference. He sustained the hover for almost 20 seconds while turning the landing light on and off rather than immediately landing the helicopter or making a maximum performance takeoff.■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (B series) High side governor failure occurred during flight. Pilot landed in field. Aircraft sustained engine/rotor overspeed, engine overtemp, and overtorque. □ (H series) M-56 pod was released, fell to ground and was destroyed. Passenger may have inadvertently released manual cable.

UH-1 Class E mishaps □ (M series) Crew smelled burning odor and heard squealing sound. No. 2 hydraulic light came on. Caused by failure of hydraulic line. □ (H series) Hydraulic light came on and hydraulic boost failed. Running landing was made. Failure of right lateral servo seal caused loss of all hydraulic fluid. □ (H series) Aircraft was No. 2 in flight of 4 landing downwind in LZ in mountainous terrain. Copilot initiated landing power of 45 pounds, which did not stop the descent. Copilot then used maximum torque available, which still did not stop the descent. □ (H series) Crew smelled hydraulic fluid, and master caution and hydraulic lights came on. Pressure line from hydraulic filter sheared at fitting at upper bulkhead of cyclic servo compartment. □ (H series) Aircraft was No. 2 in flight of 3. On landing approach, aircraft was caught under rotorwash of No. 1 and started to descend. Power was applied and torquemeter indicated 52 pounds for 1 second. Lead aircraft made 90-degree left turn on short final, resulting in overtorque situation for No. 2 aircraft. □ (H series) Gas producer dropped to zero. Caused by failure of tachometer generator.

UH-60 Class C mishap □ Aircraft was flying at 90 knots and 50 feet agl at dusk. Rotor blades hit tree, damaging tip caps.

UH-60 Class E mishaps □ Master caution and transmission oil temperature lights came on. Caused by failure of main module high temperature switch. □ Passenger acting as fireguard during engine start did not lower the visor on his SPH-4 helmet. When he bent down to pull chocks away from wheel, rotorwash blew hydraulic fluid from left main gear backup release line into his eyes. He rinsed his eyes with cool water and boarded aircraft. After about 30 minutes, his eyes began to burn. Aircraft was landed, and passenger was treated by a flight surgeon. □ Controls stiffened during hover, followed by illumination of several caution lights. Caused by failure of transfer module.

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**9**	**2**
	June	6	3	1-2 June	**1**	**0**
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**41**	**23**

Attack helicopters

AH-1 Class A mishap □ (S series) Aircraft settled with power and hit sand dune, damaging turret and bulkhead. 8250

AH-1 Class C mishap □ (S series) Aircraft landed hard during autorotation with turn. Aircraft hit on left rear skid and bounced to right front skid.

AH-1 Class E mishaps □ (S series) N_2 increased to 105 percent during landing. Caused by failure of tachometer generator. □ (S series) Master caution and transmission oil bypass lights came on during hover. Caused by failure of transmission oil bypass pressure switch. □ (S series) Engine-driven fuel pump light came on. Caused by failure of fuel pressure switch.

Cargo helicopters

CH-47 Class C mishaps □ (A series) Tunnel cover came off during flight, damaging synchronized shaft. Caused by improper preflight. □ (C series) Crew felt severe vibrations in floor panel during climbout. Fuselage skin was torn and lower rescue door was destroyed.

CH-47 Class E mishaps ☐ (B series) Pilot felt feedback in cyclic during hover. Caused by magnetic brake failure. ☐ (B series) Aft transmission area developed oil leak during flight. Caused by failure of packing in No. 2 engine transmission oil cooler return line. ☐ (C series) Rotor rpm dropped to zero. Caused by failure of tachometer generator.

Observation helicopters

OH-58 Class A mishap ☐ (A series) Aircraft was seen to circle a boat and then fly into water and break up. Two injuries. 8251

OH-58 Class E mishaps ☐ (A series) N_2 dropped during landing. Caused by failure of overspeed governor. ☐ (A series) Engine-out indicators activated and N_2 dropped. Caused by failure of engine governor control. ☐ (A series) Generator caution light came on during hover. Caused by broken wire from generator to voltage regulator.

Fixed wing

C-12 Class E mishaps ☐ (A series) Aircraft vibrated after takeoff. Nosewheel tire was out of round and out of balance. ☐ (C series) When gear handle was placed up after takeoff, in-transit light remained on. Nose gear down limit switch bracket was bent, allowing continuous contact of switch electrical circuit.

U-3 Class E mishap ☐ (A series) Left engine tachometer fluctuated during climbout. Caused by broken piston ring.

U-8 Class E mishap ☐ (F series) Engine fuel primer line broke between primer solenoid and manifold, causing raw gasoline to puddle and run out of lower left engine cowling. Engine was manually primed with throttle, backfired, and ignited spilled gasoline. Fireguard signaled pilot to shut down engine and immediately extinguished fire.

U-21 Class E mishaps ☐ (A series) Copilot saw oil leaking from left side of No. 2 engine. Oil cap was not securely locked. ☐ (A series) Right brake was lost during landing rollout. Deceleration was continued using differential reverse power. Aircraft turned to left and came to a stop with nose wheel about 10 feet off runway. Caused by failure of hydraulic brake line. ☐ (D series) Gear handle lights did not go out after takeoff. Flyby of tower indicated gear was not fully retracted. Emergency extension was used. Gear spur splines were stripped.

Maintenance

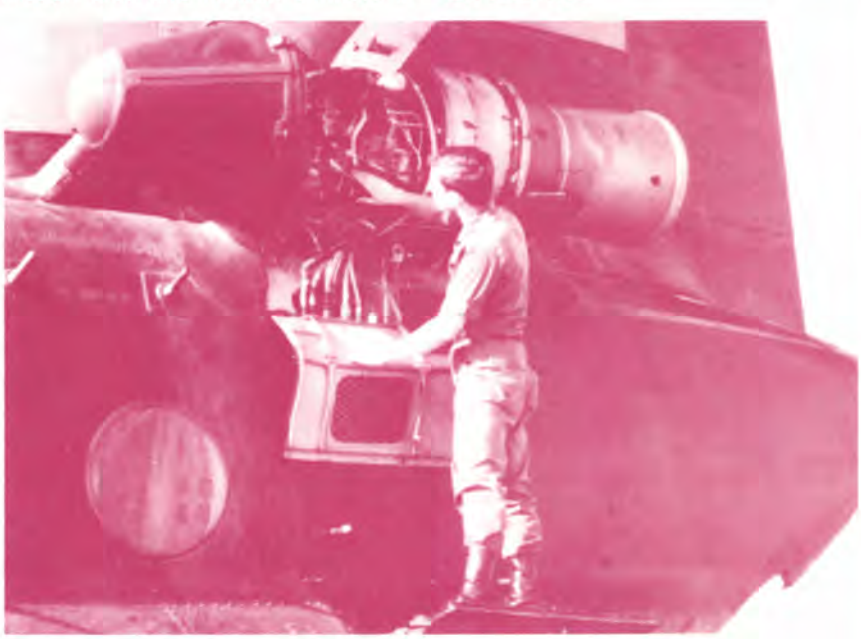
UH-1 Class E mishaps ☐ (H series) Engine noise decreased, engine fuel pump light came on, and N_1 torque dropped to zero. Caused by incorrectly adjusted flight idle solenoid, which let throttle pass flight idle stop and shut off fuel to engine. ☐ (V series) Pilot heard knocking noise in vicinity of transmission area and noticed stiffness in cyclic control during landing. Self-locking nuts holding servo backed off.

AH-1 Class E mishap ☐ (S series) Vibration developed in main rotor system, followed by yaw channel SCAS hardover. Caused by out-of-balance SCAS card.

CH-47 Class E mishaps ☐ (C series) No. 1 engine would not accelerate beyond 20 percent N_1. Caused by loose electrical harness connector. ☐ (C series) When condition levers were positioned to flight, rotor rpm stabilized at 238. No. 1 engine would not decrease rpm using normal engine trim. N_2 control arm was positioned incorrectly.

OH-58 Class E mishaps ☐ (A series) TOT rose and rotor rpm bled off during takeoff. Caused by loose bleed air line of T fitting to accumulator. ☐ (C series. Transmission oil pressure light came on during takeoff. Caused by incorrectly torqued transmission oil line. Oil was dumped overboard.

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



Thermal stress

During the summer months, flightlines get about as hot as anywhere in the world. All that concrete bounces back the sun's heat. Aircraft become like furnaces. The temperatures generated in such an environment can be hazardous for people working there. A little knowledge about how the body copes with heat and some of the precautions each individual can take reduces this risk to manageable proportions.

The human body can control its temperature through several mechanisms. Of these, the most important for our individual on the flightline are radiation, convection, metabolism, and evaporation.

The loss of [illegible] heat by radiation and conv[illegible] very important when the [illegible] is low. Radiation and [illegible]ion, as heat loss mechanisms, cease when the air temperature reaches body temperature (98.6° F.). Without proper clothing, at high temperatures, radiation actually increases body temperature by absorption through exposed skin.

Once the temperature reaches 98-99° F., evaporation is the only method of heat loss the body has. Evaporative cooling is achieved by heat transfer from the secretion and drying of sweat and the exhalation of water vapor. This is where humidity comes into the game. If the air is perfectly dry and an individual drinks enough water and wears proper clothing, the person could survive very high temperatures (assuming no exertion). But as humidity increases, evaporative cooling becomes ineffective and thus heat tolerance decreases. This difference is obvious to anyone who has worked flightlines in Georgia and Arizona during the summer. The actual relationship is shown in figure 1.

Air movement aids evaporation because the layer of saturated air next to the skin is replaced by dryer air. This is why fanning helps cool you off. Sweat must evaporate to cool you. Sweat dripping off your body is useless as a cooling mechanism.

The three most critical effects of heat stress are exhaustion, cramps, and stroke. Heat exhaustion is the result of excessive sweating, usually over several days, with inadequate replacement of water and/or salt. The victim's circulation volume actually drops, he will usually be weak, with cool, clammy skin, will complain of fatigue, and have slight mental confusion. He usually feels excessively drained, but not hot. Even mild effects can contribute to inattention and improper procedures, increasing your risk of mishap and injury. This commonly hits the maintenance troop working in an airless, inclosed "sweat box" where the lack of circulating air hinders evaporation and renders sweating ineffective. If you or your troops feel weak, tired, are sweating profusely and are short of breath, get out of the sweat box, drink fluids (not coffee or alcohol), and rest.

If you are not used to high temperatures, you are most prone to heat exhaustion, but even a person acclimatized can develop the symptoms. Inadequate fluid intake is the cause. So if you are flying a couple of sorties on a nice, hot day, make sure you get enough to drink between missions. If you are sweating and have an inadequate salt intake, you may experience cramps in muscles being exercised. These cramps will continue until the salt deficiency is corrected. Generally, a little extra salt with meals is all that is necessary. Be sure you take plenty of liquids, too. You can overdo it with the salt—but not the fluids.

Heat stroke is the most serious of the thermal stress effects. It is a true

(continued on back page)

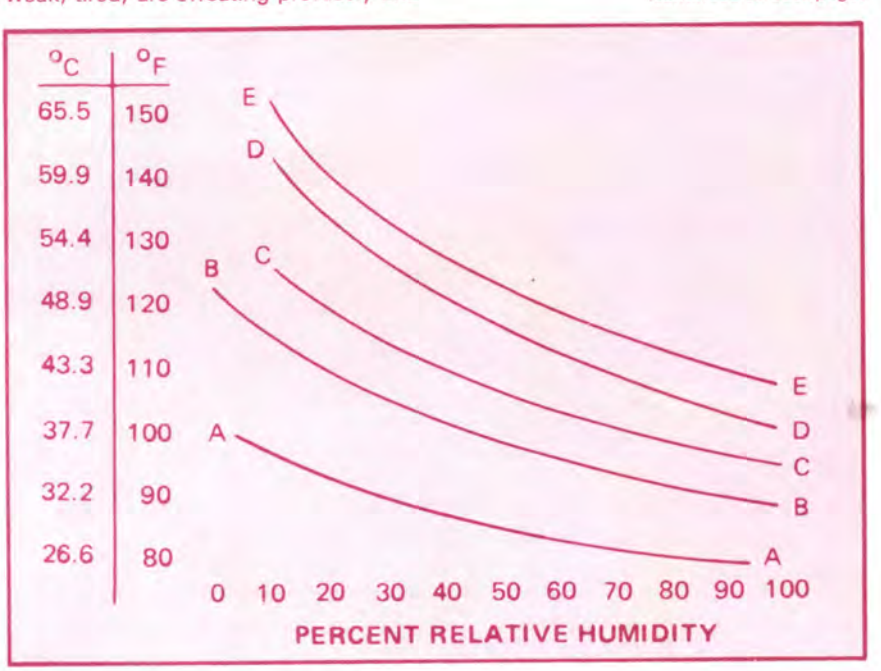


Figure 1

Relationship of temperature-humidity effect. The limiting environments of temperature and humidity for human tolerance, employing criteria which range from easy to difficult: AA, the upper limits of summer comfort zone; BB, the limits of evaporative cooling, with little or no rise in body temperature; CC, the limits of compensated hyperthermia; DD, 60-minute tolerance limit. (Winslow, Herington and Gagge; Robinson, Turrell and Gerking)

Thermal stress

emergency. Typically, the victim is working hard, generating a metabolic heat load in excess of what his cooling

mechanisms (evaporation radiation) can dissipate. This, too, usually occurs in high humidity, rendering sweating relatively ineffective. What happens is the core temperature of the body begins to rise—and at a certain point—usually around 103°-104° F., the body's temperature control center in the brain shuts off. Now, sweating stops altogether, and the temperature really shoots up. The victim's skin is red, hot, and dry. Even the armpits will usually be dry. He is confused, may have seizures, and may lapse into a coma. Without immediate cooling, he will incur brain damage and likely die. The treatment is to immediately cool the body by immersion, cold blankets, cold water spraying and fanning, and cold water enemas. Don't give fluids if unconscious. Most important, **get medical aid fast.**

There are several things a person can do to prevent heat stress.

• Slow down. With physical exertion, more than 75 percent of the increased metabolism appears as heat. Muscular exercise can raise the body temperature 4° F. or more. So plan for extra time to preflight, and if you have to get a spare aircraft and are hurrying to make a takeoff or range time, be extra careful. The increased exposure to heat can affect your performance in the cockpit.

• Drink more. The normal person needs 2 to 3 quarts of water per day, without exertion or hot weather. You can lose almost that much in an hour working in high heat.

• Eat sensibly. For most people, salting food provides enough salt (about 3 grams per day). Supplemental salt should only be taken on advice of the flight surgeon. During hot weather, low protein diets are best since protein increases heat production. Sorry, steak lovers.

• Don't overdo it. If you start to feel any of the signs of heat stress, quit, get to a cool place, drink some fluids, and if you really feel bad, see the flight surgeon.

Heat is a part of everyday operations, and for some of us a welcome change from the cold and damp of winter. With the proper precautions, we can continue to do the job assigned without undue risk and still be able to enjoy the fun of summer. ■

—from FLYING SAFETY

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Lightning time again

Various terms have been used to describe lightning, but few capture the awesomeness of this natural phenomena. Without a doubt, lightning is nature's most "flashy" show of force. It is hard to believe that several thousand of these shows are occurring at any one time somewhere in the world. Although they provide a spectacular show to those on the ground, they take on an entirely different light from inside the cockpit.

What is lightning?

Although current knowledge of lightning is far from complete, enough information is available to form a basic understanding of just what lightning is and how it originates. Without going into any great detail, lightning is a very long electrical spark between two oppositely charged areas.

The energy that produces lightning comes from warm air rising in a developing cloud cell. As the air becomes cooler, water droplets condense and form the cloud. When the air has risen to a point where the temperature reaches approximately minus 40°C, the water droplets freeze. Some of the ice crystals form hailstones which fall through the cloud. As they fall, small positively charged splinters separate, leaving the hailstone negatively charged. The vertical currents within the cloud cell carry the positively charged ice splinters upward, making the top of the cloud positively charged. When the potential near one of the charged areas exceeds the threshold for atmospheric breakdown, lightning results. It can occur within the cloud and/or between clouds. Cloud to ground lightning occurs when the potential between a positively charged spot on the ground and the negatively charged cloud base exceeds the threshold for atmospheric breakdown.

Although the lifetime of a typical cloud cell lasts about 30 minutes, a lightning "bolt" lives only for a few thousandths of a second. It starts with a relatively slow moving column of ionized air called the "pilot streamer," which moves 30-50 meters. This is followed by a more intense discharge called the "step-leader," which allows additional negative charge into the "pilot streamer," recharging it, and moving it another 30-50 meters. This cycle repeats itself and forms a zigzagging column of ionized air traveling at about 1,000 meters per second. The approaching negatively charged "stepped leader" drives out the negative charge in the ground, leaving it with a positive charge. At some point when the electrical field is strong enough, the ground sends up streamers toward the approaching leader.

When they meet, a path is established and the charge flows to the ground. As the charge is neutralized, the heavily conducting arc moves back up the path at a speed of 100 million meters per second until it reaches the cloud. This movement of the conducting region upward is called the "return stroke,"

Lightning

and produces the intense flash and loud noise associated with lightning. This action can produce a current as high as 200,000 amperes. A "restrike" occurs when other charge centers discharge through the same path.

Why is your aircraft struck?

If your aircraft happens to be in the area of this activity, it may end up acting as a conductor for the lightning. When your aircraft approaches a charge center, the developing leader from the cloud may induce a streamer from your aircraft. As the streamer and leader connect, the charge passes through the aircraft. When the leader joins a streamer from the ground, a return stroke passes back up the path. The return stroke with its high, loud current (as high as 200,000 amperes) is the prime factor concerning damage.

It may appear to the pilot that the aircraft is actually building up a charge and discharging itself. However, if you see a bright flash and hear a loud noise, you almost certainly have been "zapped" by lightning.

When can you expect a strike?

Lightning can occur almost anytime, but statistics show that lightning occurs more often in clouds, between 10,000 to 15,000 feet, in light rain and light turbulence, and near an OAT of 0°C. From these statistics, it shouldn't come as any surprise that these same statistics are associated with thunderstorms and, therefore, you can expect lightning in or around thunderstorms. [Most lightning strikes on helicopters occur below 6,000 feet. But some have occurred as high as 9,000 feet.]

What are the effects of a strike?

The risk of a strike causing injury to personnel onboard the aircraft is relatively insignificant. The possibilities include a mild electric shock from the strike and temporary blindness from the flash. Although mild electrical shocks have been reported when a strike occurred, there is no danger of being electrocuted. A more likely occurrence would be temporary blindness if the bright flash was observed. The blindness usually occurs at night and only lasts for a short time (approximately 30 seconds). The effects of the bright flash can be reduced by turning up the cockpit lights, or selecting the "bright" feature in some aircraft.

In the past, physical damage at the points of attachment was the primary concern. The damage included holes burned in the metallic skin of the aircraft, shattered, nonmetallic structures (radomes), and damage directly into the aircraft through electrical wiring. These types of physical damage are called "direct effects."

Today, other "indirect effects" of lightning are becoming known. The cause of these "indirect effects" is the electromagnetic field associated with lightning. Even though the aircraft skin provides a degree of shielding, some fields penetrate the aircraft and damage electrical and electronic equipment. The problems associated with "indirect effects" are further complicated by two developments in current aircraft design. First, designers are using more and more sophisticated electrical and electronic equipment that are more sensitive to these effects. Second, the use of nonconducting materials in aircraft skin cuts down the amount of shielding previously provided by aluminum skin. Since "indirect effects" originate in the aircraft's electrical wiring, the problem can show up anywhere in the aircraft.

What's a pilot to do?

Since the best protection against a lightning strike is to avoid it altogether, start by knowing the seven warning signs of a lightning strike. Lightning is imminent when some or all of the following conditions are present.

- In clouds
- In precipitation (particularly icy types)
- Near OAT of 0°C.
- Progressive buildup of static or St. Elmo's fire (at night)
- In light turbulence
- At altitudes between 10,000 and 15,000 feet
- Climbing or descending

If avoidance of these conditions is out of the question, take as many of the following actions as you can.

- Avoid the areas of heaviest precipitation.
- Reduce airspeed to slow static buildup.
- Avoid operation near an OAT of 0°C.
- Turn up cockpit lighting.

If a strike occurs, monitor equipment for malfunctions. In addition, if weather conditions were not as forecast, a PIREP may warn other aviators. ■

—adapted from FLYING SAFETY

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) Darkness and blowing sand caused pilot to lose visual reference with landing zone. Aircraft landed hard, spreading forward cross tube.

UH-1 Class C mishaps □ (H series) Master caution and hydraulic lights came on during hover. Caused by failure of hydraulic pressure switch. □ (H series) Aircraft developed severe vertical vibration during flight. Bottom of main rotor blade skin separated at tip end. □ (H series) Right fuel boost pump and master caution lights came on during hover. Caused by failure of fuel boost pump. □ (H series) Smoke was seen coming from top battery vent during landing. Caused by overheated battery.

UH-60 Class E mishaps □ Engine failed during flight. Failure of short impeller vane of particle separator blower set up a vibration that resulted in hydromechanical control unit failure and subsequent engine failure. □ As APU generator was brought on line, APU failed. Inspection revealed APU compressor blades failed and APU digested blades.

Attack helicopters

AH-1 Class A mishap □ (S series) Aircraft on maintenance test flight began rolling from left to right. Roll angles were in excess of 45 degrees. Pilot was unable to control rolls but felt he had partial cyclic control. Aircraft was crash landed in open, marshy area. Technician was killed and pilot was injured. 8252

AH-1 Class C mishaps □ (G series) Tail rotor blade hit top of tree during turn from hovering position. □ (S series) Low rpm audio and light activated. Pilot increased throttle and power, but aircraft continued to descend and hit trees and a powerline. Pilot then flew aircraft to base and landed.

AH-1 Class E mishaps □ (S series) Engine oil pressure fluctuated during flight. Caused by failure of pressure transducer. □ (G series) Transmission oil temperature increased. Caused by failure of transmitter. □ (S series) Transmission oil pressure gauge fluctuated. Failure of valve ball allowed 5½ quarts of oil to be dumped overboard. □ (S series) After aircraft was refueled, fuel was seen running down side of aircraft below engine cowling. Caused by failure of hose at fuel line connector.

Cargo helicopters

CH-47 Class C mishaps □ (C series) Pilot heard loud snapping sound and felt jolt in airframe. Flight engineer told pilot that one leg of sling had broken. Load shifted, causing second sling leg to break. One of the sling legs flew up and wrapped around right aft landing gear. On approach for landing, sling leg untangled from landing gear. Bottom of ramp was damaged. □ (C series) Right cabin door escape panel blew out during descent. Caused by failure of seal.

Observation helicopters

OH-6 Class A mishap □ (A series) Pilot was attempting go-around after deciding, on short final, that confined area was not suitable for a landing. As aircraft accelerated through 40 knots, it hit two powerlines. Wires broke and aircraft continued straight ahead. Pilot lowered collective and aircraft descended into trees, hit the ground, and came to rest on left side. 8253

OH-58 Class A mishap □ (A series) Pilot was approaching heliport after maintenance test flight. About 10 feet agl, pilot heard grinding noise in engine/

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**9**	**2**
	June	6	3	1-9 June	**2**	**0**
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**42**	**23**

transmission area. Aircraft began to yaw to right. Attempts to fly out of the turn were unsuccessful. Pilot closed throttle and made hovering autorotation. Aircraft hit the ground on left skid, breaking it off. Transmission displaced forward, and main rotor blades hit the ground. 8254

OH-58 Class E mishaps □ (A series) Sparks were seen coming from behind pilot's instrument panel. Electrical power to console lights and instrument lights was lost. Caused by failure of transistor and potentiometer to light dimming element. □ (A series) Rotor rpm began to increase toward upper limits during deceleration. IP applied collective pitch to maintain rotor rpm within limits. Rotor rpm continued to build until it peaked at 393. Aircraft landed without further problems. □ (A series) Loud grinding noise was heard from transmission area, followed by control stiffness and moderate feedback in cyclic. Caused by cracked line. □ (A series) During runup, crew chief noticed hydraulic filter differential pressure indicator button had popped out. Caused by clogged hydraulic fluid filter.

Fixed wing

T-42 Class E mishap □ Main vibrator failed during engine start, causing left magneto No. 1 engine points to burn. Water inside vibrator caused internal failure.

U-21 Class E mishaps □ (RU-21H) Right fuel transfer test switch activated with 150 pounds of fuel in nacelle tank. Master caution and right transfer pump lights came on. Fuel did not transfer from right wing tank to nacelle tank. Caused by failure of fuel pressure switch. □ (YU-21) Vibration was felt after liftoff. When aircraft was landed, vibration became very noticeable. Nose wheel was found to be at 45-degree angle to axle because of nose wheel bearing failure.

Maintenance

UH-1 Class E mishaps □ (V series) Rpm light and audio came on. Rpm warning control box was out of adjustment. □ (V series) Master caution light came on during landing. Caused by bent cannon plug. □ (H series) Engine inlet filter light and master caution light came on. Caused by loose cannon plug. □ (H series) Postflight inspection revealed oil around 42-degree gearbox. Caused by installation of incorrect (vented) cap. □ (H series) Pilot heard unusual noise from transmission area during takeoff. Four mounting bolts on right cyclic servo were loose, allowing servo mount to move when control inputs were made. Bolts were incorrectly torqued. □ (H series) Fuel was seen on engine deck after landing. Caused by loose screws in governor flange.

UH-60 Class E mishap □ Hydraulic pressure dropped during runup, and caution lights came on. Set screws holding fan motor assembly onto shaft of utility pump backed off, allowing fan to contact hood motor assembly.

AH-1 Class E mishaps □ (G series) No. 2 hydraulic light came on during hover. Ammo chute guard was not installed. Chute rubbed against hydraulic line, chafing line. □ (S series) Aircraft pitched nose up during flight. Pitch channel SCAS was out of adjustment. □ (S series) Master caution and transmission oil pressure lights came on. Inspection revealed transmission oil in and on cannon plug. Oil had been spilled while aircraft was being serviced and was not thoroughly cleaned up. □ (S series) N_2 rpm dropped to 95 percent. Inlet guide vane actuator bolts were installed incorrectly.

CH-47 Class E mishap □ (C series) Master caution and transmission oil pressure lights came on, and oil pressure fluctuated. Inspection revealed aft and forward transmission oil levels were low. After special inspection of oil filters, crew chief did not correctly service transmissions.

OH-58 Class E mishap □ (C series) Engine lost power during runup. Loose fitting caused air leak.

C-12 Class E mishap □ (A series) Master warning and right bleed air fail lights came on. Caused by break in polyflow tube. Tube was rubbing against grommet.

U-3 Class E mishap □ (B series) Aircraft veered right and then left after touchdown. Undersized washer allowed bolt on torque knee to dislodge, upper torque knee to separate from lower, and gear to swivel.

U-21 Class E mishap □ (A series) Cabin door light came on after takeoff. Door handle was not adjusted correctly.

Messages received

• Correction to safety-of-flight message concerning one-time inspection of CH-47B/C rotor blade nose caps (CH-47-82-04, 261830Z May 82).

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

A new view of thunderstorms

Thunderstorms pose a significant problem for the military crewmember. The associated weather—the high winds, shear, turbulence, lightning, downbursts, and hail—makes severe demands of even the most experienced aviator.

You are probably familiar with two basic types of thunderstorms—frontal and airmass. The frontal, or prefrontal squall line, consists typically of a narrow line of individual storms. Your alternatives are (1) to fly over or (2) perhaps "sit it out" until the squall line passes by you. Probably the most often used approach, but by far the most dangerous, is to attempt to fly through a break in the line. Lack of adequate "elbow room" between you and the individual thunderstorm cells can be very hazardous.

The airmass thunderstorm occurs randomly over much of the United States, especially during warm summer afternoons. Again avoidance—picking your way around and giving a wide berth to the individual cells—is the "normal" procedure.

Research meteorologists have recently described a third type of thunderstorm system of which you should be aware, the Mesoscale Convective Complex (MCC). By definition, these systems develop rapidly, become very large, move slowly, persist for long periods, and are usually circular or elliptical in shape. The MCC produces typical summer thunderstorm weather, but because of its size, persistence, and slow movement, it can have more dramatic effects on the area. Unlike the airmass or frontal thunderstorm, the MCC's hazards which range from lightning and hail to IFR or marginal VFR conditions may persist over a terminal for hours. For example, the weather at Jackson, Mississippi, during an MCC included thunder, lightning, and light to moderate rain that persisted continuously for more than 9 hours.

MCCs pose particularly tough problems for pilots for several reasons. The MCC appears to grow within areas of favorable flying conditions (weak pressure gradients and light winds). The upper air charts may even indicate the MCC has developed within a ridge of high pressure. However, upon detailed analysis, meteorologists find the areas were usually very unstable, with an upper level disturbance embedded in the winds at higher altitudes. Within 2½ hours, scattered airmass thunderstorms can develop into an MCC covering an area the size of the Dakotas.

The typical MCC covers several states and has a life cycle which spans over 12 hours. The pilot whose destination is in or near an MCC must be aware that conditions are slow to improve as contrasted to rapidly improving conditions when a squall line passes. Also, the MCC may be too large to permit you to circumnavigate the system.

MCCs are thunderstorm systems that threaten or substantially impact all of the aviation community; yet, MCCs are not routinely considered in most flight decisions. The aviation community needs to be wary of them since they usually develop rapidly, cover several states, blanketing 100 times the area of an airmass thunderstorm, last a minimum of 6 hours, and move very slowly. Since these systems have not been previously well recognized and documented, the first effort is to improve the way in which the aviation weather system copes with them. This must involve education to develop a general recognition of the significance and effects of MCCs. ■

—adapted from FLYING SAFETY

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The record through May—a somber accounting

During the first 8 months of this fiscal year, 23 aircrewmembers/passengers died in 40 Class A accidents, and 34 aircraft were destroyed. This is a distressing increase over the same period in FY 81 . . . 30 Class A accidents involving 23 fatalities and 25 destroyed aircraft. Flying hours for both periods were about the same.

Human error was a definite factor in 27 of the total 40 Class A mishaps, and this figure is expected to go up when all investigations are complete.

With the peak summer flying months just beginning, the situation is not improving. As this issue goes to press, the record for June is already two Class A accidents. An OH-6 was destroyed when it crashed after hitting trees in an LZ. A UH-60 hit a tree when the pilot lost visual contact with the ground in a dust cloud stirred up by another landing helicopter.

This sharp increase in Class A accidents is not the result of more demanding operations, nor is it peculiar to any particular aircraft system or level of aircrew experience. The accidents span the entire fleet of aircraft and are spread across the entire range of aviator experience levels.

Following are typical examples:

• An OH-58 was lead of a flight of six hovering to a parking area at an airport. The pilot was told by tower personnel to hold short of one runway, which was active, and to clear another runway. The pilot misinterpreted the instructions and told the copilot to cross the active runway. As the aircraft approached the runway at 30 to 40 knots of speed, tower personnel told him to hold short. The copilot placed the aircraft in a nose-high decelerative attitude, and the main rotor blades struck and severed the tail boom. The aircraft spun right several times and landed hard. Result: $143,782 in damages.

• During takeoff from a 6-degree slope, the UH-1 copilot applied excessive collective pitch without applying sufficient left lateral cyclic into the slope to level the aircraft. He 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. As a result, the aircraft pivoted about the right skid and rolled onto its right side. Result: $922,704 in damages.

• A UH-1 IP initiated a simulated engine failure from a hover during night emergency procedure training. The pilot applied excessive left cyclic and collective pitch. The IP did not correct, and the aircraft landed hard and rolled over. Result: $200,000 in damages.

• As an AH-1 was brought to a hover at night, the crew became disoriented because of lack of outside visual reference. The aircraft drifted to the right about 100 feet, and the main rotor blades hit a large tree. The aircraft rotated to the right and crashed upright. Result: $204,578 in damages.

• Flying at 12,300 feet msl in mountainous terrain, a UH-1 pilot allowed his aircraft to slow to 20 to 30 knots while in a 20- to 30-knot downwind condition. The aircraft encountered a downdraft condition and the pilot tried to stop the sink rate with additional collective pitch. Demand for power exceeded that available and engine/rotor rpm bled down. The aircraft spun to the right and crashed on the side of a mountain. The pilot had received no mountain flying training. Result: $619,000 in damages.

• An OV-1 pilot was on a VFR photo mission. About 400 feet agl, the pilot began a right turn by applying 30 degrees of bank. In the turn, the pilot increased bank angle to about 90 degrees and allowed the aircraft to assume a nose-low attitude. The turn (in excess of ATM bank standards) was made in an attempt to align the aircraft with a target area and avoid further penetration of restricted airspace. The aircraft was returned to a wings-level attitude with a high vertical sink rate just before impact. Result: two fatalities and $2,892,634 in damages.

The common thread running through the majority of these accidents is a breakdown in professionalism by those flying the aircraft or those supervising the flights.

The bottom line of this rather somber accounting is that the Army aviation safety program is a people problem. If the current upward trend in accidents is to be stopped, a major effort is required in the weeks and months ahead by commanders, supervisors, SIPs, IPs, PICs, and pilots.

Reducing human error by increasing professionalism and flight discipline is the key to drastically reducing aircraft accident losses. The formula for fixing the people problem is simple: increased concern + increased aircrew discipline = decreased human error. ■

Mishap review: violation of flight discipline

Synopsis

A UH-1M flying low over a large lake hit the water while in a descending right turn. The helicopter was destroyed, and a passenger was killed.

History of flight

After completing the first part of a training mission, the crew RON'd. The next morning, the pilot and crew chief decided to fly to a resort area about 1½ hours away. A copilot did not go with them. This flight was uneventful, and the helicopter was landed at the local airport.

After the aircraft was serviced, a civilian passenger was allowed to ride in the helicopter. The pilot did not file a flight plan, but he called the tower and said he would be in the local area for about 30 minutes. Tower personnel next heard of the aircraft about 20 minutes later when the forestry service called about several complaints they had received concerning a low-flying helicopter buzzing boats, homes, and beach areas.

After taking off from the airport, the pilot flew to a lake. He flew along the shoreline of the lake for several miles, at 90 to 100 knots and 20 to 30 feet altitude. He then reversed course, maintaining low-level flight. As the aircraft rounded a point in a slight right turn following the shoreline, about 300 yards off shore, it entered a shallow descent. The tail hit the water first. The aircraft rotated forward and entered the water in a right, nose-low attitude.

Both crewmembers exited the aircraft with minor injuries and were picked up by boats. The passenger did not get out of the aircraft and drowned.

Crewmember experience

The 32-year-old pilot had more than 400 rotary wing hours, with more than 200 in UH-1Ms.

Commentary

The pilot exceeded the power limitations of the aircraft during an attempted recovery from a high-speed, low-level descent. He applied power without making a corresponding change in aircraft attitude. He did not prepare a performance planning card and was therefore unaware of the maximum torque available for the existing density altitude.

Several other violations were also present during the flight:

- The pilot flew a VFR flight without filing a flight plan.
- An unauthorized passenger was in the aircraft.
- The pilot was flying below 500 feet agl without approval or authority. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft was on search and rescue mission. Engine and rotor rpm bled off during approach to LZ. Pilot tried to execute missed approach, but airspeed was slow and aircraft began descending turn. Pilot's attempts to fly out of turn were unsuccessful. Aircraft hit trees and crashed, coming to rest on right side. One fatality and five injuries. 8255

UH-1 Class E mishaps □ (H series) Hydraulic light came on and crew smelled fumes. Hydraulic pressure line was cracked at fitting. □ (H series) Crew heard loud bang, followed by excessive vibrations. Caused by separation of bonding at tip of main rotor blade. □ (H series) Engine oil temperature gauge exceeded red line during flight. Caused by failure of flow control thermostat. □ (H series) Hydraulic pressure light came on during hover. Caused by failure of pressure switch. □ (H series) As aircraft was landing in LZ, unsecured poncho liner blew up into main rotor. □ (H series) Crew heard loud whistling sound. Skin on main rotor blade separated on leading edge of spar 20 inches from blade tip. Caused by corrosion inside blade.

UH-1 aviation-related mishaps □ Maintenance personnel were trying to install tail rotor hub assembly. Hub would not fit and it became jammed on 90-degree gearbox spline. Maintenance supervisor was called. He held one rotor blade and hit the other blade with his free hand. Blade suddenly came off, fell, and hit edge of maintenance stand. □ As tow bar was being placed in position to move helicopter, end of tow bar hit and broke chin bubble of adjacent aircraft. □ As mechanic was backing helicopter loaded on tow trailer, tail skid hit parked helicopter, breaking windshield and damaging nose section.

UH-60 Class A mishap □ Two aircraft were landing in LZ at night. First aircraft stirred up dust cloud. Pilot of second aircraft lost visual contact with ground. Aircraft drifted left and hit tree. Pilot then landed. 8256

UH-60 Class B mishap □ Crew heard loud grinding noise during engine overspeed check. No. 2 engine tgt then rose rapidly. Engine was shut down. Disintegration of No. 2 engine output shaft, forward support tube, and flex pack caused large amount of metal to be ingested into engine. 8257

UH-60 Class E mishap □ Antitorque pedals stuck during flight. Caused by failure of yaw boost servo.

UH-60 aviation-related mishap □ Engine inlet cowling was removed for inspection of engine drive shaft. Cowling was placed on control access cover. Strong gust of wind blew cowling off aircraft. Cowling fell to ramp and was damaged.

Attack helicopters

AH-1 Class E mishaps □ (S series) Airspeed indicators remained at zero during climbout. Water jug placed behind pilot's seat came in contact with static system tube, causing tube to break. □ (S series) Crew smelled burning electrical wires and cockpit filled with fumes. SCAS went off line. Caused by failure of alternator. □ (S series) ECU cooling turbine bearing seized, causing smoke and fumes to enter cockpit.

AH-1 aviation-related mishap □ No. 5 drive shaft was removed from aircraft. Mechanic returned to hangar with drive shaft. He did not secure tail rotor blades and left maintenance stand near aircraft. High winds caused tail rotor to spin and hit maintenance stand. Tail rotor blades, hub, and gearbox were damaged.

Cargo helicopters

CH-47 Class C mishap □ (C series) Insufficient equipment was available for slingloading an F16. Crew hand-receipted two 16-foot multi-leg slings. Slings were attached together and then connected to steel sling on F16, making a total length of about 40 feet of sling. It was not possible to stand on the F16 fuselage and connect the sling to the CH-47 hook because of the height of the F16 vertical stabilizer. There was insufficient sling length to connect the aircraft up before picking up to a hover. Therefore, a decision was made to use the rescue hoist to pull the sling up to the cargo hook while aircraft was at a hover. As sling was raised to cargo hook with the hoist, flight engineer tried to transfer sling to cargo hook. During the process, aircraft was allowed to become tight against rescue hoist cable, pulling hoist assembly bracket loose. When hoist bracket broke loose, a wire bundle was severed, requiring 30 splices to repair.

CH-47 Class E mishaps □ (C series) Flight engineer noticed utility pump leak during flight. Caused by failure of O-ring. □ (A series) Fog and cloud layers prevented use of predetermined route, extending flight time beyond aircraft capability. Aircraft was landed to prevent fuel exhaustion.

Observation helicopters

OH-6 Class A mishap □ Aircraft had landed at tactical field site. Pilot lifted aircraft to 12- to 15-foot hover to reposition for takeoff and attempted right turn into 10-knot tailwind. Turn accelerated into a spin because of insufficient left antitorque pedal. Spin continued until main rotor blades hit a tree. Aircraft then crashed and rolled onto left side. 8258

OH-58 Class A mishap □ (C series) Engine failed during takeoff. Aircraft landed hard and bounced into air. Main rotor blades flexed and cut off tail boom. 8259

OH-58 Class C mishap □ (C series) Rotorwash from landing UH-60 blew

unlatched door against stops, cracking door post. Crew chief was standing at nose of aircraft and had left door unlatched.

OH-58 Class E mishaps □ (A series) Pilot noticed high TOT during HIT check. Caused by failure of engine scroll and scroll tube fitting. □ (A series) N_2 increased during flight. Caused by failure of fuel control and double check valve. □ (C series) When pilot applied power for takeoff, right skid came off ground, but left skid remained on the ground. Pilot continued to apply collective and add right cyclic. IP lowered collective and aircraft settled to runway. Tar was found on left skid.

OH-58 aviation-related mishaps □ Crane hoist cable broke and main rotor assembly of OH-58 fell on engine inlet cowling. Hook from crane fell onto left side of aircraft. Hook had been fully retracted, coming in contact with boom. Boom was then lowered, causing excessive cable tension. Crane operator had been checked out the day before the mishap. He had not read the operators manual. □ As mechanic was descending from aircraft roof, his foot slipped on passenger seat cushion. Ring on left hand caught on left skid of transmission cowling, resulting in deep cut to finger.

Fixed wing

C-7 Class E mishap □ During cruise flight in heavy rainshowers, static electricity began discharging into cockpit from HF antenna interconnect. Attempt to eliminate electrical charge imbalance by turning off unnecessary electrical equipment was not successful. Discharging stopped when aircraft was on final. HF antenna was not grounded.

C-12 Class E mishap □ (A series) IP noticed tgt passing red line and torque decreasing on No. 1 engine during takeoff. Caused by failure of high pressure bleed air diaphragm.

OV-1 aviation-related mishap □ Generator used to power avionics system on aircraft was hitched to warehouse tractor to be towed away. Generator power cable was still plugged into aircraft external electrical power receptacle. When power cable was fully extended, its hardened plug end was at an 80-degree angle to aircraft power receptacle. Plug end ripped electrical power receptacle junction box mounting bracket from aircraft, causing sheet metal damage.

Maintenance

UH-1 Class C mishap □ (H series) After preflight, crew chief told pilot that he would close tail rotor drive shaft cover. When pilot returned to aircraft after filing flight plan, he did not check cowling. Aircraft took off with open cowling. No. 5 drive shaft was damaged by drive shaft cover.

UH-1 Class E mishaps □ (H series) Crew heard unusual noise during hover. Master caution and hydraulic lights came on just before touchdown. Flex line chafed hole in pressure tubing, causing loss of fluid. □ (H series) Master caution and right fuel boost pump lights came on. Caused by loose wire on boost pump.

UH-60 Class E mishap □ Master caution, No. 1 hydraulic reservoir, and No. 1 tail rotor servo lights came on. Chafed hydraulic lines caused partial hydraulic failure.

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

TM changes

Change 21, dated 17 Mar 82, to TM 55-1520-228-23-1, for OH-58A and C helicopters, has been released.

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**9**	**2**
	June	6	3	1-16June	**2**	**0**
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**42**	**23**

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 81 □ 16 Jun 1982

Dynamic rollovers

In the past 5 years, Army aviators have destroyed 17 aircraft while performing the most basic of all helicopter maneuvers - the pickup to a hover. One would think that these accidents occurred because of operations on sloping, uneven or rutted terrain, or because of a skid being snagged on psp. **Not so!**

Fourteen of these dynamic rollover accidents occurred while operating from level surfaces, often prepared. It is incomprehensible to understand how an accident could occur at this stage of flight. After all, the pickup to a hover must be mastered by the fledgling before he can hover out for takeoff for his first solo flight. Yet some of these accidents were caused by experienced aviators such as maintenance test pilots, and in five instances by instructor pilots.

Generally speaking, the problem appears to involve a considerable amount of inattention and complacency. In short, the IPs stop being instructor pilots, and the aviators are thinking of matters other than flying.

We have said it before and the inescapable fact is that ours is a profession that allows for very few mistakes. It is also one that cannot tolerate inattention to our duties. You, Mister Aviator, are the final authority for the successful conduct of your mission from the beginning pickup to its completion. ■

Flaky hover practice

Some things never change, and people looking for trouble is one—they are still with us. DES received a query recently concerning skid shoe maintenance. The questioner wanted to know if it was okay to inspect/replace skid shoes on a helicopter while at a hover.

Besides receiving a big fat "no," the questioner should reexamine his judgment in considering the possibility of such unauthorized procedures and the obvious hazards involved. Then, if he was merely relaying the question from his maintenance personnel, he would be well advised to observe his maintenance operations and see what other cockamamie procedures they have concocted in the interest of time-saving.

As stated in FLIGHTFAX, 25 June 1980, skid shoe maintenance is properly described in TM 55-1520-228-20, paragraph 4-27a. **No other procedures are authorized!** ■

Recurring deficiencies

Evaluations by DES indicate that many aviators have displayed deficiencies which resulted in the evaluations being graded as "unsatisfactory." These deficiencies are recurring in nature and affect the aviator force worldwide.

They include:

- Emergency procedures.
- Aerodynamics.
- Aircraft limitations.
- Premission planning, to include weight and balance.

Unit administrative deficiencies that stay in the forefront include:

- Failure to maintain individual aircrew training folders IAW TC 1-134.
- Poor management of the Aircrew Training Program.
- Lack of viable NVG training program.

Although Chapter 7 of the appropriate ATMs contains guidelines for areas to be checked during all evaluations, commanders are advised that the above listed deficiencies are the most prevalent. ■

Use of checklists

The important consideration is not how one uses the checklist but that the

(continued on back)

Stacom

aviator develops the habit of using the checklist on all flights. The checklist should be studied and the purpose and procedure for each item should be thoroughly understood. The aviator's check of each item listed must be an intelligent investigation of the indications sought.

The foregoing was extracted from the CAA Flight Instructor's Handbook of 1956. After all these years and many attempts to improve the statement, we believe it cannot be said better. The professional aviator will read and take heed! ■

Questions and answers

Question: How is Vref computed for OV-1 aircraft?

Answer: The approach speed chart (figure 7-40 in appropriate OV-1 series operators manual) is based upon 1.2 Vso. TC 1-144 requires a Vref based upon 1.3 Vso for normal approaches; thus, the chart does not present proper information for performance planning. However, use of the chart to compute the proper Vref for power approach/precision landing is acceptable, and either one of the two following methods may be used.

Method No. 1. Using the current approach speed chart (figure 7-40), compute Vref for the appropriate weight and flap configuration. Divide this value by 1.2 and multiply the quotient by 1.3 to arrive at the proper Vref.

Method No. 2. Obtain flight idle stall speed from figure 8-7, using the appropriate weight and flap configuration at zero degree of bank. Multiply this value by 1.3 for the proper Vref.

Mohawk aviators are cautioned that the landing distance chart (figure 7-41) is also predicated on 1.2 Vso approach speed. The data indicates that landing distance may increase approximately 30 percent above that indicated for a normal approach and landing in the current chart.

This extra landing distance must be considered in performance planning. ■

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.

Radio replacement speeded up

The problem of long turn-around times for repair/replacement of AN/PRC-90 survival radios appears to have been solved. When you send your radio for repair, identify on the requisition document that it is an "exception requisition" for a serviceable radio. Cite the turn-in document number and insert code "26" in columns 55 and 56 of the requisition document. Doing this will prevent requisitions from activities with a low Department of the Army Management priority from being placed on back order. ■

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Mishap review: communication gap

Synopsis

The OH-58A was lead of a flight of six helicopters hovering to a parking area at an airport. The pilot misinterpreted instructions from the tower to hold short of a runway and told the copilot to cross the runway. As the aircraft approached the runway, the crew was again told to hold short. The copilot placed the aircraft in a nose-high decelerative attitude, causing the main rotor blades to strike and sever the tail boom. The aircraft spun several times and landed hard.

History of flight

Six OH-58s were on a service mission. After refueling and eating lunch, the pilots took off for the final leg of the flight. The copilot was flying the No. 1 aircraft and the pilot-in-command (PIC) was operating the radios.

After flying more than 2 hours, the pilot of one of the helicopters called the lead aircraft and said he was low on fuel. It was getting dark by this time. Lead called approach control and told them he was lead of a flight of six, with aircraft critical on fuel. Approach control acknowledged and began issuing progressive radar vectors for a right base landing on runway 35. The aircraft turned to the final approach course for landing. Approach control handed the flight over to the control tower but did not tell the tower that some of the aircraft were low on fuel.

The PIC of the lead aircraft tuned the VHF and UHF transceivers to the control tower frequencies while continuing to communicate with the flight on FM. The control tower cleared the flight to land on runway 35. On short final, the PIC told the tower he wanted to be parked at the same location where some Cobra aircraft were parked. Control tower replied with instructions to land and proceed north on runway 35 but to hold short on runway 08. As the shallow approach was terminated, the lead aircraft hovered north on runway 35 at about 20 to 30 knots to make room on the runway for the rest of the flight. As the remainder of the flight was landing, the crew of the lead aircraft saw an airliner leave runway 08. The tower then cleared an Air Force plane to land, and another aircraft had entered traffic for landing.

(continued on next page)

Communication gap

As the lead helicopter hovered to an area about 2,600 feet north of the intersection of runway 35 and runway 03, the tower requested that the flight clear runway 03. Some of the flight had not crossed the intersection of the runways and was preventing a civil aircraft from landing on 03. The lead aircraft was about 200 feet south of the intersection of runways 35 and 08 when the tower issued the request. The PIC interpreted the instructions to mean he should expedite across runway 08.

The PIC told the copilot to expedite across runway 08. The copilot increased the speed of the aircraft to 30 to 40 knots. The PIC was looking at his airfield diagram as the aircraft approached the intersection of runways 08 and 35. As tower personnel saw that the OH-58 was about to cross runway 08 in the path of the Air Force KC-135 which was on 1-mile final, they urgently transmitted to the helicopter to hold short. Hearing the warning, the copilot began a deceleration as the PIC looked up and to the left. He saw the landing lights of the plane on short final and told the copilot to stop. The copilot placed the aircraft in a 45- to 60-degree nose-high attitude in an attempt to stop short of the active. The aircraft continued forward onto runway 08, and the PIC told the copilot to continue on across the runway.

Because of the extreme nose-high attitude of the aircraft, the main rotor blades severed the tail rotor drive shaft and the tail boom. The aircraft assumed a level attitude as it began to spin violently nose right. The crew of the Air Force plane saw the helicopter spinning on the runway and made a go-around.

The OH-58 completed about four revolutions before hitting 43 feet north of the intersection of runways 35 and 08 on the centerline of 35. The aircraft continued to spin right as it rebounded into the air and then hit the runway a second time. It completed five more revolutions while sliding 23 feet from the second impact point and came to rest upright.

Crewmember experience

The 22-year-old PIC had more than 400 rotary wing hours, with more than 350 in OH-58As. The 23-year-old copilot had more than 200 rotary wing hours, with less than 20 in OH-58As.

Commentary

The PIC misinterpreted instructions from the control tower to have his flight clear runway 03, which was 2,600 feet to his rear, as clearance to expedite crossing runway 08. He saw an aircraft depart on runway 08 as he was landing and assumed the runway was clear. He was anticipating clearance to cross the runway as he approached to within 200 feet of the intersection when the tower called and told him to have his flight clear runway 03. He had heard the tower clear an aircraft to land and tell another aircraft that it would be No. 2 for landing on runway 08. The PIC was not consciously aware of the significance of the clearance to land for the two aircraft, but he was probably subconsciously aware that if he was going to cross the runway he would have to do it quickly because of the landing traffic.

The PIC did not visually check the runway to verify that no aircraft were taking off or landing as he approached the runway with an intent to cross. He assumed the absence of traffic because he thought he was cleared to cross the runway.

The copilot placed the aircraft in the excessively nose-high attitude because he heard the control tower urgently tell him not to cross the runway, and he assumed he was in a dangerous position. When the PIC told him to hold short after he had begun to decelerate, it reinforced his supposition that he was in danger. So he increased the decelerative attitude to try to stop forward movement of the aircraft. The copilot was unable to adequately judge the severity of the maneuver as he had never seen or done a deceleration at night. The maneuver is not required by the aircrew training manual to be performed or demonstrated for proficiency or qualification.

Contrary to the operators manual, the copilot did not close the throttle and complete a hovering autorotation after losing tail rotor thrust. He did not recognize the aircraft action as a loss of tail rotor thrust because of his lack of experience. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap □ (V series) Main rotor blade hit tree while IP was backing into tactical parking site. Aircraft landed, bounced, and skidded to left rear into the tree a second time. 8260

UH-1 Class E mishaps □ (H series) Pilot heard thud during slide after landing. Plastic spray bottle, used to clean windows, was found on floor under jump seat. Bottle had been placed in seat with seatbelt secured over it before flight. □ (H series) Vertical vibration was felt on takeoff. Caused by crack in main rotor blade about 7 feet from tip. □ (H series) Engine oil pressure and torque pressure went to zero. Master caution and engine oil pressure lights came on. Caused by failure of engine oil pump. □ (H series) Loud bang was heard during engine runup, and fuel pressure dropped to zero. Caused by compressor stall. □ (H series) Master caution light came on. Loose housing on pressure switch caused internal short. □ (H series) Fuel pressure dropped and egt and engine oil temperature rose. Static sound was heard. Caused by intermittent operation of deice valve. One-inch crack was found in diffuser section. □ (H series) Excessive feedback in cyclic controls during hover was caused by failure of irreversible valve.

UH-60 Class C mishaps □ Main rotor blades hit trees during landing, damaging tip caps. □ Stabilator was found damaged after flight. Aircraft had been flown into several confined area LZs during the mission.

UH-60 Class E mishap □ Loud whining noise was heard from No. 2 engine area during flight. Caused by failure of engine output shaft assembly.

Attack helicopters

AH-1 Class E mishap □ (S series) Post-flight inspection revealed three tears in tail rotor drive shaft cover. Socket and washer were found near 42-degree gearbox. Copilot preflighted the area where the damage occurred and did not detect the foreign objects.

Cargo helicopters

CH-47 Class C mishap □ (B series) Aircraft was flying with slingload. Sling broke and water bucket fell to ground and was destroyed.

CH-47 Class E mishaps □ (B series) No. 2 engine had static beep failure. Single-engine landing was made. Caused by failure of engine trim electrical cable assembly. □ (C series) No. 2 engine torque fluctuated several times during hover check. Caused by failure of N_2 actuator. □ (C series) After takeoff, external load began to oscillate and turn. After 10 minutes in flight, flight engineer noticed that clevis pin retaining bolt nut had backed off and bolt was working out of clevis pin. Load was landed on road. Inspection revealed that bolt nut face of clevis was scarred by the turning movement of the bolt. □ (C series) Flight engineer saw oil leaking around C-box area. Caused by failure of O-rings on pressure line to combining transmission. □ (C series) No. 2 engine chip detector light came on. Caused by failure of engine transmission.

Observation helicopters

OH-58 Class C mishap □ (A series) Pilot misjudged height and rate of descent and pulled cushioning pitch high during straight-in autorotation. IP reacted too late, and aircraft landed hard.

OH-58 Class E mishaps □ (A series) N_2 increased during takeoff. Malfunction in governor caused engine to overspeed. □ (A series) Low rotor light came on and audio sounded. Master caution, d.c. generator, and inverter lights came on. Battery vent was

clogged with a dirt dobber nest, causing battery to overheat. ☐ (A series) Master caution light came on. Caused by malfunction in electrical wiring.

Fixed wing

C-7 Class E mishap ☐ Hydraulic fluid mist was seen and smelled in cockpit. Worn flare in hydraulic line allowed fluid to leak from fitting.

C-12 Class E mishaps ☐ (A series) On takeoff roll, pilot's airspeed indicator was showing 160 knots when actual speed was 65 knots. Caused by failure of airspeed indicator. ☐ (C series) Left engine oil pressure was 100 psi during climb. Caused by failure of oil pressure transmitter.

OV-1 Class E mishap ☐ (RV-1D) Anti-ice light came on during climbout. Aircraft was being flown in icing conditions. Caused by failure of heating element in ring cowl.

U-21 Class E mishap ☐ (A series) No. 1 engine oil pressure fluctuated during flight. Caused by failure of oil pressure gauge.

Maintenance

UH-1 Class E mishaps ☐ (H series) Loud bang was heard during flight. Caused by dirty engine. ☐ (V series) Engine oil temperature was seen at 120 degrees during before-takeoff check. Bleed air line had been capped off to shut off heater. Line was capped in the wrong place, shutting off bleed air to drive engine oil cooler blower.

AH-1 Class E mishap ☐ (S series) Ammeter indicated 300 amps on final approach. Twenty millimeter cannon moved left, then stowed in full right position. Stow circuit breaker and drive motor circuit breaker popped out. Stow control was installed without setting resistor.

CH-47 Class E mishaps ☐ (B series) Smoke was seen in vicinity of No. 1 engine. Master caution and low oil lights came on. Caused by incorrect installation of oil sump drain plug. ☐ (B series) IP attempted simulated low side governor failure on No. 1 engine. AC beep and DC beep failed to respond and restore rpm. Caused by out-of-rig N_2 actuator.

OH-58 Class E mishap ☐ (C series) Pilot felt vertical vibration while engine was idling. Swashplate friction was out of adjustment.

C-7 Class E mishap ☐ Left prop went into feather on landing roll with throttles in idle position. Caused by worn blade switches and dirty brush block cannon plug.

OV-1 Class E mishap ☐ (D series) No. 2 propeller rpm would not increase above 1590 on takeoff roll. Tab washer was not secure on locking nut, which allowed coupling to back out of rod end on power rod assembly, restricting full power.

Messages received

- Maintenance information message concerning CH-47C fiberglass rotor blades (MIM 82-47-02, 081430Z Jun 82).
- Maintenance information message concerning OH-6/OH-58A/C T63 engine daily deceleration check (MIM 82-T63-01, 0920017 Jun 82).
- Maintenance information message concerning change 13, dated 15 Apr 82, to TM 55-1520-227-23-1 (MIM 82-47-03, 101930Z Jun 82).

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

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**8**	**2**
	June	6	3	1-23 June	**3**	**0**
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**42**	**23**

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 28 Oct 81 issue (8203)☐ Left side engine cowling separated from aircraft during maintenance test flight. Cowling hit tail rotor. Both tail rotor blades and hub assembly separated from aircraft, resulting in loss of tail rotor thrust. Thinking of engine failure, pilot entered autorotation and rolled off throttle. During descent, pilot could not move his antitorque pedals and realized he had an antitorque problem. Aircraft yawed to left and, about 50 feet agl, rotated to right. Aircraft then landed hard, bounced, slid 35 feet, and came to rest upright. Top front latch of cowling was incorrectly secured on top of its bracket, providing a one-half-inch gap between top of fuselage and cowling.

8203

UH-1 Class A mishap in 2 Dec 81 issue (8210) ☐ During final approach to sloping terrain, and while flying from the left seat, pilot misjudged his clearance and rate of closure. In addition, he did not correctly execute a slope landing. Right skid hit the ground, dug into mud, and became a pivot point about which the aircraft rotated and crashed.

8210

UH-1 Class A mishap in 13 Jan 82 issue (8217) ☐ Momentary airframe shudder was felt during maintenance test flight. Descent was initiated for precautionary landing. On short final, pilot used excessive airspeed and overshot the intended landing area, 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 aircraft descended into trees.

8217

UH-1 Class A mishap in 3 Feb 82 issue (8222) ☐ During takeoff from 6-degree slope, copilot applied excessive collective pitch without applying sufficient left lateral cyclic into the slope to level the aircraft. 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. As a result, aircraft pivoted about the right skid and rolled onto its right side.

UH-60 Class A mishap in 9 Sep 81 issue (8158) ☐ IP was demonstrating simulated single-engine run-on landing at night, with No. 2 engine at idle. After beginning left descending turn onto base leg of traffic pattern, pilot inadvertently shut down both engines. Altitude was too low for a restart and aircraft crashed.

8158

Attack helicopters

AH-1 Class B mishap in 11 Nov 81 issue (8207) ☐ Aircraft was on night gunnery training mission. When rockets failed to fire, pilot did not immediately level the aircraft. Instead, he rechecked his switches and tried to refire the rockets in an attempt to reduce the number of times he would be required to perform the critical maneuver. Copilot told pilot aircraft was drifting to rear, but pilot could not react in time to prevent the tail rotor and tail boom from hitting the ground.

Observation helicopters

OH-6 Class B mishap in 16 Dec 81 issue (8216) ☐ Pilot had refueled aircraft with nonaviation fuel. About 5 minutes after takeoff, with the electric fuel boost pump in the "off" position, engine failure occurred. Pilot adjusted his autorotation airspeed to 62 knots (minimum rate of descent) instead of 88 knots (maximum glide). This action resulted in termination of the forced landing in trees about 40 yards short of a large open area.

(continued on back)

Followups

OH-58 Class A mishap in 13 Jan 82 issue (8219) ☐ Pilot applied right rear cyclic during takeoff to a hover and then did not reduce collective pitch when aircraft began to roll to right. Aircraft rolled onto right side and was destroyed.

OH-58 Class A mishap in 13 Jan 82 issue (8220) ☐ Two OH-58s on night vision goggle training mission took off from different lanes on stagefield about 3 seconds apart. During climb, the aircraft drifted toward one another and collided about 600 meters south of the stagefield takeoff lanes.

8220

Fixed wing

OV-1 Class A mishap in 10 Feb 82 issue (8225) ☐ Left engine failed during two-engine go-around at an airspeed of about 104 knots. Aircraft began rolling to left. Power was reduced on the right engine in an attempt to stop left roll. Low airspeed caused aircraft, even with full control deflection and at reduced power, to continue to roll to left. IP told rated student pilot to eject, and then IP ejected. Student pilot did not eject and was killed. IP sustained severe injuries.■

8225

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A message for maintenance

By reading our publications, you have seen that most of our articles are aimed at aviators. That's because aviators are highest on the list of accident causes. But this does not mean that maintenance people make fewer errors. On the contrary. During the 3½-year period from 1 October 1978 through 31 March 1982, more than 1,900 missions were aborted because of some type of maintenance problem. Ten Class A mishaps, 5 Class B mishaps, and 81 Class C mishaps cost the Army almost $17 million. The remaining mishaps were Class Es.

Only a combination of pilot alertness, skill, and favorable environmental conditions prevented more of the precautionary landings from turning into accidents. Though the impact of a fatal maintenance-caused mishap is greater than the impact of a precautionary landing, the end result of destroyed confidence may be the same.

Heading the list of maintenance errors was 341 cases of loose, broken, or frayed lines, fittings, wires, couplings, plugs, nuts, etc. Two of these resulted in Class C mishaps. Incorrect installation (not counting chafed lines) resulted in 3 Class A mishaps, 1 Class B mishap, 12 Class C mishaps, and 311 Class E mishaps. Incorrect adjustment of linear actuators, bleed bands, switches, droop cams, fuel controls, etc., accounted for 295 mishaps. One of these was a Class A and four were Class Cs.

Following are other maintenance errors most often committed and the number of mishaps caused by each:

- Chafed lines - 179.
- Incorrectly torqued bolts, fittings, nuts, etc. - 159.
- Dirty or clogged parts - 87.
- Incorrect voltage regulator adjustments - 71.

- Incorrect rigging - 54. Two of these were Class A mishaps.
- Something left in aircraft (tools, parts, oil sample bottles, etc.) - 52. One of these was a Class A and 14 were Class Cs.
- Part left off of aircraft (caps, clamps, O-rings, guards, etc.) - 37.
- Incorrect part used - 35. One of these was a Class A and one was a Class C.
- Electrical short circuits - 33.
- Incorrect maintenance on battery - 26.
- Out of balance (tail rotor, stabilizer bar, etc.) - 24.
- Incorrectly secured cowlings, caps, covers, etc. - 23.
- Incorrect lubrication - 21. Five of these were Class Cs.
- Not enough or too much fluid - 14.
- Incorrect washing procedures - 13. Two of these were Class Cs.
- Out of track (tail rotor, main rotor, etc.) - 13.
- Tracking flag raised into blade - 13. All of these were Class Cs.
- Incorrectly serviced (strut, tail rotor, etc.) - 12.

A message for maintenance

Some of the other errors included defective parts used, incorrect alignment, poor recordkeeping, incorrect reassembly, incorrect engine cleaning procedures, mismatched blades, and metal shavings left in aircraft.

Here are a few examples of the mishaps:

• During replacement of a No. 1 normal engine trim system switch on a CH-47, the aircraft was not placed on a red X status. After the job was completed, neither a technical inspection nor a maintenance operational check was done. Incorrect maintenance techniques resulted in twisted terminals, cold solder joints, and twisted wiring. The switch was installed in the thrust lever incorrectly. The cover plate securing the switch was loose and one screw was missing, allowing the switch to shift and enhance the possibility of the No. 1 engine beep increase circuit terminals shorting out. When the terminals shorted while the aircraft was hovering over a landing zone, the No. 1 engine went to full increase trim in less than 2 seconds. The No. 2 engine then dropped off line. The helicopter touched down and then bounced. A forward rotor blade hit and killed a soldier on the ground. During coastdown, the forward blades hit the fuselage three times.

• Engine oil temperature of an AH-1 increased during flight. A paper towel in the engine oil cooler fan was obstructing air intake. The day before the flight, the crew chief working on a leak in the oil cooler fan compartment placed the paper towel in a corner of the compartment to soak up some oil. He forgot about the towel.

• A UH-1 copilot felt his cyclic grip twist. Maintenance personnel had not replaced a bolt after working on the cyclic and did not tell anyone that the work had been done.

• An AH-1 pilot heard a high-pitched noise, and the No. 1 hydraulic light came on. An O-ring on a hydraulic line was incorrectly installed.

• The crew of a UH-1 smelled JP4 fumes during flight. After the aircraft was landed, fuel was seen leaking from a line at the fuel control. Overtightening during installation caused incorrect seating between the start fuel hose and elbow.

• A U-21 IP noticed fuel vaporizing off the trailing edge of the right outboard flap. The fuel vent lines were installed backwards and were cross connected.

• An OV-1 engine intake was damaged by pliers left in the intake.

• Rpm decreased below engine idle and the OH-58 pilot entered autorotation. About 25 feet above the ground, the pilot saw that the area selected for touchdown sloped upward, and he tried to extend his glide by applying collective pitch. The aircraft fell through and landed hard on the rear of the skids. Inspection revealed a loose line fitting which backed off allowed pneumatic air loss between the line assembly and accumulator. This resulted in reduced engine power and inadequate rpm to sustain flight.

• In-flight separation of the white drive link trunnion from the swashplate outer ring caused a UH-1 to descend in an uncontrollable right turn and crash into trees. The cause of the trunnion separation was an oversized trunnion bore and lack of torque on the clamping bolts.

• As a UH-1 crew chief was tracking the tail rotor blade, his tracking stick hit the blade. The crew chief was familiar with tracking procedures in the TM, but he chose to use a tracking stick not outlined in the TM.

What causes a maintenance-induced mishap? There are only two real causes: Someone didn't do the job or didn't do the job correctly. With possibly few exceptions, the errors mentioned here were preventable and inexcusable. There is no reason why maintenance errors cannot be virtually eliminated. Good maintenance is trained personnel following correct procedures **all of the time.** When authorized procedures are not followed, the stage is set for mishaps.

Here's what it takes to develop and maintain good maintenance practices:

• Awareness on the part of supervisors about the training, experience, and abilities of every person under their supervision.

• Qualified technical inspectors.

• Up-to-date technical manuals available in each unit in sufficient quantities to be in the hands of mechanics. It's true that after a mechanic works on an aircraft for awhile, he remembers torques and even assembly procedures, but manuals change. Mechanics **must** use the book every time.

• Scheduling of flights to insure preventive maintenance inspections are performed when due.

• Submission of DA Form 2028 or DA Form 2028-2 when required. Errors may appear in publications from time to time or some important item may be omitted. The quicker DA knows about the errors, the quicker they will be corrected.

• Constant command emphasis on all of the above points.

The maintenance technician is the best life insurance an aviator can have. It is the mechanic's responsibility to perform maintenance by published and approved procedures. All guesswork must be eliminated. This means keeping abreast of all maintenance manuals, other maintenance publications, and the techniques required for the aircraft. A good mechanic won't be satisfied with minimum requirements—he will

insist on the nearest thing to perfection. To help him do this, he can adopt the mechanic's code.

The Mechanic's Code

As a maintenance technician, I recognize my obligations:

To the United States Army, which trusts that I am technically qualified for the tasks expected of me.

To the aircrews and passengers, who trust their lives and safety to my mechanical skills.

To my organization, who expects me to be a professional mechanic as well as a professional soldier.

To my fellow mechanics, who as team members must depend upon me for a task completed.

To myself for the personal satisfaction of a professional job well done.

To discharge these responsibilities:

I will perform maintenance of the highest quality to assure the safety of every flight.

I will always be sure of my work or when in doubt consult my supervisor.

I will strive to improve my professional skill by attention to duty and self-education.

I will not allow personal desires or consideration to affect performance of duty.

I will never attempt to perform duty when my mental or physical condition might lead to maintenance error.

I will keep my tools and equipment in first class condition to insure a job worthy of the professional mechanic that I am.

I pledge adherence to these principles to reflect credit to myself, my fellow workers and my profession. ■

Attention prospective ASO students

Personnel designated to attend the Aviation Safety Officer Course at Fort Rucker are reminded to contact the Army Safety Center, Education and Evaluation Directorate Operations, at AUTOVON 558-2091/6410 immediately upon receipt of orders to attend the course. This action is required by DA circular and is necessary to insure timely receipt of precourse information and instructional materials. ■

Defective helmets

Army activities have reported receiving SPH-4 helmets, NSN 8415-00-144-4981/4985, manufactured by Aqua-Aire, which are unusable due to various deficiencies.

DPSC has agreed to give full credit for defective helmets produced by Aqua-Aire on contract No. DLA100-80-C-2226 only. Deadline for return is 30 July 1982.

Procedure for return and credit is as follows:

- Submit Report of Discrepancy (ROD), SF 364, to:

Commander
Defense Personnel Support Center
ATTN: DPSC-TTEF
2800 South 20th Street
Philadelphia, PA 19101

- Return helmets with a copy of SF 364 to:

Defense Depot Mechanicsburg
ATTN: DDMP-JQ
(Mark for Condition Code L)
Mechanicsburg, PA 17055

Defective helmets received from other contracts should be reported by QDR, in accordance with chapter 12, TM 38-750. □

—from TSARCOM Supply Information Letter

Spares for MK-896A headset

The following parts are now available for requisitioning in accordance with TM 11-5965-279-13 and P, published 15 February 1981:

Source of supply (RIC)	Nomenclature	NSN
S9E	Kit, Cord Assembly	5965-00-177-2897
N32	Swivel Assembly	8475-00-117-4538
S9I	Screw, Machine	5305-00-616-8543
S9I	Washer, Lock	5310-00-579-5554
S9E	Plate, Jack Holder	5340-01-007-8366
B16	Microphone, Dynamic CC7A/AIC	5965-01-094-6574
S9E	Earphone H-143A/AIC	5965-01-094-6602
B16	Boom Assembly	5965-01-094-6573
B16	Cable Assembly, Microphone	5965-01-094-6572
S9I	Grommet, Earcup	5325-01-096-1189
S9I	Grommet, Helmet	5325-01-096-1190

—from TSARCOM Supply Information Letter

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap □ (H series) Aircraft yawed left and master caution and engine chip detector lights came on during instrument training flight. Grinding noises were heard from engine compartment and crew smelled fumes during descent. Engine failed about 50 feet above the ground. Aircraft landed hard and skidded 36 feet before coming to rest upright. 8261

UH-1 Class C mishaps □ (H series) Front cross tube failed at right attaching point during landing. Aircraft yawed left and rolled right. IP took control and kept aircraft from rolling onto its side. Cross tube was damaged as aircraft tried to roll right. □ (H series) IP initiated simulated forced landing during approach to LZ. Collective was not lowered full down. Rpm deteriorated below the green and high rate of descent occurred. At 5 feet, IP took control and tried to cushion the landing. Aircraft landed hard and slid 90 feet. Cross tubes and skids were damaged.

UH-1 Class E mishaps □ (H series) Cyclic locked in left rear position during hover. Hydraulic control switch was recycled, and movement was restored to cyclic. Caused by failure of irreversible valve. □ (H series) Aircraft yawed right, egt increased, and N_2 bled to 6000 rpm. Failure of fuel control resulted in compressor stall. □ (H series) Master caution and transmission oil pressure lights came on and oil pressure gauge dropped to zero. Caused by failure of main transmission oil filter gasket. □ (H series) N_2 fluctuated during flight. Caused by dual tachometer failure. □ (H series) Right fuel boost pump light came on. Caused by failure of boost pump. □ (M series) Crew smelled burning odor during flight. Caused by main generator failure. □ (V series) Master caution and right fuel boost pump lights came on. Caused by failure of submerged pump.

UH-60 Class E mishaps □ Rotor and engine rpm deteriorated during hover over LZ. Aircraft began slow turn to right. Tail rotor effectiveness was lost. Aircraft continued turn to right and began to settle. Pilot lost visual contact with ground because of blowing dust. Load was jettisoned and aircraft was landed. □ Crew smelled JP-4 during ground run. JP-4 was found in No. 2 engine oil system. Caused by malfunction of oil cooler.

Attack helicopters

AH-1 Class E mishaps □ (G series) No. 2 hydraulic light came on. Running landing was made. Caused by failure of pressure switch. □ (S series) Master caution and engine oil bypass lights came on. Caused by failure of engine oil drain line valve in oil cooler compartment. □ (S series) Transmission oil bypass light came on and transmission pressure fluctuated. Caused by ball valve failure. □ (S series) Master caution and engine chip detector lights came on. Caused by failure of engine. □ (S series) Pilot allowed rotor rpm to build during right 180-degree autorotation. IP stabilized rpm at 104 percent and pilot continued the maneuver. Pilot saw he was going to overshoot his landing lane and abruptly increased bank angle. Rotor rpm increased to 107 percent for 1 second before IP could increase collective to bring rpm down.

Cargo helicopters

CH-47 Class C mishap □ (C series) Aircraft was flying with pallet as external load. Crew chief noticed load was oscillating fore and aft and left to right. Copilot decelerated aircraft and initiated

(continued on next page)

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**7**	**2**
	June	6	3	June	**5**	**2**
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**43**	**25**

Mishap briefs

right turn. Load appeared to stabilize, and copilot turned left to line up with helipad for landing. With no warning, load rose and hit aircraft in several locations underneath fuselage behind No. 2 engine. Sling wrapped around right aft landing gear. Approach was terminated at a hover. Load was lowered to ground and ground personnel cleared slings from landing gear. Copilot may have overcontrolled aircraft because of wind conditions and oscillations.

CH-47 Class E mishaps □ (C series) No. 1 engine chip detector light came on. Caused by failure of engine transmission. □ (YCH-47D) AFCS dash actuator light came on, followed by smoke in cockpit. Caused by short in cannon plug wire.

CH-54 Class E mishap □ (A series) Five minutes after takeoff, loud banging noise was heard. Flight engineer said items were blowing overboard from front of aircraft. Aircraft was flared to reduce airspeed and approach to ground was started. As aircraft slowed through about 60 knots, right avionics compartment door left aircraft. Aircraft was returned to level flight. Door was located and approach was made to open spot to pick up lost items. Avionics door and fuel sample probe were returned to aircraft and items in avionics compartment were secured.

Observation helicopters

OH-6 Class C mishaps □ Pilot felt slight bump in collective pitch control lever, followed by vibration. Internal bolt on blade damper failed in flight, causing loss of cap and internal parts, which nicked leading edge of trailing blade. □ Postflight inspection revealed broken ADF sensing antenna. Main rotor blades and tail rotor blade were scratched.

OH-58 Class C mishap □ (A series) Left skid caught on PSP and aircraft began to roll left. IP lowered collective, and aircraft hit the ground right skid low and spun to right. Both tail rotor blades and left skid shoe were damaged.

OH-58 Class E mishaps □ (A series) Transmission oil hot light came on. Caused by leaking forward freewheeling unit seal. □ (A series) As aircraft was sitting on hot refueling pad, refueler saw smoke coming from battery vents. Caused by overheated battery. □ (A series) Crew smelled burning oil during hover. Front seal of main drive shaft was ruptured and packing grease was slung out. □ (A series) Aircraft yawed left during takeoff. Engine audio, low rotor light, and engine-out light came on. Caused by broken air line.

Fixed wing

C-12 Class C mishap □ (A series) As crew was maneuvering around isolated thunderstorms, noise was heard from right side of aircraft. There was no visible lightning or arcs. VOR went off for about 5 seconds and then returned to normal. Postflight inspection revealed aircraft had been struck by lightning, causing damage to top of right outboard flap and lower trailing edge of bottom ventral fin.

C-12 Class E mishaps □ (A series) Cockpit began to fill with smoke. Caused by burned armature of forward ventilation blower. □ (A series) No. 1 engine would not produce minimum power for takeoff. Inspection revealed damage and deterioration of internal hot end portion of engine.

T-42 Class E mishap □ Fuel siphoned from right main tank fuel cap during takeoff. Cap did not seat properly because of deteriorated O-ring.

U-21 Class E mishap □ (D series) No. 1 engine would not restart when IP shut it down for demonstration. Caused by failure of glow plugs.

Maintenance

UH-1 Class E mishaps □ (H series) Transmission oil pressure gauge fluctuated during flight. Caused by loose cannon plug. □ (H series) Egt dropped to 320 degrees as aircraft was being repositioned for HIT check. Caused by loose wire on egt gauge.

AH-1 Class E mishap □ (S series) Master caution and transmission oil hot

(continued on back page)

Mishap briefs

lights came on. Caused by loose fitting from customer bleed air adapter to oil cooler fan.

OH-58 Class E mishaps ☐ (A series) N_1 and N_2 began to bleed off, and aircraft yawed. Caused by loose line. ☐ (A series) Pilot noticed sloppy control response and landed. Engine fuel line was seeping at flare end connection. Caused by dirty seat flare.

T-42 Class E mishaps ☐ VOR signal and indicator input were lost during climb. Caused by use of incorrect cannon plug retaining hardware in installation of avionics package. ☐ Upper latch of cabin door came open. Copilot held door handle and aircraft was landed. Caused by incorrectly adjusted latch.

Messages received

• Safety-of-flight message concerning ungrounding of AH-1 Kaman main rotor blades (AH-1-82-08, 111415Z Jun 82). Summary: Kaman blades that have been modified with ECP KAC-HI-009-R1 and reidentified with P/N K747-003-205 are ungrounded. The same daily inspection which was applicable to previous metal and composite blades will continue to apply to the -205 blade. Contact: John Morris, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message concerning proper installation of CH-47 engine transmissions (MIM 82-47-04, 171915Z Jun 82). A field-installed engine transmission failed after 9 minutes of operation. The oil pressure hose had been connected to the return port with a reducer fitting, causing oil starvation of the output shaft bearing and clutch. This message is a reminder of the necessity for correct maintenance and revises the instructions for assembly-buildup of the transmission in the applicable -23 manual.

• Maintenance information message concerning update of selected serialized rotor head assemblies (MIM 82-47-05, 181430Z Jun 82). This message provides an updated table 1-19 for TM 55-1520-227-23-1.

• Maintenance information message concerning OH-58A/C potential nickel-cadmium battery internal heating problem (MIM 82-58-02, 171900Z Jun 82). The possibility of loose intercell battery connections should be considered when OH-58A/C battery problems occur. If loose intercell connections are found, NSN 5310-00-976-4621 washers may be installed under the link attach screw heads.

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

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Mishap review: dynamic rollover

Synopsis

The OH-58 pilot landed to let off a passenger. During the attempted take-off, the left skid cleared the ground by 2 to 3 inches, but the right skid remained on the ground. The aircraft rolled onto its right side.

History of flight

The OH-58A was one of several participating in a field training exercise. The pilot (the detachment commander) and crew chief took off at midmorning on the first of a series of three flights to provide airborne control. About an hour later, the pilot landed to pick up one of the evaluators of the exercise. During subsequent flights, landings were made for refueling.

After the passenger boarded and the aircraft was refueled, the gross weight of the aircraft was 62 pounds over the maximum allowable. At this point, c.g. was within limits, but as fuel was consumed, the c.g. moved forward to slightly forward of the forward limit.

Just past midafternoon, the aviation support requirement for the exercise ended and the evaluator asked to be dropped off at a field site. The pilot began an approach to an open, plowed, muddy field. A go-around was made because of winds and wires in the area. The next approach was made into the wind using a normal approach angle The helicopter was landed and collective pitch was lowered to the full down position. The aircraft settled about 3 inches into the soggy field.

The passenger got out of the aircraft. The pilot used his pedals and cyclic to insure the skids were not stuck in the mud. As the pilot tried to take off, the left skid cleared the ground by 2 to 3 inches, but the right skid remained on the ground. The helicopter rolled onto its right side. The pilot and crew chief escaped uninjured.

Crewmember experience

The 30-year-old pilot had almost 1,000 rotary wing hours, with less than 80 hours in OH-58As.

Dynamic rollover

Commentary

The pilot applied right rear cyclic on takeoff to a hover, contrary to TC 1-137, and then did not reduce collective pitch when the aircraft began to roll to the right, as specified in the operators manual. He had flown the aircraft for 5 hours with a passenger in the left rear seat and had been compensating for the passenger's weight with right cyclic. When the passenger left the aircraft, the c.g. shifted right and aft. The same control inputs which had previously resulted in a normal takeoff now resulted in a right roll and tail-low attitude. The mud remaining on the lower part of the vertical fin after the mishap indicated an excessive tail-low attitude during the rollover.

Several things contributed to the pilot's incorrect control actions, the most prominent being fatigue. The pilot had overflown crew rest limits the day of and the day before the mishap. He was overweight and did not exercise regularly. The 2 days of flying had been particularly stressful. The pilot had not eaten or drunk anything on the day of the mishap and was somewhat dehydrated and almost certainly hypoglycemic.

The exercise had ended for the detachment. The pilot's primary concern was finding a lost jeep and getting his unit prepared for movement back to home station.

Although the pilot had almost 1,000 hours total flying time, he had only 25 hours as pilot and 51 hours as copilot in the OH-58. This lack of experience prevented him from recognizing the dynamic rollover in time to take effective corrective action.

Another contributor was habit interference. The pilot had been accustomed to flying an aircraft which was heavier on its left side and outside its forward c.g. limit. When the c.g. changed as the passenger got out, a new control action was required. The pilot did not adequately adjust to the new c.g.

If only one of these factors had been present, the accident might not have happened. However, their cumulative effect led to a tired, inexperienced, somewhat dehydrated, and hypoglycemic pilot trying to bring his aircraft to a hover while thinking about other pressing responsibilities and with his aircraft at or slightly forward of the forward c.g. limit. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft had resupplied rations to a unit on a training mission along a river. As recon was being made of the river, aircraft hit two powerlines and crashed. Two fatalities and seven major injuries. 8262

UH-1 Class B mishap □ (V series) As aircraft began gradual descent to begin flying NOE route, pilot heard loud bang, aircraft yawed left, and engine and rotor rpm decayed. Pilot entered autorotation and maintained maximum glide airspeed since he was flying over a small lake. Shoreline could not be reached, and aircraft hit the water hard and came to rest in an upslope attitude on an underwater sandbar extending from the shore. Engine may have seized. 8263

UH-1 Class E mishaps □ (H series) After completing topping check, test pilot increased collective pitch to level off. N_1 decreased to 45 percent. Caused by failure of fuel control. □ (H series) D.C. generator light came on and main generator voltage dropped during flight. Caused by broken wire to voltage regulator. □ (H series) Master caution and fuel filter lights came on during landing. Caused by failure of fuel filter sensing unit. □ (H series) Master caution and hydraulic pressure lights came on during landing. Caused by failure of hydraulic pressure switch. □ (H series) Vertical vibration was felt during climb. Caused by failure of pitch change link rod end bearing. □ (H series) Fire warning light came on. Caused by malfunction of fire control alarm box. □ (V series) Electrical power was completely lost. Caused by failure of voltage regulator. □ (H series) Pilot completed standard autorotation to runway and could not lower collective. Flashlight was found wedged under bellcrank located in transmission well on left side of aircraft.

Attack helicopters

AH-1 Class B mishap □ (S series) During standard autorotation, pilot applied initial pitch at 20 to 25 feet. IP chose not to attempt power recovery. Aircraft settled. Pitch was applied to cushion landing, but aircraft touched down hard. Vertical fin was severed by main rotor blades. 8264

AH-1 Class E mishaps □ (G series) Master caution and engine fuel pump lights came on, and engine fuel pressure exceeded 30 psi during runup. Engine immediately flamed out. Caused by broken wire on cannon plug to main fuel shutoff valve. □ (S series) N_2 engine rpm needles went to zero during runup. Caused by sheared N_2 tachometer generator pin. □ (S series) Stiffness was felt in tail rotor pedals during hover, followed by illumination of master caution and No. 1 hydraulic lights. Postflight inspection revealed hydraulic pump was operating intermittently, resulting in temporary binding of pedals. □ (S series) Copilot was making approach to confined area. Approach was downwind and steeper than normal. Excessive power was needed to terminate the vertical descent, resulting in overtorque.

Cargo helicopters

CH-47 Class E mishaps □ (C series) No. 1 engine fire light came on during runup. Caused by malfunction of fire control alarm. □ (C series) While aircraft was hovering over slingload, crew chief directed copilot to descend 5 feet. Utility cargo hatch door was slightly damaged when it hit slingload. □ (C series) Oil was seen spraying from hydraulic oil cooler fan area during runup. Caused by failure of housing hydraulic motor fan.

Observation helicopters

OH-58 Class B mishap □ (C series) Engine failed during NOE flight. Pilot autorotated to sand dunes. Tail boom, tail rotor, vertical fin, and drive train were damaged.

OH-58 Class C mishap □ (A series) Left skid caught on psp hidden in grassy area, causing skid to crack.

OH-58 Class E mishaps □ (A series) N_1 gas producer fuel control failed during runup for maintenance test flight, giving pilot no control of throttle except for engine cutoff. □ (A series) Master caution and fuel boost pump lights came on. Caused by failure of fuel boost

pump. □ (C series) High frequency vibration was felt. Caused by failure of No. 2 hanger bearing.

Training helicopters

TH-55 Class C mishap □ Engine quit during landing after test flight. IP had to land straight ahead because the terrain to his left, right, and behind was unfavorable for an autorotation. Aircraft landed hard, damaging all major components.

Fixed wing

U-21 Class E mishaps □ (A series) Nose gear position warning light did not come on when landing gear control switch was placed in down position. Aircraft was flown by tower for visual check, and nose gear appeared to be down. Aircraft was landed without incident. Caused by stuck microswitch. □ (RU-21H) Fuel would not transfer from wing tank to nacelle. Caused by failure of fuel transfer pump.

Maintenance

UH-1 Class E mishaps □ (H series) Crew chief saw fuel leaking around aft hellhole panel during runup. Caused by loose connection. □ (H series) Rpm dropped during takeoff. Caused by fuel control linkage rubbing against customer bleed air line. □ (H series) Postflight inspection revealed 42-degree gearbox was extremely loose on mounts. Bolt holes were elongated.

AH-1 Class E mishap □ (S series) Antitorque pedals lodged in neutral position during landing. Wire bundle had fallen behind left pedal.

CH-47 Class E mishaps □ (C series) No.1 engine torque needle fluctuated. Rpm increased to 250 when No. 2 engine normal engine beep failed to high side. Caused by incorrectly rigged N_2 actuator. □ (C series) Crew chief noticed hydraulic leak in transmission area after aircraft was landed from hover. Caused by incorrectly tightened No. 2 hydraulic bleed fitting. □ (C series) Aft speed trim failed to extend as airspeed was increased during climbout. Longitudinal cyclic speed trim indicator cannon plug was incorrectly positioned and tightened.

OH-58 Class E mishaps □ (A series) Engine oil temperature gauge fluctuated. Caused by loose wire on gauge. □ (C series) Hydraulics failed during flight. Running landing was made. Hydraulic line fitting was cracked. Caused by overtorque.

C-12 Class E mishap □ (A series) Right bleed air light came on. Left bleed air could not maintain cabin pressure. Caused by loose polyflow tube in right wheel well.

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**5**	**3**
4th Qtr	July	1	0	1-7 July	**0**	**0**
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**42**	**26**

Messages received

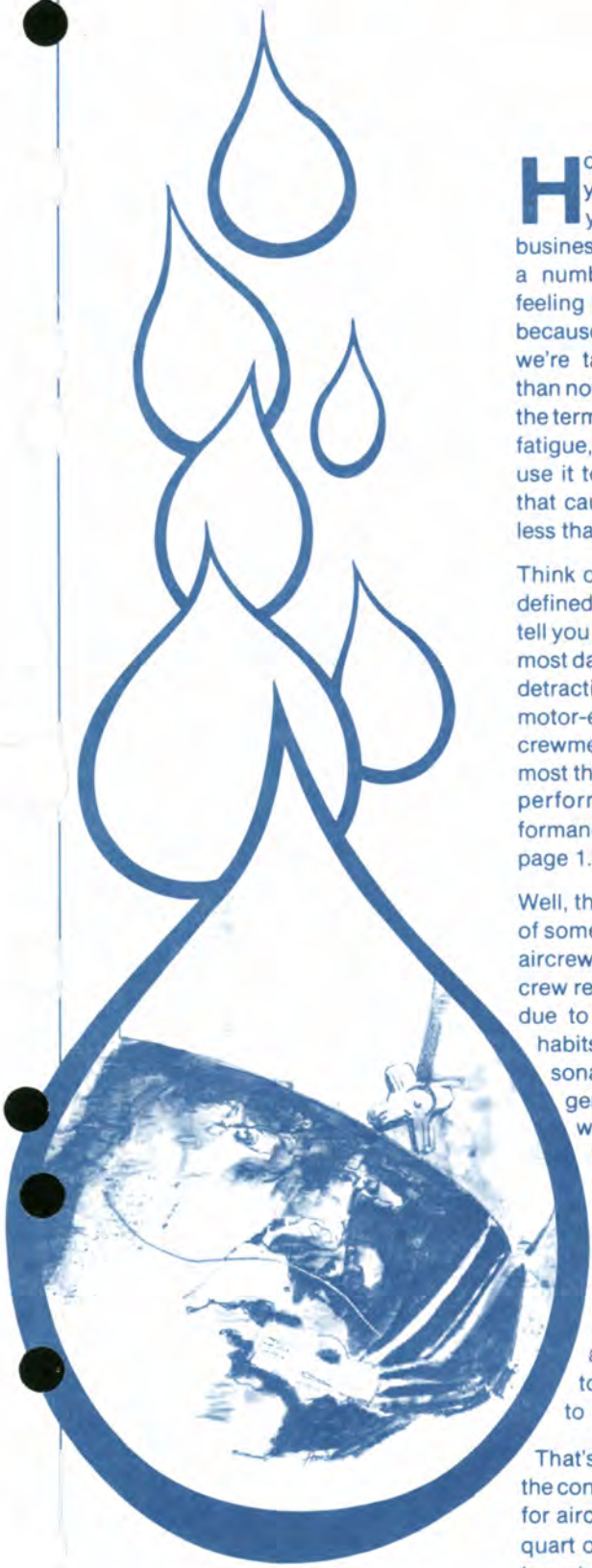
• Safety-of-flight message concerning inspection of UH-1H/V and EH-1H main rotor blades for oversize and/or improperly installed skin patches (UH-1-82-02, 212100Z Jan 82). Summary: A U.S. Air Force aircraft recently had a catastrophic blade failure. Failure may have been caused by an oversize and/or incorrect skin patch repair. Contact: Dick Mooy, TSARCOM, AUTOVON 263-3300, commercial 314-263-3300.

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

Urgent TB

TB 55-1520-244-20-4, dated 13 May 1982, concerning one-time inspection of pitch change link tube assembly for AH-1s has been released.

Quench your fatigue



How many times in your life have you felt like a million bucks? If you make your living in the flying business, you can probably remember a number of times when you were feeling like less than a million bucks because of plain old fatigue. Obviously, we're talking about something more than not getting enough sleep. Let's use the term to include mental and physical fatigue, but, even greater than that, let's use it to sum up all the stress factors that cause you to feel and perform at less than your best.

Think of all the contributors to fatigue defined in those terms! We don't have to tell you aircrewmembers that one of the most dangerous effects of fatigue is the detracting effect it has on your mental motor-eye performance. In fact, most crewmembers vote fatigue as the single most threatening contributor to altered performance: perhaps unsafe performance. [See the mishap review on page 1.]

Well, that's no surprise. Look at the list of some common causes of fatigue for aircrewmembers: long flights, minimal crew rest, noise and vibrations, anxiety due to certain missions, poor eating habits, stress associated with personal life, stress of military life in general, fatigue due to being overweight, smoking, alcohol intake; but of all causes of fatigue, perhaps one of the most treatable causes is plain old dehydration! Notice, we didn't say it was necessarily the biggest contributor to fatigue but that it was certainly one of the most treatable causes since all we need to do is increase water intake to correct the problem.

That's right, dehydration! Consider all the contributing sources of dehydration for aircrewmembers. You lose about a quart of water a day in your urine and bowel movements alone. Sweating in hot weather can cause humans to lose up to an unbelievable 4 quarts an hour. Of course, in the cockpit you won't lose that much but you'll lose some. Then there is a good amount of water lost due to the dehydrating effect of pressurization systems where the humidity can be lowered to that of the Sahara Desert. And how about just due to having your body at altitude? Remember, as you go to altitude, there is less nitrogen, less oxygen, and less water, too. The tendency is for the human body to try to share its water with that virtually water-free atmosphere (at higher altitudes).

This water loss due to the low humidity at altitude increases the rate of another important mechanism of water loss for the body called insensible perspiration: insensible because you don't notice it but it could be called evaporation just as easily. You see, our bodies, which are 75 to 80 percent water, are like wet sponges on the desert, continually losing water through evaporation. The rate of insensible perspiration is increased when the body goes to altitude.

Sure, a lot of this dehydration is "mission-imposed" but some of it is "self-imposed." Right? Like the fact that you probably don't drink enough water in the first place. How many of you routinely ask for water with your dinner? Probably not many of you, and why? Because you want something sweet with sugar in it, right? Sure, like a cola, or iced tea, hot tea, juices, milk, etc.; in fact, almost anything but plain old water. Now come on, you're not W.C. Fields (who would spit out water with disgust when he would mistakenly take it for alcohol.) You know, when the human body gets thirsty, it's already about a quart low and drinking sweetened drinks is sometimes the last thing your body needs, because sugar can complicate the absorption of water in the body. And let's

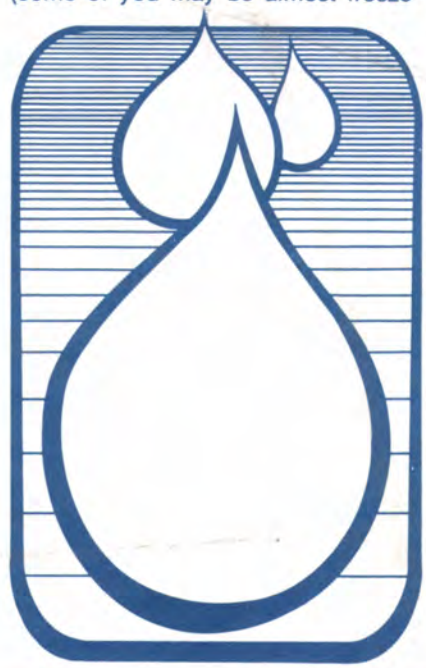
(continued on back page)

Quench your fatigue

not forget alcohol and coffee, both of which can cause the body to lose more water than it gains.

As if things weren't bad enough, be warned that your thirst drive tends to be somewhat diminished at altitude. Your body, which was created to survive on earth, usually loses most of its water by sweating and not by this insensible perspiration or "evaporation" as it's called at altitude. As you sweat on earth, you lose not only water but also lose body chemicals called electrolytes or "salts." The amount of salt and water lost in the sweat changes the concentration of the salts left in the blood which flows throughout the body. As the blood flows through the brain, the brain detects the change in salt concentration and decides that you've been sweating and have lost some water and so you must be "thirsty." For aircrewmembers, that mechanism may be delayed by the fact that the change in salt concentration is not as dramatic when you lost water through insensible perspiration rather than sweating, so your thirst lags behind in many cases.

So you're wondering why haven't you dried up like a piece of jerky by now? Well, fortunately, you get water in your foods, and your body produces water as a by-product of cell respiration as well. Put that together with the water you get the hard way through sweetened drinks, etc., and you manage to remain alive, but you're usually walking around dehydrated to some extent (some of you may be almost freeze-dried) and you no doubt feel the associated fatigue factor due in part to dehydration. Now remember, we're not talking about the average person on the street, although dehydration can be a problem for many other lifestyles in America today as well.



You need to drink more water, folks! Flight surgeons have said that when they hospitalize an aircrewmember they routinely have to add a couple of liters of fluid to him just to "top him off!" Still other docs advocate that crewmembers stop and take a couple of swallows of water from every water fountain they pass. Even the early stages of dehydration can lead to emotional alterations and impaired judgment, not the sorts of changes that go well with flying.

Fatigue through dehydration must be realized and treated. Drink more water and **quench that fatigue**; after all, treating that day-to-day dehydration may be one of the easiest ways to give yourself a better shot at feeling like that million bucks! Go on, have a glass of water if you haven't forgotten how. It's not going to hurt you and we all know you've earned it. ■

—adapted from FLYING SAFETY

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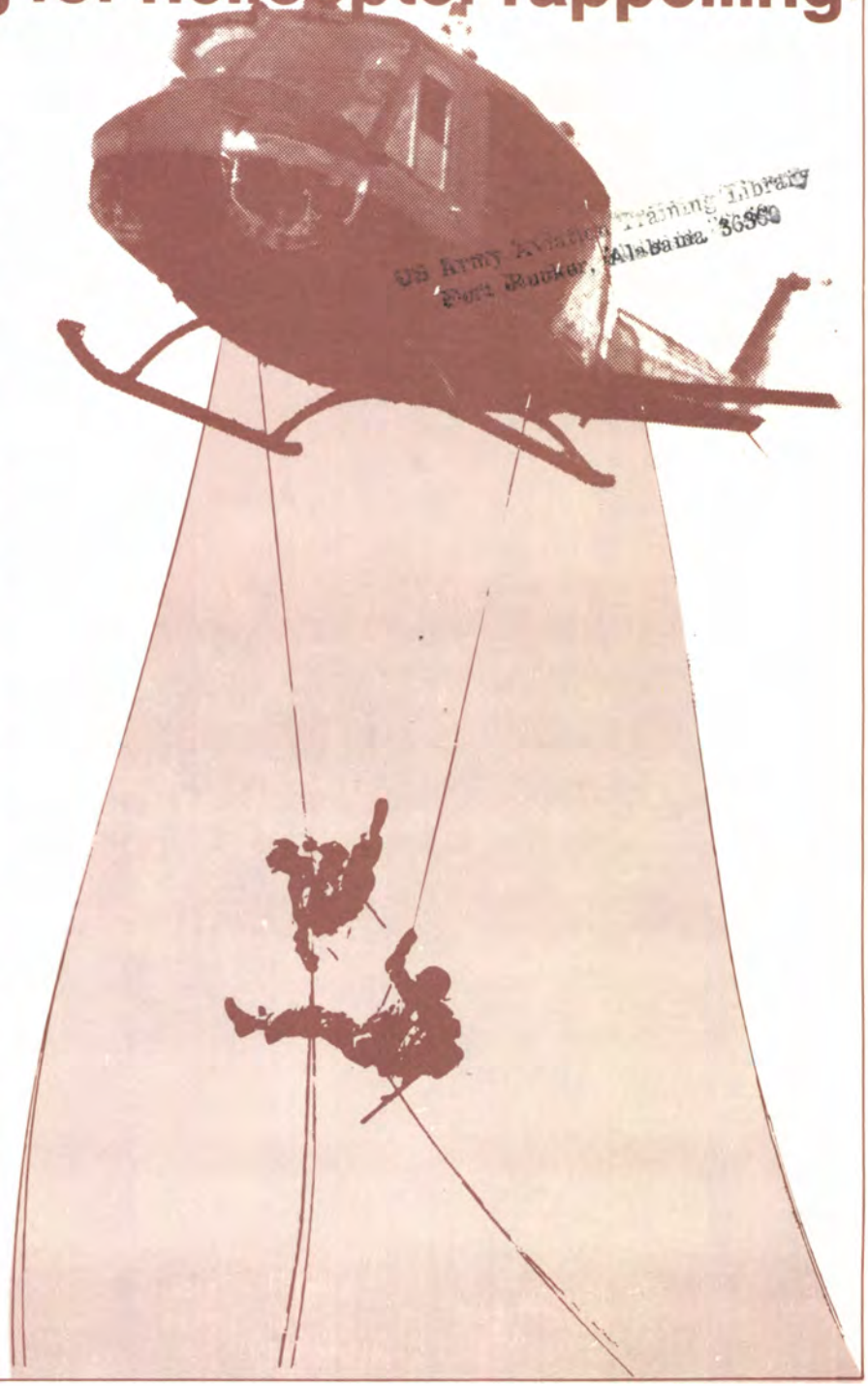
Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 39 □ 14 Jul 1982

Pilot briefing for helicopter rappelling operations



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During a recent helicopter rappelling operation for a high school ROTC unit, a soldier participating in the exercise apparently lost control after exiting the aircraft, descended too fast, and fractured his leg when he hit the ground. The accident involved a UH-1H and was, therefore, considered aviation-related. However, neither the aircraft nor aircrew was found to be a contributing factor. One very important and potentially hazardous fact surfaced several times during the investigation: Four of the six rappellers could not remember receiving any type of safety briefing by the pilots before the rappelling mission. All six could remember a preflight and an en route safety briefing given by the pilots before departure from home base, but nothing thereafter.

This raises an important question that each and every pilot must consider, one that does not necessarily apply just to rappelling operations. The question is **not** "Have you briefed your crew and passengers?" but "Did your crew and passengers hear and understand your briefing?"

While the rappelling team was donning their equipment and rigging the aircraft, they were also being briefed on emergency procedures by one of the pilots. The second pilot was inspecting the rigging. With all this activity going on, could anyone expect the rappelling team members to give their undivided attention to a pilot's briefing? In this case, the team members were experienced rappellers and knew what actions to take in case of an emergency. Rappelling operations were adequately covered in their unit SOP, and they were all knowledgeable of the SOP. But what

(continued on next page)

Helicopter rappelling operations

would have happened if these soldiers had not been experienced in rappelling from an aircraft and a complete or partial power loss had occurred? The results could have been disastrous.

Pilots, it is your responsibility to brief your crew and passengers, and it is also your responsibility to insure they understand everything you say. Stop your passengers from whatever they are doing and make them pay attention. Don't rush your briefing. Cover all applicable areas and repeat them if necessary.

It is virtually impossible to establish a standard checklist to cover every type of mission flown by Army aircraft. Each unit must evaluate the type of missions in which they are involved and incorporate special pilot briefings in their individual unit SOP. In the case of rappelling operations, following is an example of the minimum areas or topics to be covered as a checklist in a unit SOP.

General safety

- FM communications in the aircraft and on the ground will be tested and positive communication established.
- Two-way intercom will be established between the pilots and the rappel master by the use of the aircraft intercom system.
- The rappel master will brief the aviator on this SOP and rappelling procedures.
- The rappel master will be secured in the aircraft with either a "monkey strap" or safety line.
- The safety officer/NCO will establish positive two-way communication with the aircraft pilots.
- There will be no running within 50 meters of the aircraft. During reduced visibility, no running will be allowed.

Aircraft safety

- Students/instructors will wear identification tags and ear plugs.
- Students will wear properly secured steel helmets.
- Sleeves will be rolled down to prevent burns in case of flash fires.
- Approach the helicopter from the front and forward of the rear cargo doors, bending slightly forward at the waist.
- All obstacles and loose debris will be cleared from the rappel site.
- During engine failure, rappellers on the rope will complete their descent as rapidly as possible and move as quickly as possible to the outer side of the descending aircraft. The pilot will attempt to move forward as the aircraft settles to the ground.
- If the rappelling rope becomes knotted or entangled with the rappeller, the pilot will lower the rappeller to the ground.
- If the rope becomes entangled with the ground, the rappel master will release or cut the rope as rapidly as possible, after making **one** attempt to free the ropes.
- Students will not depart aircraft until told to do so by the rappel master as cleared by the pilot.

There will be a different briefing for every mission and situation. Units must tailor briefings to fit their needs and add them to their SOPs. There's always the possibility that the briefing you give and make the soldier listen to may someday save not only his life but yours and others as well. ■

Captain John R. Orkwis
DOFT, Operations Branch
Fort Rucker

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishap □ (H series) While in OGE hover at 20 feet agl and 40 psi torque, pilot applied collective to maintain hover altitude. Engine and rotor rpm began to bleed off, and aircraft settled into trees and came to rest on left side. Aircraft was being operated at or near maximum allowable gross weight, and density altitude was 3,200 feet. 8265.

UH-1 Class B mishaps □ (H series) Copilot allowed aircraft to settle with power during approach. Neither pilot nor copilot could recover in time to prevent hard landing. Aircraft hit the ground and slid to a stop. 8266 □ (V series) IP noticed rotor rpm was at low end of green arc just before initial pitch pull and decided to recover with power. Aircraft hit level and bounced 3 feet into the air. Second contact was made with aircraft about 20 degrees off lane alignment. 8267

UH-1 Class E mishaps □ (H series) Crew entered low-level autorotation at 50 feet agl and 85 knots airspeed. As throttle was reduced, rotor rpm began to decay with engine rpm. About 30 feet agl, IP took control and began to increase throttle. At initial pitch pull, rotor rpm decayed further because engine had not caught up with throttle application. Run-on landing was made. Aircraft slid about 75 yards and stopped. Sprag clutch failed to properly disengage. □ (H series) Rpm dropped during flight and loud popping sounds were heard from engine. Caused by failure of bleed band actuator. □ (H series) Crew smelled fuel fumes. Caused by leaking fuel line. □ (H series) Master caution and transmission oil pressure lights came on. Transmission oil pressure gauge indicated zero. Caused by failure of oil filter gasket. □ (H series) Postflight inspection revealed oil on engine deck. Leak in oil line was caused by deteriorated O-ring.

UH-60 Class E mishaps □ Master caution and No. 2 hydraulic reservoir low lights came on. Caused by failure of pitch SAS actuator. □ No. 2 hydraulic and backup system lost fluid in flight. Caused by crack in pitch trim servo relief valve. □ Main module chip detector light came on. Caused by failure of transmission filler neck.

Attack helicopters

AH-1 Class C mishap □ (S series) Maintenance personnel had adjusted PC links and climbed down from aircraft. Maintenance test pilot asked mechanics if all tools had been removed, but he did not visually check to see that they had. As pilot started aircraft, wrench left on top of blade bounced on blade and knocked hole in blade.

AH-1 Class E mishaps □ (S series) Engine oil pressure light came on. Caused by failure of pressure switch. □ (S series) Copilot started left turn and increased power. Pilot saw torque passing through 95 percent and started to decrease power. Transient torque increased to 103 percent and overtorque light came on. □ (TAH-1S) Front cross tube failed at right skid saddle during landing. Pilot lifted aircraft back into air and then landed on stacked wooden pallets.

Cargo helicopters

CH-47 Class B mishap □ (C series) Pilot was repositioning aircraft on airfield. While taxiing straight ahead, aircraft began uncommanded right turn, pivoting around left forward landing gear. Aircraft turned at least 360 degrees as rear of aircraft began to lift off the ground. Pilot stopped the turn by pulling engine condition levers to "stop." Droop stops on forward head were lost and forward rotor blades hit tunnel cover. 8268

CH-47 Class E mishaps □ (C series) Master caution and No. 2 hydraulic lights came on. Caused by leak in flight boost manifold. □ (C series) Oil began

(continued on back page)

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**4**	**3**
4th Qtr	July	1	0	1-14 July	**2**	**2**
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**43**	**28**

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 82 □ 14 Jul 1982

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, sheet 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 F-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.
- 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 the 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. ■

Correction

STACOM 81, 16 June 1982, referenced an outdated TM for maintenance of skid shoes. TM 55-1520-228-20 was listed as the maintenance authority. The correct manual for OH-58 skid shoe maintenance should have been listed as TM 55-1520-228-23-1, chapter 3, dated 4 August 1978. The replacement of skid shoes while the aircraft is at a hover remains an unauthorized maintenance procedure. ■

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 review: nonaviation fuel

Synopsis

An OH-6 was on a cross-country ferry mission. The pilot landed at an airport to refuel. Gas was obtained from a service station in a nearby town. About 5 minutes after takeoff, the engine failed and the OH-6 was autorotated into small trees.

History of flight

The aircraft, with a pilot and technical inspector aboard, left on the first leg of a ferry flight. The first stop was made about 2 hours later. The OH-6 was refueled, a weather briefing was obtained, and the crew took off on the second leg of the flight.

About 30 miles from their second stop, the pilot decided, because of unexpected headwinds, they would not have enough fuel to get there. They landed at a small airport and found the field unattended. Two old fuel pumps at the airport were locked and vandalized. The crew called the local police and asked them to have someone bring 10 gallons of the highest octane fuel available.

About one-half hour later, a truck from a gas station arrived with 10 gallons of 89 octane motor gas. The fuel was examined by the crew and the aircraft was refueled. The crew did not refer to the TM to refresh their memories on the use of appropriate emergency fuels or for any operating limits or changes in systems operations in relation to their use.

Five minutes after takeoff, the engine failed without warning. The pilot immediately entered autorotation from about 1,000 feet agl by reducing collective pitch. Airspeed was adjusted to 62 knots. There was an open area to the pilot's front that he was unable to reach with the left quartering headwind that was present. An autorotative landing was made among trees 2 to 3 inches in diameter and 15 to 18 feet high. The aircraft remained upright, and both occupants exited with no injuries.

Crewmember experience

The 33-year-old pilot had more than 1,100 rotary wing hours. More than 550 of these were in OH-6 aircraft.

Commentary

The engine failed because the pilot tried to fly his aircraft on other than the prescribed primary or alternate fuel (nonaviation) with the electric fuel boost pump in the off position, contrary to procedures in the operators manual. He was so confident in his knowledge of the operators manual that he did not review the restrictions for use of emergency fuel. When the engine failed at 1,000 feet and 100 knots, the pilot adjusted his autorotation airspeed to 62 knots (minimum rate of descent) instead of 88 knots (maximum glide). By doing this, he denied himself access to an open field that could have been reached by maintaining his airspeed at 88 knots. ■

Mishap briefs

spraying in cargo compartment from aft transmission area. Caused by cracked transmission oil filter housing. ☐ (C series) Master caution and generator lights came on. One generator and one transformer rectifier dropped off line. Caused by broken terminal lug on generator wire.

Observation helicopters

OH-6 Class E mishaps ☐ Engine flamed out during approach for landing. Caused by failure of engine. ☐ Main transmission oil light came on. Caused by failure of transmission assembly.

OH-58 Class E mishaps ☐ (A series) Engine oil bypass light came on. Four quarts of oil had vented out because of clogged check valve. ☐ (A series) Engine oil pressure dropped during flight. Caused by inoperable oil pressure indicator. ☐ (A series) Transmission oil pressure low light came on. Caused by switch failure. ☐ (A series) Engine quit during runup. Caused by fuel contamination. ☐ (A series) Master caution and inverter lights came on. Caused by failure of inverter. ☐ (C series) Engine-out light and low rpm audio activated during landing. Caused by failure of tachometer generator.

Fixed wing

C-12 Class E mishaps ☐ (A series) Right bleed air light came on during climb. As aircraft was descending, left bleed air light came on. Loss of pressure was caused by rupture in plastic tubing that parallels bleed air lines. ☐ (A series) Cabin overpressurized during takeoff. Out-flow valve was cleaned, solving the problem.

T-42 Class E mishap ☐ No. 1 engine oil pressure dropped. Single-engine landing was made. Caused by separation of No. 4 cylinder on No. 1 engine. Cylinder separated where head and base join.

U-8 Class E mishap ☐ (F series) Right main gear would not indicate up and light remained on after takeoff. Caused by failure of actuator gear.

U-21 Class E mishaps ☐ (A series) Oil was seen coming from right engine during climb. Caused by loose oil cap. ☐ (A series) When gear handle was placed in up position after takeoff, right main gear down light remained on. Tower personnel reported gear appeared down. Gear handle was placed in down position and aircraft was landed. Caused by stripped actuator worm gear.

Maintenance

UH-1 Class E mishap ☐ (H series) Master caution and hydraulic lights came on. Clamp holding transmission oil line was loose, allowing transmission oil line to chafe against and wear hole in hydraulic oil line.

C-7 Class E mishap ☐ Right feather button would not hold in during engine runup. Caused by loose electrical lead.

T-28 Class E mishap ☐ Pilot saw dark smoke as he applied power for takeoff. Magneto was set incorrectly, and aircraft had been fueled with jet fuel.

Messages received

• Safety-of-flight maintenance message concerning one-time inspection of UH-60A main transmission beam fastener hardware (UH-60A-82-07, 290830Z Jun 82). UH-60 aircraft, SN 77-22714 through 78-23015, will be inspected for loose hilok rivets in the main transmission beam area.

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

TM changes

Change 26, dated 8 June 82, to TM 55-1520-235-10, for OH-58C helicopters, has been released. ■

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Published by the
United States Army Safety Center
Fort Rucker, Alabama 36362

Volume 10
Number 4
21 October 1981

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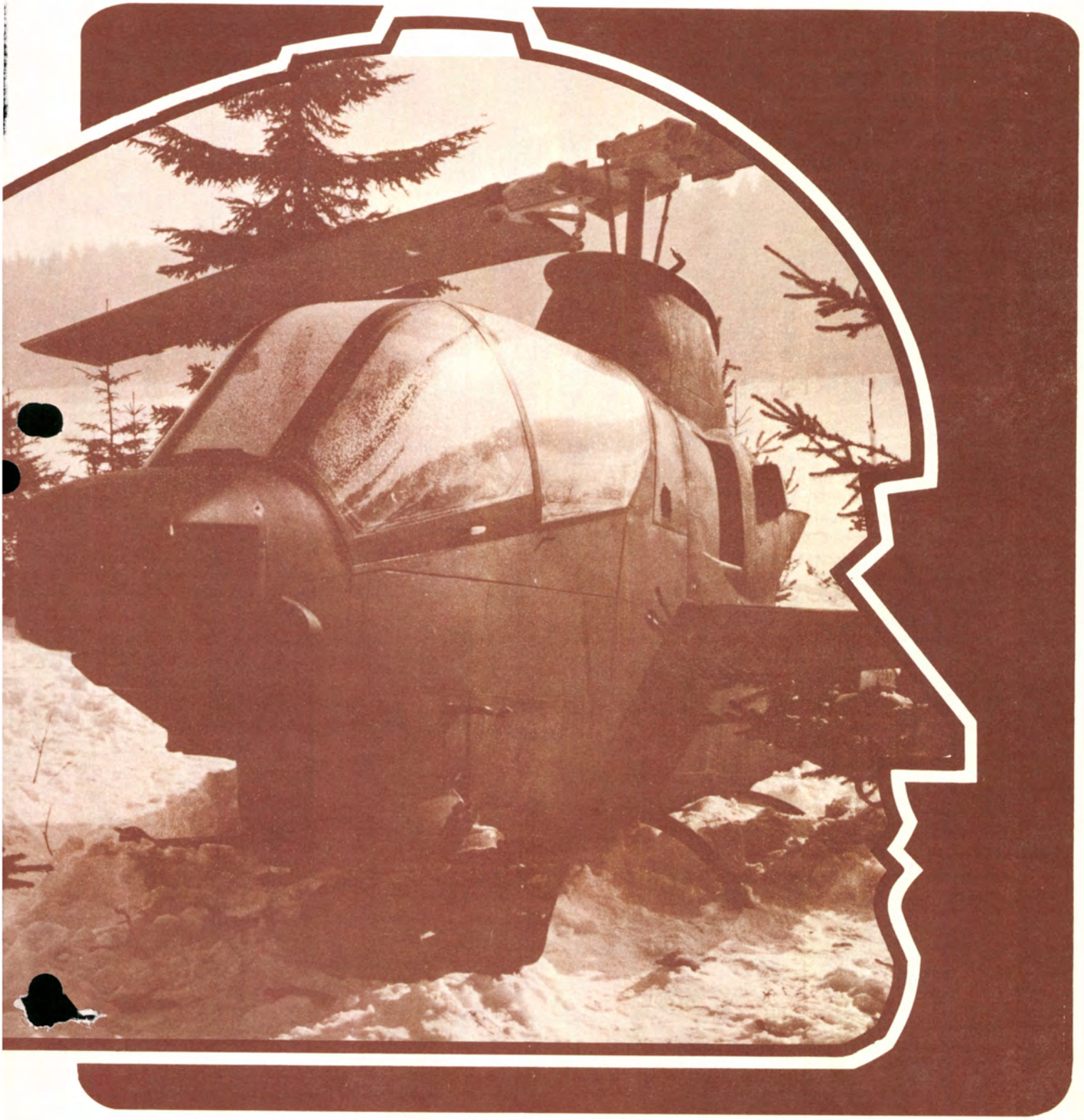

Mishap review

Synopsis

While hovering about 45 feet above the ground, the AH-1S drifted rearward into a 50-foot tree. Antitorque control was lost. The pilot rolled the throttle to the flight idle detent position, partially lowered collective, and applied full collective to cushion the landing. The helicopter slid about 18 inches after hitting the ground.

History of flight

The crew was on a tactical training mission. They had been operating in a tactical environment from a field location for 2 weeks and had been living in tents. The weather was cold.

The crew flew for 5 continuous hours in a combination of NOE and low-level flight modes. They had flown an earlier 1-hour 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.

As the pilot was determining whether or not to land in a field, the nose of the aircraft yawed severely to the right. The pilot decided that the antitorque pedals were ineffective and diagnosed a loss of tail rotor thrust. He then retarded the throttle to flight idle detent and partially reduced collective. Full collective input was used to cushion the aircraft as it settled to the ground.

During the descent, the aircraft turned right about 305 degrees. The main rotor blades hit and chopped through a small tree. The tail boom then hit a small tree, and the aircraft slid aft about 18 inches as it hit the ground.

Crewmember experience

The 35-year-old pilot had more than 1,700 rotary wing hours. Almost 1,100 were in the AH-1. The 33-year-old copilot had almost 800 rotary wing hours, with more than 150 in the AH-1.

Commentary

The pilot was concentrating on the suspected enemy tanks, and the copilot was looking at the 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 fuel for only 5 minutes station time remaining. 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. He was also experiencing mental stress from personal problems and was undergoing psychological therapy.

The unit commander was aware of the pilot's problems but unaware of their overall extent and effect on aviator performance. He did not refer the pilot to a flight surgeon for evaluation or remove him from flight status pending resolution of his personal problems.

The 90 aviation personnel in the area had been without the full-time services of a flight surgeon for about 3 months. The flight surgeon had been transferred and came back to the area only one-half day every other week for flight physicals, etc. This seriously hampered the monitoring of the medical condition of aviation personnel and may have contributed to the continued flight status of the pilot. ■

Selected mishap briefs

uh1 **Class B mishap** ☐ (H series) During hovering autorotation, with student pilot at the controls, aircraft rocked forward. Main rotor blade hit ground. Aircraft landed upright. 8201

Class C mishaps ☐ (H series) Dust from rotorwash caused loss of visual reference on short final to helipad. Aircraft touched down hard on aft portion of landing gear and bounced forward. Cross tubes were bent. ☐ (H series) During runup, as power was applied, torque rose to 20 psi with engine at 6200 rpm. Aircraft spun to left and tail boom hit pickup truck. Aircraft then spun 360 degrees to left and came to rest upright. Tail boom, synchronized elevator, and tail rotor hub, blades, and drive shafts were damaged. ☐ (H series) Pilot was doing an autorotation with 180-degree turn. Just before touchdown, pilot applied additional aft cyclic, causing tail rotor to hit the ground. As pilot applied cyclic, IP grabbed the controls but was too late to prevent tail rotor strike.

Class E mishaps ☐ (H series) Airframe shuddered during shutdown. Caused by malfunction of main transmission quill assembly. ☐ (H series) Preflight inspection revealed main rotor blade skin had separated. Maintenance personnel told crew to tape the area where the skin had separated. Area was taped and aircraft took off. A few minutes later, crew heard loud popping noise coming from main rotor blades. Aircraft was landed in field, where it was found that tape had come off blade. ☐ (H series) Battery produced unusual odor during landing. Caused by cell leakage. ☐ (H series) Master caution light came on during landing. Caused by failure of hydraulic pressure switch.

uh60 **Class E mishap** ☐ Copilot made evasive right turn maneuver to avoid lead aircraft during terrain flight. Pilot took control as aircraft descended into trees. Antenna and stabilator fairing were damaged.

ah1 **Class C mishap** ☐ (S series) Main rotor blade hit two small trees during NOE flight. Copilot was flying aircraft and pilot was looking at map.

Class E mishaps ☐ (S series) Loud whining noise was heard from behind copilot's compartment during flight. A few minutes later, master caution and No. 2 hydraulic pressure lights came on. Postlanding inspection revealed area beneath transmission was soaked with hydraulic fluid and No. 2 hydraulic reservoir was empty. Caused by failure of O-ring in hydraulic cylinder. ☐ (S series) Engine oil temperature increased after takeoff. Caused by failure of oil cooler fan bearing. ☐ (S series) N_2 fluctuated as power was increased and decreased during NOE training flight. Caused by large amounts of grass being picked up by rotor and sucked into inlet screen.

ch47 **Class E mishaps** ☐ (C series) No. 1 transmission hot light came on during runup. Caused by broken wire. ☐ (C series) Pilot noticed utility hydraulic pressure at 2500 psi. Accumulator pressure was 3000 psi.

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	1-21 Oct	**3**	**1**
	November	5	4	November		
	December	1	1	December		
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**3**	**1**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

During descent, APU supply line and dual compensator valve on utility pump started leaking and crew chief smelled something burning. Caused by failure of utility hydraulic pump. □ (B series) No. 1 flight boost fluctuated during hover. Caused by failure of pressure transmitter.

oh6 **Class A mishap** □ Wire strike. Details unknown. One fatality and one major injury. 8202

Class C mishap □ During hover/taxi, IP told pilot to make 180-degree turn to left. Pilot applied left pedal and, after turning about 10 degrees to left, aircraft suddenly began turning to right. Pilot and IP applied full left pedal to stop turn, with no response. IP began slowly lowering collective in an attempt to put aircraft on the ground. As aircraft touched down, it made three 360-degree turns and left landing gear collapsed.

oh58 **Class E mishaps** □ (A series) During approach to LZ along riverbed, copilot saw wire about 10 feet in front of aircraft. Pilot applied cyclic to miss wire, but wire hit lower left front of fuselage. Wire broke on skid cross tubes. Aircraft was landed without further incident. □ (A series) As pilot was shutting down aircraft, copilot got out and heard grinding noise coming from oil tank compartment. Caused by failure of No. 1 tail rotor drive shaft bearing. □ (A series) N_2 and rotor rpm slowly decreased during hover, and low rotor rpm audio sounded. Caused by failure of governor assembly.

c7 **Class E mishap** □ No. 1 engine backfired after liftoff. Caused by cracked No. 4 cylinder.

c12 **Class E mishaps** □ (A series) After takeoff, oil was seen streaming along top of No. 2 engine nacelle . Oil cap was closed incorrectly, resulting in oil siphoning. □ (A series) Gear transit light remained on and gear warning horn sounded after takeoff. When gear handle was placed in down position, light went out and horn was silenced. Caused by failure of landing gear squat switch actuator arm. □ (A series) Pilot had no brakes on right main gear during landing. Aircraft was stopped with reverse thrust. Caused by failure of five seals, allowing fluid to escape from brake.

ov1 **Class C mishap** □ (RV-1D) As crew was recovering from high speed dive, pilot noticed sudden change in cockpit air pressure. Left overhead hatch glass had broken, causing fragmentation damage to left and center vertical stabilizers.

Class E mishap □ (D series) Pilot heard loud noise from No. 1 engine side and noticed N_2 at max and torque in bottom of scale. No. 1 engine was shut down. Prop would not feather, and pilot could not maintain altitude with max power on good engine. Aircraft was landed at airfield. Caused by failure of No. 1 propeller governor.

u8 **Class E mishap** □ (F series) Loud bang was heard from right wing when pilot retracted gear. Right gear continued to indicate in transit. All efforts to lock gear failed. As aircraft was flown about 1 foot above runway, left gear was bumped against runway. Second bump caused right gear to lock and landing was completed. Caused by failure of landing gear actuator.

u21 **Class E mishaps** □ (A series) Pilot saw fuel siphoning from left nacelle fuel cap during flight. Cap was not secured correctly. □ (A series) IP lost both brakes during taxi. Pilot tried to help with braking action, but he also had no brake control. Aircraft ran off taxiway. Caused by failure of shuttle valve.

(continued on next page)

Mishap briefs

Maintenance

uh1 **Class E mishaps** □ (H series) Airspeed indicator did not register during takeoff. Indicator was installed incorrectly. □ (H series) Egt varied considerably during runup. Caused by loose cannon plug on egt harness. □ (H series) After APU start, pilots told crew chief to disconnect APU. Crew chief drove tug away from aircraft with plug still in aircraft receptacle. Skin around APU plug door was torn and APU prongs were bent.

ch47 **Class E mishap** □ (C series) No. 1 engine fire light came on during runup. Caused by chafed sensing element.

oh58 **Class E mishap** □ (C series) About 1 minute after engine start, pilot and copilot smelled fumes. Copilot exited aircraft and saw fuel coming from engine deck drain. Caused by incorrect installation of fuel filter O-ring.

c12 **Class E mishap** □ (A series) Aircraft vibrated during takeoff. Inspection revealed carrier and lining assembly loose and rubbing dog ears on wheel assembly.

Messages received

• Safety-of-flight technical message on one-time inspection of UH-60A engine output shaft assembly (UH-60A-81-27, 051800Z Oct 81). Summary: During inspection of an engine output shaft assembly, a 1-inch crack was discovered on one of the lobes where the disc pack coupling is riveted to the shaft. In a separate incident, an aircraft was in cruise flight when a whine was heard, followed by a high frequency vibration and a loud noise. Investigation revealed that the forward support tube which surrounds the engine output shaft assembly was completely severed. Two lugs of the transmission input module flange were broken and the disc pack coupling which secures the input module flange to the engine output shaft was destroyed. The elastomeric gimbal which secures the transmission input module to the forward support tube was cracked. This safety-of-flight message outlines UH-60 assemblies and components to be inspected. Contact: Ronald Branson, AVRADCOM, AUTOVON 693-1661, commercial 314-263-1661.

• Correction to safety-of-flight message UH-60A-81-27 (091515Z Oct 81).

• OV-1/RV-1 message concerning conversion of propellers and propeller control systems to MIL-H-83282 hydraulic fluid (051430Z Oct 81).

• Safety-of-flight maintenance notice concerning AH-1S tail rotor pitch change horn retaining nuts (AH-1-81-31, 081400Z Oct 81).

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

Pen flares deficient

Change 8, dated 1 Sep 81, to Air Force Technical Order 11A-1-1, states that L119 pen flares (foliage penetrating), lot number MBA 5-4, are suspended from further issue and use pending investigation. The flares have a deficiency which causes them to explode immediately after launching. ■

Life of products extended

According to a message from USAMMA, Fort Detrick, the following water purification tablet lot numbers have been extended until August 1983: 1311-695 and 1311-696.

The following lots of amyl nitrite inhalants manufactured by James Alexander Corporation have been extended until August 1982: 2783, 2788, 2789, 2793, 2796, 2797, 2799, 27910, 27911. ■

Stacom

Maintenance mistakes

STACOM generally addresses areas related to the operation of Army aircraft, especially where standardized procedures are in question. This article, however, is directed at our maintenance counterparts and their "standardized procedures," commonly called "by-the-book maintenance."

Whenever an aviator disdains standardized procedures, he becomes a prime candidate for inclusion in the Army's aviation mishap statistics. An aircraft mechanic who ignores by-the-book maintenance will eventually have the product of his work listed in those same mishap statistics. FLIGHTFAX, 9 September 1981, listed the following four maintenance mishaps:

• UH-1 Class C Mishap - Grinding noise was heard from tail rotor drive shaft cover after engine shutdown. Screwdriver was found under No. 2 drive shaft section.

• AH-1 Class C Mishap - Crew heard unusual noise from tail boom area during flight. Postflight inspection revealed screwdriver had been left under tail rotor drive shaft cowling, causing damage to drive shaft.

• AH-1 Class C Mishap - When 42-degree gearbox was checked during preflight, pilot noticed pair of pliers under No. 4 tail rotor drive shaft and damage to drive shaft and clamps.

• CH-47 Class C Mishap - Postflight inspection revealed No. 3 drive shaft was scored by resilient mount bolt which had lodged under drive shaft. Bolt had been removed during phase inspection and a new one installed. Old bolt was left in tunnel area.

The four errors listed above were each capable of inflicting far greater damage or injury. They are indicative of inattention to proper maintenance procedures on the part of maintenance personnel and acceptance of substandard performance by their supervisors.

What say we get back to basics and tighten up that quality control? ■

AH-1 power limitation in EMER

DES is informed that some of our Cobra jocks are unaware of the severely limited performance of Cobra power plants when operating in EMER position. One aviator has even attempted a takeoff in EMER mode; the unsatisfactory result was not surprising. Chapter 2, "Engine Fuel Control System," states that the EMER position permits the pilot and gunner to manually control the engine rpm. This statement in TM 55-1520-234-10 is followed by a note saying: "During operation in EMER position of governor fuel control mode, torque available may be up to 14 psi less than is available while operating in GOV AUTO position."

A similar note in TM-1520-236-10 states: "A maximum of approximately 78% torque is available in the EMER position due to limited fuel flow."

In either case, it is evident that upon being forced to go to EMER position, the aviator is, for all practical purposes, in an entirely different aircraft. Further flight under such drastically reduced power conditions may not be possible, or a conventional landing may be out of the question. Certainly, no takeoffs under such power restrictions should be atempted unless some great emergency dictates otherwise. There is no training takeoff situation that falls into an emergency category. Finally, TC 1-136, Attack Helicopter ATM, does not describe takeoffs with the governor switch in the EMER position. ■

NOE/NH/NVG Qualification

There appears to be considerable confusion among the trainers, supervisors, and administrators of field units regarding NOE/NH/NVG qualification, as a result of initial entry aviator training conducted at USAAVNC, Ft Rucker. Aviators will be considered qualified under the following criteria:

a. Aviators graduating from the ORWAC/WORWAC program of instruction after 1 September 1974 are considered to be NOE qualified.

b. Aviators graduating after the 175-40 program of instruction (Class 77-35/36, 9 March 1978) are considered to be NH qualified.

In addition to the foregoing qualification criteria, the new aeroscout 12-week program of instruction will produce aviators who are NH/NVG qualified. The first class is projected to graduate 15 January 1982. ■

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.

If it can happen, it will

Who would ever imagine a normal service mission could end in an impossible emergency. Whatever the probability, the alert aviator must always function on the premise that "if it can happen, it will."

A C-12 crew was taking off from their home base when one of the generators failed. They elected to continue the IFR mission with one generator inoperative. The crew knew each generator was capable of handling the electrical load. About 30 minutes into the flight, the unexpected occurred—the second generator failed. No problem; there was still another source of electrical power—the battery. No doubt you can visualize what happened next in this calamity of errors. Yes, the battery failed. A total electrical failure—what do you do now? This situation could have been avoided if the crew had taken immediate action to resolve the initial deficiency.

Let's make a quick analysis of this situation that couldn't happen. Would you as the pilot have made the decision to continue the mission? The operators manual states: "Either generator is capable of carrying the full load of normal aircraft electrical equipment." This is a positive point to continue the mission. However, the operators manual also states: "Two operative generators are required equipment for IFR flight." Does this revoke the positive factor of the generator capabilities? The reply should be yes. Although the operators manual states the aircraft can be flown VFR with one generator inoperative, AR 95-33 states the primary mission of the C-12 is to carry passengers/cargo under instrument flight rule conditions day or night into high density air traffic control zones and into known icing weather conditions.

With this additional data available to assist you in making your decision, would you as the pilot have made the decision to continue the flight? If your reply is in the affirmative, let's examine an additional factor of this mishap. The initial emergency occurred during takeoff roll at the unit's home base of operation. Should this have been a factor in the decision process? Every available bit of information should be incorporated into the decision process to formulate the best conclusion.

It would appear from all the factors analyzed that the mission should have been aborted. From a safety standpoint, it is inconceivable that any individual would elect to initiate a mission with an existing malfunction.

Point of contact at the Safety Center on fixed wing matters is Major Fox, AUTOVON 558-3913/4198. ■

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Mishap review: failure to follow procedures

Synopsis

The crew of a UH-1V heard a loud banging sound during a maintenance test flight. The aircraft yawed to the right, and the pilot immediately entered autorotation. After landing hard, the aircraft bounced and slid 35 feet onto the edge of a field.

History of flight

The maintenance test pilot preflighted the aircraft three days before the actual flight. The day of the flight, the pilot walked around the aircraft, checked the fluid levels, and removed and secured the main rotor tiedown. The pilot and technical observer then took off and flew to a maintenance test flight area.

The test flight was routine until the pilot began the vibration analysis check about 1,900 feet agl. He chose not to do the out-of-ground-effect hover portion of the check because of gusty winds. As the pilot accelerated through 100 knots, he heard a loud bang, and the helicopter vibrated and yawed to the right. The pilot suspected he had an engine failure and entered autorotation. He did not verify engine failure by checking the rotor tachometer or the N_1 gas producer.

The aircraft streamlined with a slight left yaw and nose-down attitude. The pilot then realized that the antitorque pedals would not move and that the engine was operative. He did not try to regain control in cruise flight as stated in the operators manual and remained in autorotation. The pilot began a deceleration above 100 feet. About 50 feet, the aircraft began to rotate to the right. Initial pitch was pulled. The aircraft settled to the ground, and all remaining collective pitch was pulled. The aircraft then bounced and slid 35 feet, coming to rest upright in the edge of a field.

The technical observer sustained a back injury, and the pilot sustained an elbow abrasion.

Crewmember experience

The 31-year-old pilot had almost 1,000 rotary wing hours. Most of these were in the UH-1, with almost 200 hours in the UH-1V. *(continued on next page)*

Operation alert

A new FLIGHTFAX feature, "Operation Alert," starts with this issue. This new feature will be a regular addition to FLIGHTFAX and will always appear on page 5. This page is designed to be cut out and displayed where pilots will see it often. Each "Operation Alert" will focus on a critical aircraft system problem and will contain recommended corrective actions to be taken immediately. ■

Failure to follow procedures

Commentary

The left side engine cowling came off in flight and hit the tail rotor. Both tail rotor blades and hub assembly separated from the aircraft, resulting in complete loss of tail rotor thrust. The engine cowling came off because the top front latch of the cowling was incorrectly latched on top of its bracket, which provided a gap of about one-half inch between the top of the fuselage and the cowling, allowing the airstream to enter under the cowling and forcing it from the aircraft.

The pilot failed to follow procedures during the preflight inspection of the aircraft. At no time did he latch or physically check the security of the cowling. When he inspected the aircraft 3 days before the mission, he did not secure the cowling and was not aware of who did or if anyone did. The crew chief had not latched the cowling and was not involved in the preflight. The technical observer did not assist in the preflight and did not notice the latches.

If the pilot had done his preflight in accordance with established checklist procedures, he would have discovered the gap between the fuselage and engine cowling. He was known to take shortcuts, perform unauthorized maneuvers, and not go "by the book."

Once the accident sequence started, the pilot did not take the time to identify his problem, which had all the indications of a loss of tail rotor thrust. Instead, thinking only of engine failure, he immediately entered autorotation and rolled off the throttle. The pilot's actions were affected by a lack of proficiency in emergency procedures, mental conditioning by a recent mishap to react to an emergency by entering autorotation, and confusion.

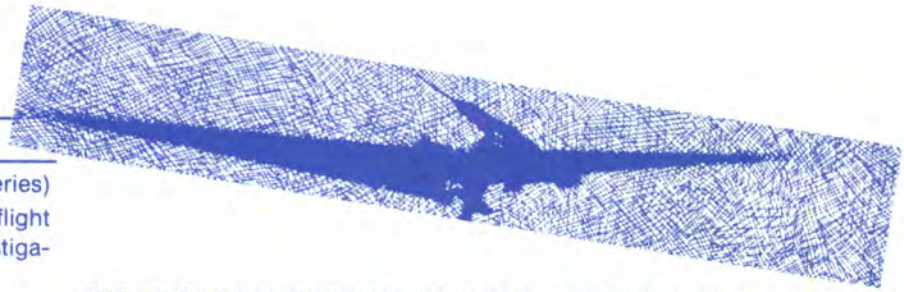
During the descent, the pilot could not move his antitorque pedals and realized he was having an antitorque problem. He tried to control the left yaw by applying throttle, but he got no response. He did not realize until he was on the ground that the lack of response was due to the throttle being in the flight idle position.

The pilot initiated a deceleration at 125 to 150 feet agl to obtain a zero ground-run autorotation instead of 75 feet agl in accordance with the operators manual. He did not consider the increased rate of descent produced by the high deceleration or the 17- to 26-knot tailwind and applied only the amount of initial collective pitch for a standard autorotation. This was insufficient to check the high rate of descent.

Although the pilot had demonstrated poor judgment during recent Class E and C mishaps in which he was involved, the platoon and company commanders were not fully aware of his failure to follow prescribed procedures. They did not know that the pilot had allowed nonrated crewmembers to fly the aircraft and had engaged in low-level flights along rivers, about 10 feet above the water. The pilot's last Annual Aviator Proficiency and Readiness Test revealed he needed further training on antitorque procedures. He had also failed a written examination on emergency procedures. No action was taken by the unit to provide additional training or upgrade the pilot's knowledge of emergency procedures. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

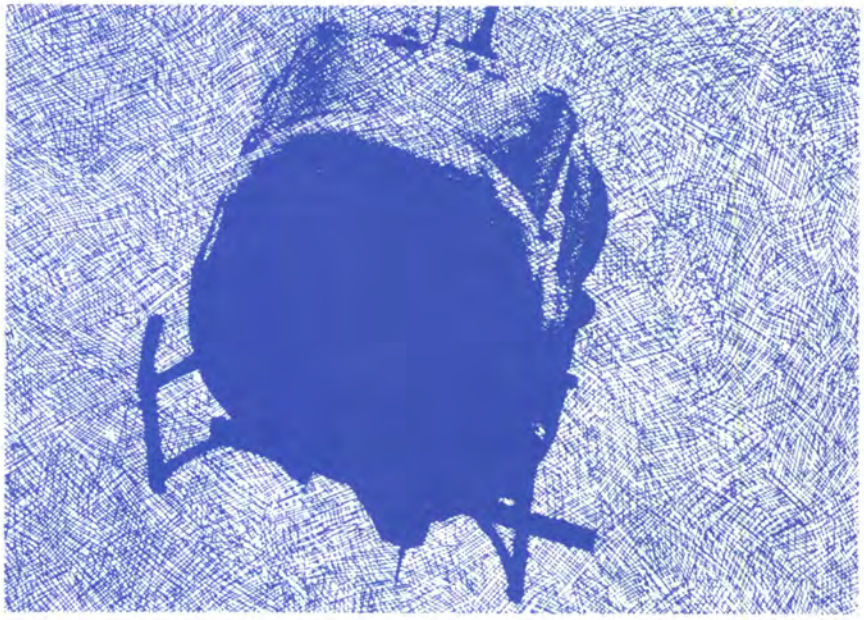


Utility helicopters

UH-1 Class A mishap □ (H series) Aircraft lost main rotor system in flight and crashed. Two fatalities. Investigation is in progress. 8269

UH-1 Class C mishap □ (H series) Postflight inspection revealed that oil had been discharged from 42-degree gearbox because of incorrect placement of oil cap. Gearbox was changed because it was not known how long it was operated without oil. Preflight inspection had been done by qualified TI and pilot. □ (H series) Pilot and medic collapsed after landing at civilian hospital. Aircraft was on medevac mission. Medic and crew chief had been performing CPR on patient for 30 minutes. Temperature inside aircraft was 130° F. Crewmembers had not consumed enough water for environmental conditions. Pilot had flown 4 hours and had one precautionary landing.

UH-1 Class E mishaps □ (H series) Controls stiffened and master caution and hydraulic lights came on. Decision was made to return to airfield. During return flight, collective bounce became so severe that copilot controlled collective and pilot controlled cyclic. During final approach, pilot controlled both the cyclic and collective, with assistance by the copilot on the collective. Short running landing was made. Hydraulic line from servo had broken at fitting and separated from sleeve. □ (H series) Strong electrical odor in flight was caused by failure of main inverter. □ (H series) N_2 needle rose above rotor tachometer needle by 200 rpm during takeoff. Caused by failure of dual tachometer. □ (H series) Engine oil temperature rose during flight. Caused by failure of flow control thermostat. □ (H series) Hydraulic and master caution lights came on, followed by stiff hydraulic controls. Left lateral irreversible valve was leaking.



Attack helicopters

AH-1 Class C mishap □ (S series) Pilot pulled initial pitch at 25 feet during autorotation to sod. IP told pilot to hold what he had and cushion at 5 feet. Pilot pulled cushioning pitch at 8 feet and added aft cyclic. Tail skid hit ground, causing main rotor to flex down and strike tail rotor drive shaft and cover, severing drive shaft.

AH-1 Class E mishaps □ (S series) As rpm reached 6100 during runup, engine rpm needle started irratic movements, then went to zero. Caused by sheared engine tachometer generator shaft. □ (S series) Copilot's torque gauge indicated 8 percent lower than pilot's during final approach. Caused by failure of torquemeter transducer. □ (S series) Pitch channel SCAS pitched up during flight. Caused by failure of pitch SCAS transducer.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Pilot heard loud whine and noticed No. 2 engine PTIT approaching 800° C. Caused by failure of variable inlet guide vane. □ (C series) No. 2 flight boost gauge fluctuated and bled off to zero. Caused by ruptured O-ring in flight boost system. □ (C series) Rotor tachometers fluctuated and dropped to zero during climbout. Caused by failure of tachometer generator.

Observation helicopters

OH-6 Class A mishap □ Pilot flew to a field site and picked up artillery forward observer. After takeoff, passenger indicated he was having difficulty communicating with pilot through intercom system. Landing was made, problem corrected, and flight continued. On landing

at destination, pilot told passenger not to depart aircraft until he could help him. Passenger either ignored or did not hear instructions and proceeded to leave aircraft. Passenger walked into tail rotor (operating at full rpm) and sustained major injuries to his head and upper torso. 8270

OH-6 Class C mishap ☐ Main rotor severed tail boom during standard autorotation.

OH-6 Class E mishaps ☐ Copilot's greenhouse window blew out and hit main rotor blade during left turn. ☐ Post-flight inspection revealed fire extinguisher was not on board.

OH-58 Class C mishaps. ☐ (A series) Pilot pulled pitch too early during autorotation and aircraft landed hard. ☐ (A series) While pilot was hovering aircraft during NOE flight, he asked copilot what their position was on the map. Pilot looked down and to the left to see where the copilot was pointing on the map. His body movement caused cyclic to move to the left. Aircraft drifted left and main rotor blade hit tree branch. ☐ (A series) Pilot was landing at field site surrounded by trees. Aircraft was brought to OGE hover to insure clearance while descending into trees. Torque was about 70 psi. Aircraft started to descend into trees with strong wind gusting from the left. Torque was increased, but it only slowed the descent and did not stop it. Torque was increased some more and left pedal turn was made into the wind. Torque was 94 psi for 2 seconds. N_2 started to bleed and low audio activated. As aircraft cleared trees, collective was lowered and N_2 returned to 103 percent. Engine is being changed because of overtorque.

OH-58 Class E mishaps ☐ (A series) Rock or stick hit main rotor blade during hover, causing tear in blade. Three other aircraft were hovering in near vicinity, causing rotorwash. ☐ (A series) High frequency vibration developed in pedals and airframe during hover taxi. Caused by failure of drive shaft hanger bearings.

Fixed wing

C-12 Class E mishaps ☐ (A series) Power levers were reduced during descent and No. 2 torquemeter froze at 40 percent. Circuit breaker shorted on torquemeter. ☐ (D series) Cabin door caution light came on during climbout. Caused by faulty microswitch.

OV-1 Class E mishaps ☐ (D series) No. 2 oil temperature gauge fluctuated during flight. Caused by failure of gauge. ☐ (D series) Failure of signal data converter caused faulty readings on cockpit display.

U-8 Class E mishap ☐ (F series) Engine ran rough during landing. Plunger assembly froze, bending push rod and causing exhaust valve to tear itself out of valve guild, which caused cylinder failure.

U-21 Class E mishaps ☐ (A series) No. 1 engine fuel boost pressure fluctuated and then dropped to zero. Caused by failure of fuel boost pump. ☐ (A series) When gear handle was raised after takeoff, unusual noise was heard from landing gear area and in-transit lights remained on. Landing gear was lowered manually. Caused by failure of gear actuator. ☐ (J series) Immediately after takeoff, pilot and copilot noticed that top front cowling on No. 2 engine rose up about 6 inches in the rear. Cowling latch was incorrectly secured.

Maintenance

UH-1 Class E mishaps ☐ (V series) Master caution light came on during takeoff. Caused by loose cannon plug. ☐ (H series) Master caution light came

(continued on back page)

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**3**	**3**
4th Qtr	July	1	0	1-21 July	**1**	**3**
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**41**	**29**

Operation Alert

OH-58 tail rotor spin phenomena

OH-58 accidents are on the increase. This increase is attributed primarily to the loss of tail rotor effectiveness under certain conditions. So far this fiscal year, five OH-58A tail rotor spin accidents have been reported.

Accident profile

The pilot's transition training did not include oral instructions by the IP on loss of tail rotor effectiveness under certain conditions. Operating at or near maximum gross weight and low airspeed, the pilot will attempt to hover below 100 feet agl. The accident will happen during a 180-degree right turn through downwind conditions (5 knots or greater).

Actions to take

Work is ongoing to identify the causes of the OH-58 tail rotor spin phenomena and to develop programs for near-term and long-term solutions. In the meantime, take the following actions:

Commander

Have your personnel take the following actions immediately to reduce the potential for tail rotor spin accidents.

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

Make sure that during all flight training the OH-58 tail rotor spin phenomena is covered in detail with OH-58 pilots.

Operations officer

Make spot checks to insure that all operational OH-58 pilots are up to date concerning the tail rotor spin phenomena **before** being assigned to missions.

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

Mishap briefs

on during runup. Wire behind master caution light was positioned incorrectly, causing it to ground out.

AH-1 Class E mishap □ (S series) Fuel indicator turned 360 degrees during flight. Caused by loose wire.

CH-47 Class E mishap □ (C series) Transmission oil hot light came on. Caused by broken wire on transmission temperature bulb.

U-21 Class E mishap □ (A series) When landing gear handle was placed in up position, light in handle and gear horn activated. When gear handle was placed down, safe indication was noted. Safety switch was out of adjustment.

Messages received

• Safety-of-flight maintenance mandatory message concerning service life for and return of UH-60A main rotor blade tip caps (UH-60A-82-10, 081430Z Jul 82). Summary: Main rotor blade tip cap failures have been reported. Fatigue cracks occur in the bend radius of the aluminum rib where the balance weights are secured. A service life is imposed to assure integrity of this part. A newly designed tip cap, P/N 70150-09107-049, NSN 1615-01-131-9767, is available which will have a 20,000-hour service life. Contact: Robert Lawyer, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Maintenance information message revising the inspection limits of the hot metal plus plume IR suppressor (MIM-82-AH-1-01, 090730Z Jul 82).

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

Defective flight jackets issued

U.S. Army Support Activity message 071433Z Jul 82, subject: Maintenance Alert for Jacket, Cold Weather, requests the following maintenance alert data be disseminated to all units.

• Army flight personnel are advised of a possible hazardous situation created by issue of cold weather jackets, NSN 8415-01-074-9413 through 9427, that have inadequate antistatic treatment. These jackets were issued as a replacement for the medium weight flyer's jacket, NSN 8415-00-217-7387 series.

• The defective jackets issued from September 1981 through February 1982 can be identified by checking the bottom closure for the following markings on cartons shipped from Memphis depot: Lancer Clothing Corp., Contract No. DLA-100-80-C-2439; partial shipment No. 8 thru 23, containers No. 834 thru 5373 inclusive.

• Issues made to Army flyers from the above containers should be recalled. Flyers are not to wear jackets near volatile fluids nor munitions.

• An attempt should be made immediately to locate these defective jackets and to request disposition by means of a message to Commander, Defense Personnel Support Center, ATTN: DPSC-TSEB, Philadelphia, PA. ■

Correction

Reference the item in the 12 May 1982 FLIGHTFAX on defective flight glasses. While regulations do not explicitly require individuals who need corrective lenses to fly with a spare pair, that is the intent in issuing two pair. If yours should break, you need that extra pair. ■

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 41 □ 28 Jul 1982

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OH-58 tail rotor spin accidents increasing

Since 1973, 18 OH-58A accidents have been attributed to the loss of tail rotor effectiveness. These accidents resulted in four fatalities and property damage of $2½ million. So far this fiscal year, the OH-58A has been involved in five tail rotor spin accidents, with one fatality and five major injuries. On the average, a tail rotor spin accident is occurring every 75,000 flight hours, and the trend is on the increase.

Cause factors for these accidents were many, but the predominant ones were inadequate OH-58 unit transitions, lack of familiarity with the OH-58's flight characteristics, insufficient information in the operators manual, and marginal antitorque control.

Everyone associated with the OH-58 agrees that it has a marginal tail rotor control system and that design improvements are needed. The Army Materiel Development and Readiness Command is working to identify the causes of the tail rotor spin phenomena and to define programs for near-term and long-term solutions. Changes to the operators manual, which will be released shortly, will address these problem areas and hopefully help reduce the number of accidents.

Analysis of tail rotor spin accidents indicates that commanders, supervisors, instructor pilots, and the aircrew are also at fault in many of the accidents. More often than not, the particular maneuver that resulted in a tail rotor spin accident was not required for successful completion of the mission being flown. One common thread running through most of the OH-58 tail rotor spin accidents concerns the placement of the aircraft in a configuration from which the pilot could not recover because of low altitude. All too often, we find that the pilot was trying to hover 10 to 15 feet above 50- to 60-foot trees with an adverse wind. When the aircraft began to spin to the right, the pilot was unable to reduce collective and fly out of the spin because of his close proximity to the trees. It is not the scout pilot flying NOE who is having the tail rotor spin accident. It is the pilot assigned to a support unit, who has not had adequate training in low-altitude, low-airspeed flight, who turns to the right under downwind conditions.

OH-58 tail rotor spin accidents

Many of our most recent tail rotor spin accidents have involved pilots with little or no experience in the OH-58. Investigations revealed that the pilots received inadequate unit transitions, did not have a working knowledge of the flight characteristics of the OH-58 and were assigned missions that they were not properly trained to perform.

When missions are assigned to recently transitioned OH-58 pilots, it must be remembered that, in most cases, the pilot will be by himself flying an aircraft that is normally flown closer to its design gross weight than any other aircraft in the Army inventory. It must also be remembered and considered when missions are assigned that the recently transitioned OH-58 pilot usually does not have the luxury of an experienced PIC to guide him while he is gaining valuable experience. If he encounters an emergency situation or, because of unfamiliarity with the OH-58's flight characteristics he places the aircraft in a dangerous situation, there is seldom another, more experienced pilot available to assist as would be found in a Huey or Chinook.

A prime example of this type accident occurred when the pilot on a service mission, operating at or near maximum gross weight, made a low-level, low-airspeed sharp right turn 20 feet above 75-foot trees so that his passenger could check the camouflage of their area. The attempted 180-degree right turn was made through a downwind condition of approximately 8-knot winds. The aircraft began a spin to the right and spun five or six times before entering the trees. It hit the ground right side low, nose down, and was destroyed. The pilot had recently completed a unit transition and had accumulated about 3½ flight hours before the accident. The IP had not covered the loss of tail rotor effectiveness during the transition.

The average OH-58 PIC is younger and less experienced than his counterparts who are flying Hueys and Cobras. You might say that the Huey and Cobra are more complex and harder to fly; thus they require a more experienced aviator. This may or may not be true, but there are few, if any, missions more demanding than flying NOE near or at max gross weight, single pilot, in an OH-58. The OH-58 crew in a terrain flight profile still consists of a single pilot who must navigate, communicate, locate and identify targets, control gunships, and, at the same time, fly the aircraft in an extremely hazardous environment.

Operations Officers Select your aviators for missions based on the difficulty of the mission and their capabilities instead of on a first-come basis. Use your unit IPs for crew selection since it is their job to monitor the pilots in the unit, and they are the ones who know the pilots' capabilities.

Instructor Pilots Work with the unit aviators and pass on some of the knowledge that you have gained over the years.

Commanders and Platoon Leaders Work with your operations officer and instructor pilots and assure that the pilot assigned the mission can safely perform it. Check your unit transition and training program and make sure that you are not only meeting the minimum requirements specified in the Aircrew Training Manual, but that you are conducting realistic training which will provide a new OH-58 pilot with the knowledge he will need to safely perform his mission.

Army National Guard TV Tape 46-2, "How Not to Crash—By the Book," is available at your local Training and Audiovisual Support Center. This TV tape addresses the flight conditions and maneuvers associated with OH-58 loss of tail rotor effectiveness accidents, the preflight performance planning process, new ATM (TC 1-137) procedures applicable to the subject, flight techniques to follow to avoid the condition, and corrective action to take if loss occurs. This tape should be mandatory viewing for all OH-58 pilots.

The OH-58 tail rotor system may not be as effective as we would like. But if we all work together as a team and improve our knowledge of the aircraft's limitations, the tail rotor spin accident trend can be turned around. ■

Major Van Kaiser
Observation Systems Manager
Army Safety Center

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) During practice NOE deceleration, pilot did not add enough power as he began the maneuver to allow him to rotate the aircraft around the tail rotor. Tail rotor hit ground, and 90-degree gearbox and tail rotor separated. Aircraft spun rapidly to right. IP took control and autorotated to hard landing. □ (H series) As aircraft was hovering for takeoff, No. 4 section of tail rotor drive shaft separated from No. 5 hanger bearing assembly. Aircraft spun 45 degrees to right. Hovering autorotation was made. Inspection revealed failure of bolt through cotter key hole, allowing coupling plates to separate. □ (H series) Main rotor blades hit top of tree during approach to LZ, damaging blades. □ (V series) Aircraft hit parking revetment during rearward hover out of parking space. Right elevator was bent and torn. Ground guide was not used. □ (V series) Right skid touched down on helipad light, damaging skid tube and shoe.

UH-1 Class E mishaps □ (H series) Pedal binding on base leg was caused by magnetic brake failure. □ (H series) Noise was heard from rear of aircraft. Caused by failure of No. 2 and No. 4 tail rotor hanger bearings. □ (H series) Engine oil pressure light came on. Caused by failure of oil pressure relief valve. □ (H series) Ten minutes into test flight, low fuel light came on. Aircraft returned to airfield. Tower personnel told pilot aircraft was smoking or leaking fuel. Caused by failure of poppet valve in fuel valve manifold, allowing fuel in left tank to pump to rear and then overboard. □ (H series) Master caution and hydraulic lights came on. Caused by failure of hydraulic pressure switch. □ (H series) N_2 tachometer fluctuated during hover. Caused by failure of tachometer generator.

UH-60 Class C mishap □ Main rotor blades hit tree branch during approach to confined area.

UH-60 Class E mishaps □ No. 1 reservoir low light, tail rotor servo caution light, and primary servo caution light came on. Caused by failure of pressure switch. □ No. 2 hydraulic low light and master caution light came on. Caused by leaking cap on pitch trim assembly.

Attack helicopters

AH-1 Class C mishap □ (S series) Ninety-degree gearbox required replacement because of rpm overspeed during test flight maneuver.

AH-1 Class E mishaps □ (S series) Airspeed indicators did not function during takeoff. Caused by broken pitot tube line. □ (S series) Ammeter indicated 225 amps during landing. Caused by overheated battery. □ (S series) Engine oil bypass light came on during runup. Ball valve failed at upper fitting, causing loss of engine oil.

Cargo helicopters

CH-47 Class E mishaps □ (B series) Rotor tachometer generator failed during hover/taxi. □ (C series) No. 1 generator light came on. Caused by broken wire under No. 5 tunnel cover. □ (C series) Speed trim actuators retracted and speed trim a.c. circuit breaker popped when airspeed was decreased. Caused by failure of actuator cylinder.

Observation helicopters

OH-6 Class C mishap □ IP and maintenance test pilot were on refresher training flight. Pilot did two autorotations, the first resulting in excessive ground run and the second terminating with power. Low rotor rpm and a near vertical descent on the third autorotation caused main rotor blades to chop off tail boom. IP was late with corrective action.

OH-58 Class E mishaps □ (A series) Master caution and starter generator lights came on during approach. Caused by failure of generator. □ (A series) Master caution and fuel boost lights came on during engine start. Caused by failure of fuel pump. □ (A series) Master caution and inverter lights came on during hover/taxi. Caused by failure of inverter.

Fixed wing

C-12 Class E mishaps □ (A series) Crew had no control of cabin pressurization during climb. Caused by malfunction of pressurization controller and outflow valve. □ (A series) Copilot noticed hole in No. 2 engine exhaust stub during landing. Caused by failure of N_2 power turbine blade.

T-42 Class E mishap □ Both alternator breakers tripped and ammeters indicated full load during flight. Caused by failure of battery cells.

U-21 Class E mishaps □ (A series) Copilot noticed fuel siphoning around inspection plate on left nacelle tank. Caused by failure of fuel sensing unit gasket on nacelle tank. □ (RU-21H) No. 2 oil pressure fluctuated. Oil pressure transmitter was replaced.

OV-1 Class C mishap □ (D series) Left main landing gear indicated unsafe. Tower personnel said gear appeared to be down. Pilot inadvertently jettisoned external fuel tanks while activating emergency landing gear extension pressure.

Maintenance

UH-1 Class E mishaps □ (H series) Stiff cyclic control was caused by out-of-rig synchronized elevator. □ (H series) N_2 rpm surged several times during flight. Inlet guide vanes were out of adjustment and interstage bleed actuator was operating sluggishly.

AH-1 Class E mishap □ (S series) Squealing sound was heard from hydraulic pump, followed by illumination of No. 2 hydraulic light. Oil was found on turret area after shutdown. Caused by incorrect torque of hydraulic fitting.

CH-47 Class E mishap □ (C series) Hydraulic fluid was seen leaking from right front wheel brake line. Caused by loose hydraulic line fitting.

OH-6 Class C mishap □ Tail boom had just been replaced and maintenance ground run was in progress. As N_2 reached about 80 percent, vibration was noticed. Main shaft assembly separated, damaging bulkheads in aft fuselage.

OH-58 Class E mishaps □ (A series) When pilot applied power for takeoff, he noticed decrease in turbine speed, delayed rotor rpm, and low rpm audio. Fittings on pneumatic lines connecting fuel control and governor had backed off. □ (A series) Minimum beep N_2 was 96 percent during runup. Caused by incorrect N_2 rigging.

T-42 Class E mishap □ Fuel odor was detected during takeoff. "B" nut had backed off, allowing fuel to leak between line and flange at rear of fuel flow gauge.

U-21 Class E mishaps □ (A series) When landing gear handle was placed in up position, light in handle and gear horn came on. Safety switch was out of adjustment. □ (RU-21H) Airspeed indicators read slower than actual speed on takeoff. Pilot static drain was left open following maintenance on aircraft.

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**3**	**3**
4th Qtr	July	1	0	1-28 July	**1**	**2**
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	29	Total to Date	**41**	**28**

Messages received

- Safety-of-flight maintenance mandatory message concerning installation of ALQ-147 top hat and bracket assembly at wing station 3 and station 4 on OV-1D and OV-1D(C) aircraft (OV-1-82-01, 151830Z Jul 82). Summary: Two units have reported chafed wire bundles affecting 15 aircraft. Chafing of the wire bundle against the aileron control rod had progressed through the harness sleeve down to the individual wire insulation. In all cases, chafing was attributed to improper installation of bracket assembly and/or improper installation of cover plate. One-time inspection will be performed. Contact: Floyd Simpson, TSARCOM, AUTOVON 693-3325, commercial 314-263-3325.

- CH-47 maintenance information message concerning update of selected serialized rotor head assemblies (MIM 82-47-06, 131930Z Jul 82). Message provides an updated table 1-18 for TM 55-1520-209-23-1.

- Correction to safety-of-flight message concerning one-time inspection of UH-1 servo wire drive rod and wear limits at the wire drive lever connecting point (UH-1-82-03, 160845Z Jul 82).

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

Shortfax

Sixteen 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.

Sixteen aviators received the Broken Wing Award from April through June 1982.

Broken Wing Award recipients

WO1 John E. Bell
E Company, 501st Aviation Battalion, APO New York 09326

Major Terrence A. Brock
Aviation Division, DPT/SEC, Fort Leavenworth

CW2 Robert G. Brogdon
Company D, 7th Combat Aviation Battalion, Fort Ord

CW3 James G. Brosnaham
14th Company, DOFT, Fort Rucker

CW3 Larry E. Bruce
Company E, 47th Aviation Battalion, St. Paul, Minnesota

CW3 John E. Cleary
Directorate of Evaluation and Standardization, Fort Rucker

CW3 Jeffrey C. Clink
C Troop, 2d Squadron, 10th Cavalry, Fort Ord

Captain David W. Dodd
1st Staff and Faculty Company, Fort Eustis

CW3 John E. Heller
Davison Army Airfield, Fort Belvoir

CW3 Gerald D. Miles
Aviation Division, DPT/SEC, Fort Leavenworth

CW3 John G. Miller
14th Company, DOFT, Fort Rucker

CW2 Barry E. Penny
14th Company, DOFT, Fort Rucker

WO1 James G. Porter
36th Engineer Group, Aviation Section, Fort Benning

CW3 John L. Potts
Directorate of Evaluation and Standardization, Fort Rucker

Marvin L. Radloff
Doss Aeronautical Services, Inc., Fort Rucker

CW3 Charles J. Restivo
Davison Army Airfield, Fort Belvoir

Put it in writing

The Army spends a great deal of money each year training, maintaining, and supporting a very capable force of dedicated technicians to keep our aircraft in flyable condition. All of this effort is useless unless a direct line of communication between the aircraft operator and the aircraft maintainer is established and kept open. This link depends almost solely on pilots making clear and concise 2408-13 entries indicating discrepancies created, detected, or suspected during operation.

Normally, before a piece of equipment fails entirely through either design defects or laws of nature, it will give some warning. Bearings worn beyond tolerance, unusual vibrations, unusual sounds, distinct visual differences, decrease of aircraft performance, abnormal instrument readings in flight, and many, many other things that only pilots can report are key signs of impending failure. If maintenance is not informed of these conditions, some of them may go undetected until the aircraft enters its timed inspection (phase). At that time, with luck and skill, it will be detected during inspection or test flight for the release from maintenance.

But there is a lot of flying time between inspections (as much as 150 hours on some aircraft), and that time leaves a lot of exposure for failures to occur if maintenance is not made aware of abnormal conditions by a simple 2408-13 entry stating the problem. An example of this came to light in a recent accident investigation. Five pilots who had flown the aircraft stated the engine was known for its tendency to have compressor stalls. One of the five indicated that he had recorded the problem on two or three occasions. None of the other pilots had written up the deficiency because they did not feel it was significant!

Put it in writing, and continue to do so. ■

John R. Arrington
Directorate of Industrial Operations
Fort Rucker

(continued on back page)

Shortfax

Landing gear actuator failures

Several U-8/U-21 landing gear actuator failures have been reported recently. One U-8 accident involved incorrect reassembly of the landing gear actuator. Although there is a **caution** in the U-8 maintenance manual that stresses proper reassembly, the following **note** was omitted from the disassembly instructions. **Note:** "To aid in reassembly, mark nut assembly with tape or a grease pencil prior to removal, or screw the nut assembly all the way in and count the number of revolutions required to unscrew the nut assembly from the actuator." This note will appear in a future change to TM 55-1510-201-35.

A second accident involved materiel failure of the nut and tube assembly. Analysis of failed nut and tube assemblies enabled CCAD to identify a manufacturing process deficiency. TSARCOM is in the process of procuring an improved nut and tube assembly. However, the best way to prevent an accident caused by failure of the landing gear actuator is to inspect and lubricate the actuator in accordance with the appropriate TM. ■

Open cowling causes accident

The starter generator garlock seal had been replaced on an OV-1, and a maintenance operational check was in order. The maintenance officer preflighted the aircraft and decided to start the No. 1 engine using battery power. He also decided to leave the chin cowling in the down position.

As the pilot moved the power lever to flight idle, he felt the aircraft shake and saw the chin cowling being hit by the propeller. The wire rope which had been holding the chin cowling away from the propeller had broken, allowing the chin cowling to swing unrestrained into the path of the turning propeller.

The aircraft had accumulated 142 flight hours since completion of the last phase inspection. The wire rope was found to be okay during that inspection. Although the rope clearly showed wear and fraying over a period of time, its deteriorated condition was never noticed during numerous daily and preflight inspections, probably because the rope is not a listed item of inspection.

TM 55-1500-204-25/1 directs that access doors will be secured by closing or removing before ground testing turbine-powered engines. Neither the maintenance officer nor the maintenance supervisor was aware of the procedures in the technical manual. The unit SOP did not outline specific guidelines for ground maintenance operational checks.

The decision by the maintenance officer —supported by the supervisor—to do the maintenance check with the chin cowling open was the cause of the mishap. If the cowling had been removed or latched as directed in the technical manual, the accident would not have occurred. ■

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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What commanders can do for accident prevention

Commanders have the responsibility of assuring the safety of all personnel and equipment under their command. This responsibility goes with the territory whether commanders are aviation rated or not. To succeed, commanders must have a complete knowledge of the capabilities of their personnel. Accident files contain many instances of junior grade and warrant officers flying into accidents because someone of higher rank wanted some particular task accomplished under circumstances beyond the capabilities of the aircrews assigned to the mission. Young (and not so young) aviators are known to waive judgment and attempt to exceed their limitations or the limitations of their aircraft when this occurs.

You can provide clearly defined policies and objectives for aircraft accident prevention. By your attitude and example, you can generate the enthusiastic professional approach to flying necessary to accomplish your missions.

You can assure that training does not end for your aviation personnel simply because they have graduated from flying or other schools and have been rated or awarded aviation occupation specialties. Schools can only provide instructions in the fundamentals of skills and sufficient practice to provide a sound basis on which further training and experience can build greater proficiency. This training and experience **must** be provided at unit level.

It is a proven fact that no commander has the time to personally plan, implement, and carry out a full-time aircraft accident prevention program. Commanders must delegate certain authority to staff officers and supervisory personnel within their command. Many accidents are the result of inadequate direction and control in this chain of command. When such accidents occur, they indicate operational weaknesses which require corrective action in the selection, training, and supervision of those to whom command authority is delegated.

You can continuously review your accident prevention program by assessing the following points:

Do all personnel know our prevention efforts are enthusiastically supported by me, that all activities receive my personal interest and that I closely monitor the results?

Do all members of the command understand that education, continuous training, and close supervision are essential to our prevention efforts?

Was my aviation safety officer selected on the basis of experience, ability, and education in the field of aviation safety?

What commanders can do for accident prevention

Does he report directly to me? Does he successfully accomplish assigned missions? Are his methods effective?

Do we have an effective system for exposing operational hazards? Are appropriate actions taken to eliminate hazards? Do all personnel understand and appreciate the advantages of hazard reports?

Are prevention council meetings regularly scheduled to discuss potential problem areas? Do the appropriate staff officers fully participate?

Are regularly scheduled safety meetings conducted for crewmembers and maintenance personnel? Do all attendees participate freely in these meetings?

Command attention to the following points will help to prevent accidents, particularly the repeaters, in all units.

• Remember that **any** aviator, under the proper combination of stressful circumstances, may commit errors leading to an aircraft accident. There is no pilot error "type." The safety-minded commander will be alert to changes in the behavior of his aviators as they react to the stresses of flying.

• Be firm with aviators whose accidents were caused by pure carelessness, inattention or willful misbehavior. Experience has shown that only positive corrective actions will prevent them from repeating.

• Closely supervise aviators who have just had pilot error accidents.

• Be very selective in appointing aviators with less than 150 to 200 hours pilot time since graduation from flight school as instructor pilots. Exercise extreme care in reinstating IP orders once they have been revoked.

• Carefully guide those pilots who are eager to excel, to succeed, and to accomplish missions at any cost. These can be desirable qualities, but, without proper guidance, this type of eagerness can adversely affect an aviator's judgment. It is also wise to question your own attitude in this regard.

• Supervise aviators with one or more Class C mishaps caused by pilot error as closely as if they had been Class As. The difference is often measured in inches or seconds. The mistakes involved are often identical.

• Carefully evaluate and supervise aviators who have had personal error accidents but will not admit to themselves or others that the fault was their own. Since they do not blame themselves, they do not learn a lesson and will continue in their erroneous ways.

• If an aviator's accident is suspected of involving lack of experience, proficiency, or currency, he will very likely repeat it if faced with the same situation without being given additional guidance, training, and practice.

• Be alert to the opinions of each pilot's ability, as expressed by other pilots. When one aviator says of another, "He is an accident waiting to happen," it is usually correct.

• Examine your own aviation accident prevention program. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Aircraft was shutting down, with throttle at engine idle. Truck with antenna was driven too close to aircraft. Main rotor blade hit and broke antenna. Blade was torn 1 inch from tip. □ (H series) IP and pilot were on training flight. As pilot entered hovering autorotation, he made erratic cyclic movements and over-applied right pedal. Aircraft began to turn to right with nose-low attitude. IP tried to correct, but aircraft touched down with right lateral drift while still in slight turn to right. Cross tube and skid tube were damaged.

UH-1 Class E mishaps □ (M series) Crew smelled burning rubber during landing. They checked aircraft over, found nothing, and took off again. After takeoff, rpm dropped. Caused by engine deice valve shorting out and burning up solenoid and cannon plugs. □ (H series) Trunnion bearing race separated from housing and disintegrated, causing severe vertical vibration during flight. □ (H series) Loud noises were heard from engine, and aircraft yawed to left. Caused by compressor and stator erosion. □ (H series) Aircraft touched down and seven passengers got out. One of the passengers, a rated aviator, was about 90 feet from the aircraft when he heard a popping sound and saw an object hit the dirt about 5 feet from him. The object was an abrasion strip scarf joint shield. Passenger told crew to shut down. Inspection revealed that both scarf joint shields were missing from white main rotor blade. Caused by failure of adhesive used to attach the shields. □ (H series) Aircraft yawed four times to left and then to right. N_2 fluctuated and rpm limit light came on. Caused by failure of fuel control.

Attack helicopters

AH-1 Class E mishaps □ (S series) Grinding noise was heard during shutdown. Gouges found on nonrotating portion of swashplate were caused by drive links striking swashplate. □ (G series) Hydraulic pressure light came on. Caused by failure of pressure switch. □ (S series) Rpm audio activated intermittently during flight. Caused by failure of tachometer generator. □ (S series) Engine oil pressure fluctuated during hover. Caused by pressure transducer failure.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Normal engine trim became unresponsive to inputs. Caused by failure of N_2 actuator. □ (C series) Master caution and aft transmission lights came on during landing. Caused by transmission failure. □ (B series) No. 2 engine oil pressure gauge went to 180 psi after aircraft landed. Caused by failure of oil pressure transmitter.

Observation helicopters

OH-6 Class E mishap □ Crew noticed high TOT and landed. Caused by failure of threads in scroll, allowing coupling to separate.

OH-58 Class C mishap □ (C series) As aircraft passed between two trees during NOE flight, one main rotor blade hit one of the trees. Tip cap on blade was damaged.

OH-58 Class E mishaps □ (A series) N_2 maximum increase was 102 percent during runup. Caused by failure of overspeed governor. □ (A series) N_2 bled

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**3**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	1-4 Aug	**0**	**0**
	September	1	0	September		
	Total for Year	43	29	Total to Date	**42**	**28**

off during hover. Caused by malfunction of power turbine governor. □ (A series) Master caution and hydraulic pressure lights came on, and controls became stiff. Caused by failure of hydraulics.

Fixed wing

C-7 Class E mishaps □ Engine vibrated and smoke was seen coming from exhaust stacks. Caused by cracked No. 11 cylinder head. □ Main landing gear wheel locked up during landing and outboard left main landing gear tire blew.

C-12 Class E mishaps □ (D series) Aircraft began overpressurizing at 20,000 feet. Cabin could not be dumped because of passenger with ear block. Slow letdown was made with passenger on oxygen. Caused by failure of pressurization controller. □ (A series) Right bleed air light came on during climbout. Caused by broken bleed air sensing line.

OV-1 Class E mishaps □ (D series) No. 1 hydraulic pressure went to zero. Caused by hydraulic pump failure. □ (D series) Pilot noticed slight right yaw. IP took control and landed. Bolt in filter had failed, allowing filter to unseat and oil to drain from engine. □ (D series) Hydraulic pressure was lost during landing. Caused by cracked hydraulic line.

Maintenance

UH-1 Class E mishaps □ (H series) Master caution light came on. Caused by loose wire on 90-degree gearbox chip detector plug. □ (H series) Both airspeed indicators remained on zero after takeoff. Two lines were reversed on roof-mounted pitot tube. □ (M series) Rpm increased and could not be reduced with governor increase/decrease switch. Wire from governor control was loose, resulting in shorted circuit breaker.

AH-1 Class E mishaps □ (S series) Transmission oil temperature fluctuated and then went to 15 psi. Wire to gauge was loose. □ (S series) Transmission oil bypass light came on. Small steel washer was found inside boot, causing system to short out. □ (G series) IP and pilot felt binding in pedals during NOE flight. Trash from bird nest was lodged in tail rotor silent chain. Crew chief did not insure fairing plug was installed while aircraft was parked on ramp.

OH-58 Class E mishap □ (C series) Engine oil bypass light came on. Oil line from oil cooler to engine oil bypass valve was loose at engine oil cooler end.

Messages received

- Correction to safety-of-flight maintenance mandatory message concerning service life for and return of main rotor blade tip cap (UH-60A-82-10, 201015Z Jul 82). This message corrects message dated 081430Z Jul 82.

- Maintenance information message permitting use of the silicone sealing compound G624 on electrical cannon plugs and terminals (MIM-82-GEN-MEA-01, 201015Z Jul 82).

- UH-60 maintenance information message concerning special inspections which will be forthcoming in a future update of TM 55-1520-237-23-4 (MIM-82-UH-60A-03, 231050Z Jul 82).

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

FY 83 USASC safety courses

The Aviation Safety Officer Course (7K-F12) is an 8-week course. The objective of this course is to provide education and training in the techniques of managing an effective Army Safety Program as it applies to aviation accident prevention. Major subjects include technology, aviation medicine, accident investigation, hazard identification, human factors, ground safety, and safety management. Active Army and Reserve component commissioned officers and warrant officers and DA civilians may attend. Commissioned and warrant officers must be rated aviators and presently assigned or programed for assignment as an aviation safety officer. Obligated service for active duty commissioned and warrant officers is 1 year.

Course Schedule		
Class	Start	Close
83-1	6 Jan 83	4 Mar 83
83-2	28 Apr 83	24 Jun 83
83-3	4 Aug 83	30 Sep 83

The Aviation Accident Prevention Course for NCO (7K-F13) is a 2-week course. The objective of this course is to train noncommissioned officers and DA civilians in the techniques of supervising Army aircraft accident prevention programs from the standpoint of the firstline supervisor. Graduates will be able to identify and control hazards primarily in the maintenance and operations areas. Active Army and Reserve component enlisted personnel in grades 6 through 9 in aviation-related MOS (67 series, 68K, 71P), performing at firstline supervisory level in Army aviation units and staffs; DA civilians GS-5 through GS-9; and U.S. Army wage grade maintenance supervisors may attend. No previous formal safety training is required. Obligated service for active duty enlisted personnel is 9 months.

Course Schedule		
Class	Start	Close
83-1	4 Oct 82	15 Oct 82
83-2	11 Jul 83	22 Jul 83

The Aviation Accident Prevention Course for Officers (7K-F14) is a 2-week course. The objective of this course is to train Army aviator personnel of the Active Army and Reserve component in the techniques of establishing and conducting aircraft accident prevention programs and in conducting aircraft accident investigations. Active Army and Reserve component commissioned and warrant officers, DA civilians, and maintenance contractor civilians assigned to safety, maintenance, or operation positions may attend. Commissioned and warrant officers must be rated aviators. There is no obligated service.

Course Schedule		
Class	Start	Close
83-1	14 Mar 83	25 Mar 83
83-2	20 Jun 83	1 Jul 83

The Range Safety Course is an 8-day course, designed to provide training which emphasizes the safety aspects of ranges and range operations for full-time safety careerists and military personnel having responsibility for developing, enforcing, approving, or advising on such matters. This course

FY 83 USASC safety courses

is recommended for all civilian safety careerists in grades GS-7 through GS-13. The course is also considered appropriate for military personnel having range safety or range control responsibilities.

Course Schedule		
Class	Start	Close
83-1	1 Nov 82	10 Nov 82
83-2	31 Jan 83	9 Feb 83
83-3	25 Apr 83	4 May 83

The Army Safety Program Management Course (7K-F9) is a 2-week course. This course is designed to provide safety training emphasizing advanced safety management and staff techniques to Army civilian and military personnel engaged in full-time safety management or key safety-related duties of considerable responsibility and scope. This training is recommended for civilian directors/managers, GS-11 and above, and is appropriate for field grade officers in safety management positions at division, installation, or higher levels. These personnel will be expected to remain assigned to safety-related positions for a period of at least 1 year.

Course Schedule		
Class	Start	Close
83-1	28 Feb 83	11 Mar 83
83-2	16 May 83	27 May 83

The Fundamentals of Army Accident Prevention Course (7K-F15) is a 2-week course. This course enables the student to develop and program accident prevention measures appropriate to intermediate levels of tactical or installation organizations on a full-time basis. The course is recommended for civilian safety careerists in grades GS-5 through GS-9. This course is also appropriate for company grade officers, warrant officers, and noncommissioned officers E5 and above. Selected civilian wage board personnel in supervisory positions will also benefit.

Course Schedule		
Class	Start	Close
83-1	17 Jan 83	28 Jan 83
83-2	11 Apr 83	22 Apr 83
83-3	15 Aug 83	26 Aug 83

The Risk Management Course for Commanders is a 1-week course that will enable commanders to integrate the safety function into all aspects of unit management, using a systems approach to accident prevention. The course is designed for Active Army and Reserve component 05 and 06 commanders. The course is also appropriate for supervisors of installation safety directors.

Course Schedule		
Class	Start	Close
83-1	18 Oct 82	22 Oct 82
83-2	21 Mar 83	25 Mar 83
83-3	18 Jul 83	22 Jul 83

The Aviation Safety Officer Refresher Course is a 1-week course designed to provide aviation safety officers with training on the latest safety management concepts. The course is exportable and will not be taught in residence. The course is recommended for school-trained aviation safety officers who graduated from an ASI-producing Aviation Safety Officer Course prior to October 1981. ■

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 43 □ 11 Aug 1982

Mishap review: loss of tail rotor effectiveness

Synopsis

The OH-58A was flying about 40 feet above some trees in 14- to 20-knot winds and light turbulence. During a right turn, the aircraft began spinning to the right. It hit the tops of the trees and crashed in a nose-down attitude.

History of flight

The PIC and copilot took off from their airfield and flew to a field site to pick up two passengers. The PIC was in the right seat and the copilot in the left seat.

Arriving at the field site, the copilot got out of the aircraft to brief the passengers. The briefing included only the method used to enter and exit the aircraft, use of seat belts, and how to use the ICS radio box. One of the passengers, a company commander, briefed the copilot on the convoy cover and route reconnaissance mission.

The passengers and copilot strapped themselves in the aircraft. The crew then took off and flew low level along the route. They made several slow turns of varying angles of bank but did not try to hover out of ground effect because of the winds and light turbulence. About 1½ hours into the mission, the crew tried to make a right turn over a wooded area to observe the convoy. It is not known who was on the aircraft controls, the PIC or the copilot.

The OH-58 was being operated about 40 feet above 80- to 90-foot trees, at an airspeed below effective translational lift. When the crew tried to make the right turn, the aircraft spun to the right at least two times. Attempted recovery was ineffective, and the main rotor blades hit the tops of the trees. The blades separated and the fuselage pitched nose down and hit on its nose on the side of a hill.

Loss of tail rotor effectiveness

The PIC and copilot were killed. One of the passengers lived for about 3 hours and then died. The company commander survived, with major injuries. The wreckage was discovered about 7 hours after the aircraft crashed.

Crewmember experience

The 39-year-old PIC had more than 2,500 rotary wing hours, with more than 750 in OH-58As. The 39-year-old copilot had almost 2,300 rotary wing hours, with more than 1,000 in OH-58As.

Witness accounts

The only witness to the accident was the company commander, who was seated in the aft right passenger/cargo compartment seat. He said the crew was very much aware of the winds and light turbulence. He heard no unusual noises, felt no unusual vibrations, and heard no conversation between the crew immediately before or during the accident sequence. He did not know which crewmember was on the flight controls.

The survivor pulled himself free of the wreckage. Because of his injuries, he was unable to walk. The other passenger was hanging in his seat by his seatbelt. The company commander cut him loose, and he struggled for about 3 hours, trying to get free of the wreckage, before he bled to death.

During the more than 7 hours between the time of impact and rescue, the survivor used pen gun flares and a strobe light in an attempt to contact searchers. He used his pistol grip to pound on the aircraft fuselage, and this is what finally attracted the attention of the rescuers. As the passengers had not received a briefing on the location and use of survival equipment, they were unaware that both pilots were carrying PRC-90 survival radios in their individual survival vests and did not know where the first aid kits were located.

Commentary

The OH-58 operator placed his aircraft in an environment conducive to loss of tail rotor effectiveness. While operating at an altitude of about 40 feet above 80- to 90-foot trees, a gross weight of 2,764 pounds, and density altitude of 2,280 feet, and with winds of 14 to 20 knots, the pilot allowed his airspeed to decrease below effective translational lift while attempting a right turn. As a result of entering this critical environment, he demanded more power than the engine was capable of providing. This led to an engine and main rotor droop and loss of tail rotor effectiveness. The operators manual states that the OH-58 tail rotor exhibits a tendency to lose effectiveness under various combinations of the conditions mentioned above.

The engine did not produce power when demanded because of a combination of a dirty compressor and a defective power turbine governor. This allowed the N_2 and main rotor rpm to droop when the power required exceeded power available. The tail rotor simultaneously became ineffective.

A briefing by the crew on the location and use of survival equipment, as required by AR 95-1, might have led to the survivor using the PRC-90 radio to contact rescuers in time to prevent the death of the other passenger.

The copilot was taking three kinds of medicine. Two were waiverable medications for flying duty. The third, Inderal, was not. It is capable of lowering blood pressure, blunting the heart's response to exercise, affecting the accommodative power of the eyes, and decreasing g tolerance and response time. The medicine could not be determined to be a contributing factor in the accident because it is not known who was on the controls. The copilot had indicated in a recent medical history form that he was taking no medications. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishaps □ (H series) Postflight inspection revealed damage to left engine cowling. Forward clamps were not secured. □ (H series) As aircraft was flying about 700 feet agl, seagull hit and broke left chin bubble.

UH-1 Class E mishaps □ (H series) Cyclic feedback in right forward quadrant was caused by failure of servo cylinder. □ (H series) Aircraft jerked and severe high frequency vibration was felt. Center tip weight had separated from tail rotor blade. □ (H series) Engine rpm fluctuated during flight. Caused by failure of overspeed governor. □ (H series) Rpm and audio warning system activated. Caused by failure of N_2 tachometer generator shaft. □ (H series) Pilot felt feedback in cyclic at 10-foot hover, and master caution and hydraulic lights came on. Hydraulics failure was caused by ruptured hydraulic line.

UH-60 Class C mishap □ Door gunner noticed cargo door had dropped from track and was hanging. Caused by stress failure of track assembly.

Attack helicopters

AH-1 Class E mishaps □ (S series) High frequency vibration was felt during landing. Caused by failure of turbine fan bearing. □ (S series) Master caution and engine oil pressure lights came on. Caused by sheared shaft on engine oil pump. □ (S series) Master caution and transmission oil bypass lights came on. Caused by failure of transmission oil ball valve.

AH-1 aviation-related mishap □ Tug driver knew he was close to AH-1 and requested additional ground guides to insure clearance. Guides told him he was clear, but tug hit lower left tow missile launcher tube of aircraft.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Crew noticed fuel leak on No. 2 engine during cooldown. Caused by leaking quick disconnect fitting on engine fuel line. □ (C series) No. 2 hydraulic boost gauge went to zero. Master caution, No. 2 hydraulic boost, and No. 2 SAS lights came on. Loss of pressure was caused by failure of fitting.

CH-47 aviation-related mishap □ Forklift driver was placing a 400-pound weight next to the aircraft when he misjudged the amount of brake pedal necessary to stop the forklift. Left main fuel cell tank of aircraft was punctured by forklift.

Observation helicopters

OH-58 Class E mishaps □ (A series) Compressor surged when throttle was advanced. Caused by FOD to compressor. □ (A series) Master caution and engine oil bypass lights came on. Caused by failure of switch float. □ (C series) High frequency vibration was felt in tail rotor pedals. Three bolts were broken on 90-degree gearbox, and tail rotor blade had 2-inch separation at tip. □ (C series) Pilot noted that logbook indicated transmission oil pressure gauge was unreliable. Pilot started engine, and transmission oil pressure gauge fluctuated 5 psi and then stabilized around 40 psi. Three minutes after takeoff, pressure started dropping. Precautionary landing was made. Pilot was unaware of TSARCOM message which stated that aircraft may be operated with defective transducer as long as transmission oil pressure light is confirmed operational.

Fixed wing

C-12 Class C mishap □ (A series) Crew saw flash on right side of aircraft during descent. There were thunderstorms in the area, with the nearest storm being about 21 NM northeast of aircraft. Lightning struck and damaged right engine prop, inboard flap, and left elevator trailing edge. *(continued on back page)*

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**2**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	1-11 Aug	**2**	**4**
	September	1	0	September		
	Total for Year	43	29	Total to Date	**43**	**32**

FLIGHTFAX readership survey

Please answer each question, cut along dotted line, fold, and mail to the U.S. Army Safety Center. Space is provided on the back for your remarks.

A. What is your present active duty grade? (Check one)

- ☐ 1 General Officer
- ☐ 2 Field Grade
- ☐ 3 Company Grade
- ☐ 4 Warrant Officer
- ☐ 5 E-5 to E-9
- ☐ 6 E-1 to E-4
- ☐ 7 Civilian

B. Which of the following describes your current duty status? (Check one)

- ☐ 1 Active Duty
- ☐ 2 Army Reserve
- ☐ 3 Army National Guard
- ☐ 4 Civilian contractor or government employee
- ☐ 5 U.S. Air Force
- ☐ 6 U.S. Navy
- ☐ 7 U.S. Coast Guard
- ☐ 8 Foreign Ally
- ☐ 9 Industry

C. What is your total flight time? (Check one)

- ☐ 1 Not rated to fly
- ☐ 2 1-500 hours
- ☐ 3 501-1000 hours
- ☐ 4 1001-1500 hours
- ☐ 5 1501-2000 hours
- ☐ 6 2001-2500 hours
- ☐ 7 2501-3000 hours
- ☐ 8 3001-3500 hours
- ☐ 9 More than 3500 hours

NOTE: Check only one after reading all items in blocks D & E.

D. Which item in paragraph D or E best describes your current duty assignment?

- ☐ 1 Operational flying—unit commander
- ☐ 2 Operational flying—staff
- ☐ 3 Operational flying—primary duty
- ☐ 4 Aviation safety—unit
- ☐ 5 Aviation safety—division headquarters or lower
- ☐ 6 Aviation safety—MACOM
- ☐ 7 Aviation safety—DA
- ☐ 8 Aviation staff—unit
- ☐ 9 Aviation staff—HQ

E.

- ☐ 1 Aviation staff—MACOM
- ☐ 2 Aviation staff—DA
- ☐ 3 Nonaviation staff—mostly proficiency flying
- ☐ 4 Maintenance/Supply
- ☐ 5 Student—flight
- ☐ 6 Student—other
- ☐ 7 Contract or civilian employee
- ☐ 8 Industry

F. How long have you been a regular (weekly) reader of FLIGHTFAX? (Check one)

- ☐ 1 Less than 3 months
- ☐ 2 3-6 months
- ☐ 3 6 months-1 year
- ☐ 4 1-2 years
- ☐ 5 2-3 years
- ☐ 6 More than 3 years

G. How long does it take FLIGHTFAX to reach you? Check number of days elapsed since 18 August 1982

- ☐ 1 2-4 days
- ☐ 2 5-7 days
- ☐ 3 8-10 days
- ☐ 4 11-13 days
- ☐ 5 14-16 days
- ☐ 6 17-19 days
- ☐ 7 Longer

H. Listed below are several uses made of FLIGHTFAX. Indicate how you use each of these items in your job and to what degree. (Use check mark for each item.)

	Use Regularly 1	Use Occasionally 2	Might Use 3	Rarely Use 4	Never Use 5
Ha Topics for safety meetings	☐	☐	☐	☐	☐
Hb Topics for unit safety pubs	☐	☐	☐	☐	☐
Hc Items for the bulletin board	☐	☐	☐	☐	☐
Hd Topics for directives	☐	☐	☐	☐	☐
He Items for reading file	☐	☐	☐	☐	☐
Hf To keep myself informed	☐	☐	☐	☐	☐
Hg Source of authority on safety positions/policies	☐	☐	☐	☐	☐

List in remarks any other ways you use FLIGHTFAX.

I. On a scale of 1 to 9, rate each section of FLIGHTFAX in terms of its benefit to you in your current assignment. Use check mark. The more benefit you get, the LARGER the number you should give it.

	→ increasing benefit → 1	2	3	4	5	6	7	8	9
Ia Front page articles	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ib Mishap briefs by type aircraft	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ic Accident reviews	☐	☐	☐	☐	☐	☐	☐	☐	☐
Id STACOM, questions/answers about flight standardization	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ie Maintenance briefs	☐	☐	☐	☐	☐	☐	☐	☐	☐
If Aviation-related ground mishap data	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ig Life support equipment information	☐	☐	☐	☐	☐	☐	☐	☐	☐

J. On a scale of 1 to 7, rate each of the following safety publications in terms of the one which is the most beneficial to you in your current assignment. Use check mark. The more benefit you get, the LARGER the number you should give it.

	→ increasing benefit → 1	2	3	4	5	6	7	Not Available
Ja FLIGHTFAX	☐	☐	☐	☐	☐	☐	☐	☐
Jb APPROACH	☐	☐	☐	☐	☐	☐	☐	☐
Jc AVIATION DIGEST	☐	☐	☐	☐	☐	☐	☐	☐
Jd PS MAGAZINE	☐	☐	☐	☐	☐	☐	☐	☐
Je FLYING SAFETY	☐	☐	☐	☐	☐	☐	☐	☐
Jf DRIVER	☐	☐	☐	☐	☐	☐	☐	☐

K. Listed below are several types of material available for publication in FLIGHTFAX. On a scale of 1 to 9, indicate how much or how little you would like to have each type of information in FLIGHTFAX. The more you need each type, the LARGER number you should give it.

	→ increasing benefit → 1	2	3	4	5	6	7	8	9
Ka In-depth reports of accidents, causes and cures	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kb Maintenance topics	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kc Safety articles on seasonal topics (e.g., weather, cold injuries, etc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kd Accident rates by command	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ke Lessons learned type articles	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kf Humorous articles	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kg Technical articles on equipment and aircraft systems	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kh Articles on new developments, equipment, etc.	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ki Statistical studies	☐	☐	☐	☐	☐	☐	☐	☐	☐

L. Check your duty location

☐ 1 CONUS ☐ 2 OVERSEAS

M. How do you receive FLIGHTFAX? (Check one)

☐ Directly from USASC ☐ Through local distribution

N. Does your unit maintain a file of FLIGHTFAX? How far back does the file date? (Check one)

- ☐ 1 Does not maintain file
- ☐ 2 Less than 6 months
- ☐ 3 6 months-1 year
- ☐ 4 1-2 years
- ☐ 5 2-3 years
- ☐ 6 3-4 years
- ☐ 7 4-5 years
- ☐ 8 More than 5 years

REMARKS

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Mishap briefs

C-12 aviation-related mishaps ☐ As aircraft was being towed from hangar, horizontal stabilizer hit hangar beam. ☐ Aircraft was parked in hangar nose first, but was not parked far enough in to clear hangar door. Hangar door controls were located on outside of door. As mechanic closed door, the No. 3 door panel hit and damaged the tail of the aircraft.

OV-1 Class C mishap ☐ (D series) Left lower dzus fastener on No. 1 engine upper ring cowling vibrated loose during flight, allowing ram air pressure to rip cowling from aircraft.

OV-1 Class E mishaps ☐ (D series) No. 1 engine failed about 1,000 feet agl. Aircraft would not maintain altitude or airspeed. Pilot jettisoned fuel tanks and landed at airport. ☐ (D series) Airspeed indicator began to lag during climbout. Caused by insects in pilot static line.

U-21 Class E mishaps ☐ (A series) Pilot noted excessive stiffness in rudder pedals during takeoff roll. Autopilot and yaw damper switches were off. Yaw damper was engaged and could only be disengaged by pulling autopilot circuit breaker. Caused by failure of flight controller. ☐ (A series) Left engine chip detector light came on during climbout, followed by torque fluctuations. Caused by failure of thrust washer in nose case.

Maintenance

UH-1 Class E mishaps ☐ (H series) Takeoff airspeed indicator did not increase from 0 knots during instrument takeoff. Lines to airspeed indicator were installed backwards. ☐ (H series) Master caution and transmission oil pressure lights came on. Loss of transmission oil was caused by chafed oil line.

AH-1 Class E mishap ☐ (S series) Aircraft pitched nose down and vibrated. Pilot disengaged SCAS and landed. SCAS pitch card was not aligned correctly.

CH-47 Class E mishap ☐ (B series) When IP tried to bring No. 2 engine back to flight after completion of simulated single-engine running landing, egt climbed to 850° C. Air bleed actuator was not rigged correctly.

OH-58 Class E mishaps ☐ (A series) When throttle was advanced to full open during runup, pilot noticed high frequency vibration in tail rotor control pedals. Tail rotor was out of balance. ☐ (A series) Master caution and fuel boost lights came on during NOE flight. Caused by loose wire.

Messages received

- Safety-of-flight operational message concerning night operation restrictions on CH-47C aircraft (CH-47-82-06, 261405Z Jul 82). Summary: Effective immediately, CH-47C terrain flights at night with night vision goggles are prohibited unless the aircraft has a radar altimeter installed and functioning properly. Contact: Michael West, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.
- T700 maintenance information message concerning forthcoming changes in T700-GE-700 engine overtemperature replacement limit (MIM-82-T700-MEA-01, 271800Z Jul 82). No changes will be made to the operating limits of the T700-GE-700 engine. This message outlines changes to TM 55-2840-248-23 for overtemperature replacement limits.

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

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Professionalism

"A lapse of professional integrity for a few minutes of fun can result in catastrophic consequences."

This quote was taken from the Weekly Summary of Aircraft Accidents and Incidents published by the U.S. Army Board for Aviation Accident Research during the week of 8-15 January 1971. I wonder how many of us paid any attention to it for more than a passing instant, if at all? I also wonder just how many accidents and incidents have been caused by just such a lapse or lack of professionalism?

I am sure that every aviator prides himself on his professionalism. To be called a professional is about the highest praise to be expected in aviation. And rightfully so, for to be considered a professional is to be considered a master of one's job. But more important it also means that one is a master of every aspect of his job, not just of one or several phases of it.

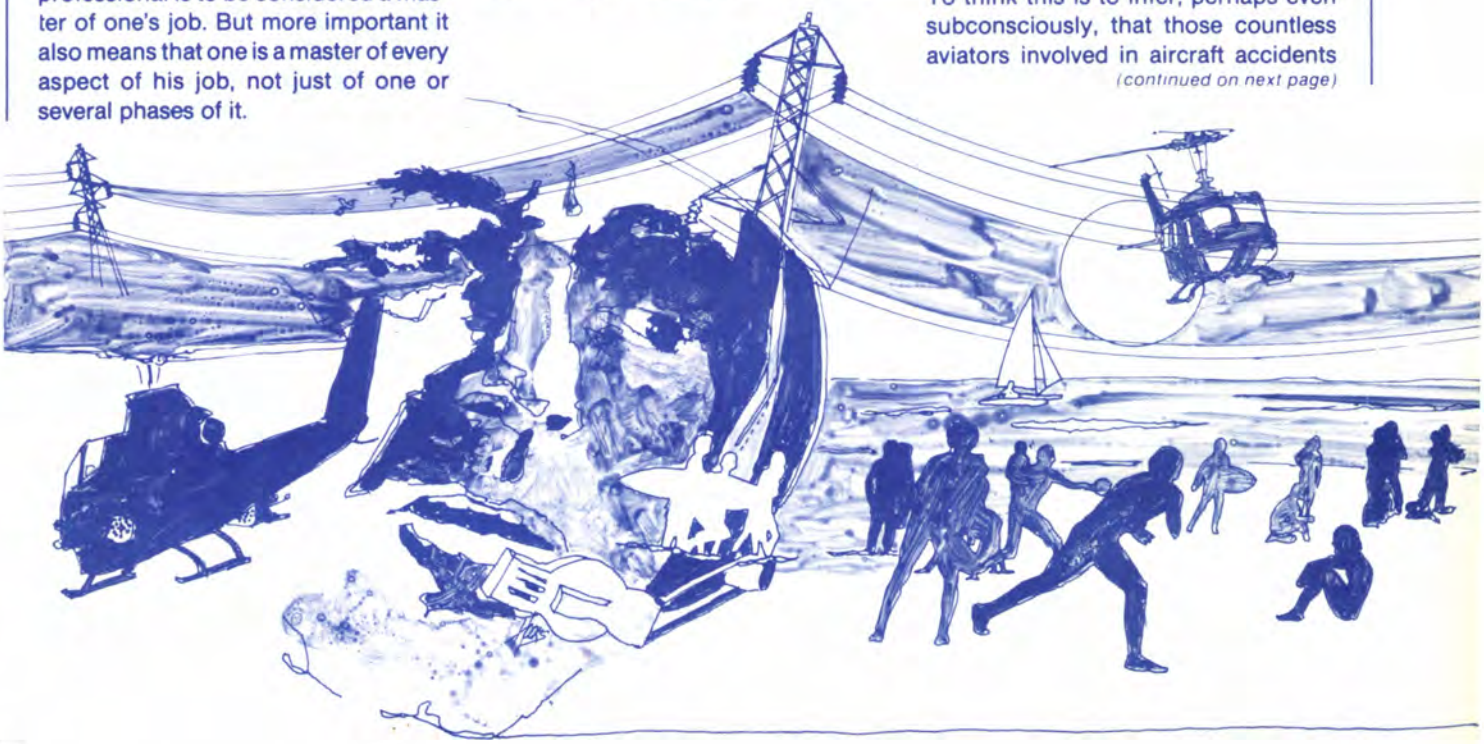
It is not enough just to be a good pilot to be considered a professional. It goes much deeper than that. To be a professional one must be able to recognize and to control the impulses which would cause a lapse in his performance. I am positive that every one of us at one time or another has had the impulse to make a cyclic climb, fly through a cloud needlessly, do a little contour flying when it really wasn't necessary, "buzz" a group of people on a beach, or even to herd some cows. There is nothing wrong with having the impulse. It is only natural.

The problem arises when we succumb to the impulse. So we go ahead and "buzz" the beach or chase the cows. Nine times out of 10, or even 99 times out of 100, nothing unforeseen will happen and everyone involved will get a big charge out of it. But what happens that one time we misjudge the aircraft's capabilities or our own? Where is the big charge then?

After reading this far the time-honored expression, "It could never happen to me," comes to mind. Let's face it; no one ever expects to be in an aircraft accident. Of the countless number of aviators killed or maimed in aircraft accidents, just how many do you think thought it would happen? Foolish question, isn't it? But how many of us are going to go out on our very next flight and court disaster by some little lapse of professionalism, all the time thinking "It won't happen to me; I know what I'm doing"?

To think this is to infer, perhaps even subconsciously, that those countless aviators involved in aircraft accidents

(continued on next page)



Professionalism

didn't know what they were doing, or that they weren't as capable as we are. I for one am not so egotistical as to think that I am that much better than those unfortunate ones, so my feelings are that maybe, just maybe, I had better be a little more cautious and give things just a little more thought before I do them. Is that such a bad idea?

Since I have been in the Army I have always tried to be conscious of the following: "Don't gripe about a situation or a problem unless you have a solution." Well, my solution is nothing new. It's been preached by the safety people and many others for as long as most of us can remember. It is the duty of each and every one of us to perform in the most professional manner possible. It is the duty of each and every one of us to control the impulse to do that which would court disaster.

When you get a crazy impulse, just stop for a second and ask yourself, "What can I gain by doing this?" Then ask yourself, "What can I lose?" If everyone did this before giving in to the impulse, just how many accidents could be avoided? Surely there can't be anyone of us who think that the thrill obtained by giving in to an impulse such as flying contour unnecessarily outweighs the consequences that might arise from misjudging a distance or flying into a powerline.

To be a professional one must be able to recognize and to control the impulses which would cause a lapse in his performance.

How could any "kicks" obtained even compare with the unnecessary risking of lives? If there is anyone who thinks that there is even one iota of comparability, even if he thinks it for only a split second, then he is in the wrong business and owes it to everyone to get out immediately.

This is what it all boils down to: It is the individual's responsibility to be aware of and avoid these problems. But it won't hurt one little bit for each of us to keep reminding our buddies of this responsibility. I'm sure commanders and safety officers continually harp on these things (or at least they should). And it's easy for us to say, "Well, that's **his** job," but we all know that it is really part of ours as well so let's give a little help.

Instead of laughing the next time some guy tells a story in the club about "buzzing the beach," and instead of going out the next day and trying to outdo him, how about gently reminding him that a little error in judgment could have very easily cost a few lives. Then ask him if he really thought it was worth it.

Maybe what we all need is a little embarrassment once in awhile to remind us that we are supposed to be professionals. It certainly isn't as high a price as the loss of a few lives.

This article, by CW2 Peter J. Smith, was published in the ARMY AVIATION DIGEST 11 years ago. Nothing has changed. ■

Shortfax

Fitting restricts oil flow

Last month, a T53-L-13B engine removed from a UH-1H was received for analysis at Corpus Christi Army Depot because of a chip light activation and excessive metal in the oil. Disassembly of the engine revealed the Nos. 2, 3, and 4 bearings were failing due to oil starvation. Inspection of the oil manifold, P/N 1-170-410-02, mounted on the engine air diffuser, revealed an unauthorized fitting was installed in the oil system. The fitting, P/N 204-072-299-1, is part of the pitot air system of the AH-1G. The fitting is also a restrictive type that is made with a very small internal passage. Use of this fitting in the oil system severely restricted the oil flow to the Nos. 2, 3, and 4 main bearings, causing them to fail due to lack of oil. This condition could have resulted in an engine failure had the pilot not taken prompt action when the chip light activated.

The unauthorized fitting was mounted in a highly visible area and should have been detected by the mechanic or tech inspector before the engine was put into service. ■

Unauthorized fitting installed in oil system.

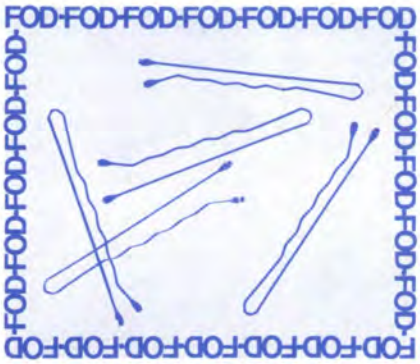
Hairpins to hair raisers

Sometimes the very thing you use to keep things up will let you down at a most inopportune time. For example, one little hairpin can ruin a perfectly good engine, usually at the worst possible time.

With more and more women joining aviation activities, hairpins (and barrettes) are becoming increasingly common as a source of FOD. They have been found on ramps, in hangars, and in, around, and on top of aircraft. They can easily fall from the hair, with no one the wiser. To keep those little rascals where they belong, it is suggested that hairnets be worn when working around the flight line. This suggestion may also be feasible for women involved in flight duties.

Let's keep the FOD problem down by watching out for those hairpins and barrettes. ■

—thanks to CW4 Randy Culp, ASO, 101st Airborne Division, Fort Campbell



Health hazard warning

Hydraulic fluid, fire resistant, MIL-H-83282, a synthetic hydrocarbon hydraulic fluid, is used in many types of Army aircraft. Review of utility and attack helicopter technical manuals reveals that some contain no information about this hydraulic fluid while others carry various specific health hazard warnings. Pending standardization of manuals in this area, the following information is provided to clarify this potentially confusing situation.

The DOD Hazardous Material Information System indicates that overexposure to MIL-H-83282 causes slight irritation to the eyes, normally causes little or no irritation to the skin, and is slightly toxic if ingested. However, carbon monoxide gas can be formed if this fluid undergoes thermal decomposition.

Good practice dictates that individuals who may be exposed to this hydraulic fluid be made aware of the following warning:

Warning

- If fluid is swallowed, do not induce vomiting; get immediate medical attention.
- Wear rubber gloves when handling liquid. If prolonged contact with mist is likely, wear an appropriate respirator.
- Prolonged contact with liquid or mist can irritate eyes and skin.
- After any prolonged contact of liquid with skin, immediately wash contacted area with soap and water. If liquid contacts eyes, flush immediately with clear water.
- When fluid is decomposed by heating, carbon monoxide is released. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class E mishaps □ (H series) Hydraulic pressure light came on. Caused by failure of hydraulic pressure switch. □ (H series) Crew felt severe vibrations. White main rotor blade skin had separated 12 to 14 inches inboard from tip. □ (H series) Pilots were told by passengers that oil was on the floor of the cargo compartment. PIC identified the oil as hydraulic fluid. Caused by leaking right cyclic servo. □ (H series) Master caution and transmission pressure lights came on. Disintegration of tail rotor output quill seal caused loss of transmission fluid. □ (H series) Postflight inspection revealed oil leak in vicinity of 42-degree gearbox. Filler cap was not replaced after oil sample was taken, allowing oil to be slung out of gearbox. Pilot overlooked missing filler cap during preflight inspection. □ (H series) Main rotor blade hit tree branch during NOE flight.

UH-60 Class A mishap □ Aircraft was seen to be flying low, and unusual noises were heard. Aircraft crashed through trees and hit top of bus. Four fatalities. 8271

UH-60 Class C mishap □ Aircraft was being taxied to refueling pumps. Crew and ground guide misjudged clearance between rotor disc and vent pipe from underground fuel tank. Main rotor blades hit pipe and were damaged.

Attack helicopters

AH-1 Class A mishap □ (S series) Aircraft was on night live fire exercise. Low rpm warning light and audio activated. Aircraft descended into trees and crashed upright. 8272

AH-1 Class E mishaps □ (G series) Engine and rotor rpm bled to 6000 and 290 respectively. Caused by malfunction of governor assembly. □ (S series) Transmission oil pressure indicated zero. Caused by failure of transmission transducer. □ (S series) Pilot and copilot N_1 gauges dropped to zero during hover. Caused by failure of N_1 tachometer. □ (S series) Pilot smelled strange odor. Caused by overheated battery. □ (S series) Master caution and No. 1 hydraulic lights came on. Caused by shorted wire on pressure switch.

Cargo helicopters

CH-47 Class E mishaps □ (B series) Aircraft developed high frequency vibrations in forward transmission area. Caused by failure of No. 1 drive shaft assembly. □ (C series) No. 1 flight boost light came on. Caused by failure of pressure switch. □ (C series) No. 2 engine fire light came on during runup. Caused by malfunction of wiring assembly of fire detection system. □ (B series) During approach with sling load, rated student pilot detected and identified beep trim system failure on No. 2 engine. Student pilot increased thrust, trying to slow rate of descent, which decayed rotor rpm and further increased sink rate. Torque on No. 2 engine exceeded 1300 pounds. While IP was attempting to control rotor rpm with emergency engine trim, flight engineer recognized the situation and released the load. Aircraft was brought under control and landed. No. 2 engine, engine transmission, combining transmission, and forward transmission were replaced.

Observation helicopters

OH-58 Class C mishap □ (A series) Aircraft was being flown across a large field. Pilot saw wires ahead and initiated cyclic climb. Top part of pitot tube hit wire. Wire then climbed up windscreen and was sheared by FM antenna.

OH-58 Class E mishaps □ (A series) Low rpm light and audio activated. Caused by failure of linear actuator. □ (A series) Fumes were seen coming from battery vent during shutdown. Caused by thermal runaway of battery.

(continued on back page)

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**2**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	1-18 Aug	**4**	**5**
	September	1	0	September		
	Total for Year	43	29	Total to Date	**45**	**33**

Operation Alert

Rotary wing high altitude flying

Three Class A accidents involving flight above 5,000 feet msl have occurred in the past 4 months. OH-58 and UH-1 aircraft alone have been involved in 34 high altitude accidents over the past 7 years.

Typical accident profile

The crew will have very little high altitude training and/or will not have flown at high altitudes recently. There will be a high-time IP or PIC on board the aircraft. Performance planning will be inadequate or incorrect. More power than is available will be demanded and rpm will be lost during approach for landing. The IP or PIC will take the controls and attempt a second approach. More power than available will again be demanded and the aircraft will crash.

Actions to take

Commander

Direct that planning be completed by all aircrews before and during all missions into mountainous areas. Require reinforcement training on high altitude ATM tasks when your unit is to operate in this type environment.

Aviator

Use the book! Plan your flight and recompute your performance data when conditions (load, altitude, temperature, etc.) change. Believe your PPC **and** your instruments.

Maintenance officer

Make sure all maintenance tasks are performed "by the book" and are supervised. Inspect special tools requiring periodic calibrations for compliance with regulations.

Safety officer

Promote the development and/or enforcement of unit maintenance, operation, and training SOP, with an underlying theme of "all tasks performed by the book and supervised are inherently safe."

IP/SIP

Conduct periodic evaluation of pilots' proficiency in performing high altitude ATM tasks. **Teach** correct performance planning procedures to all unit aviators.

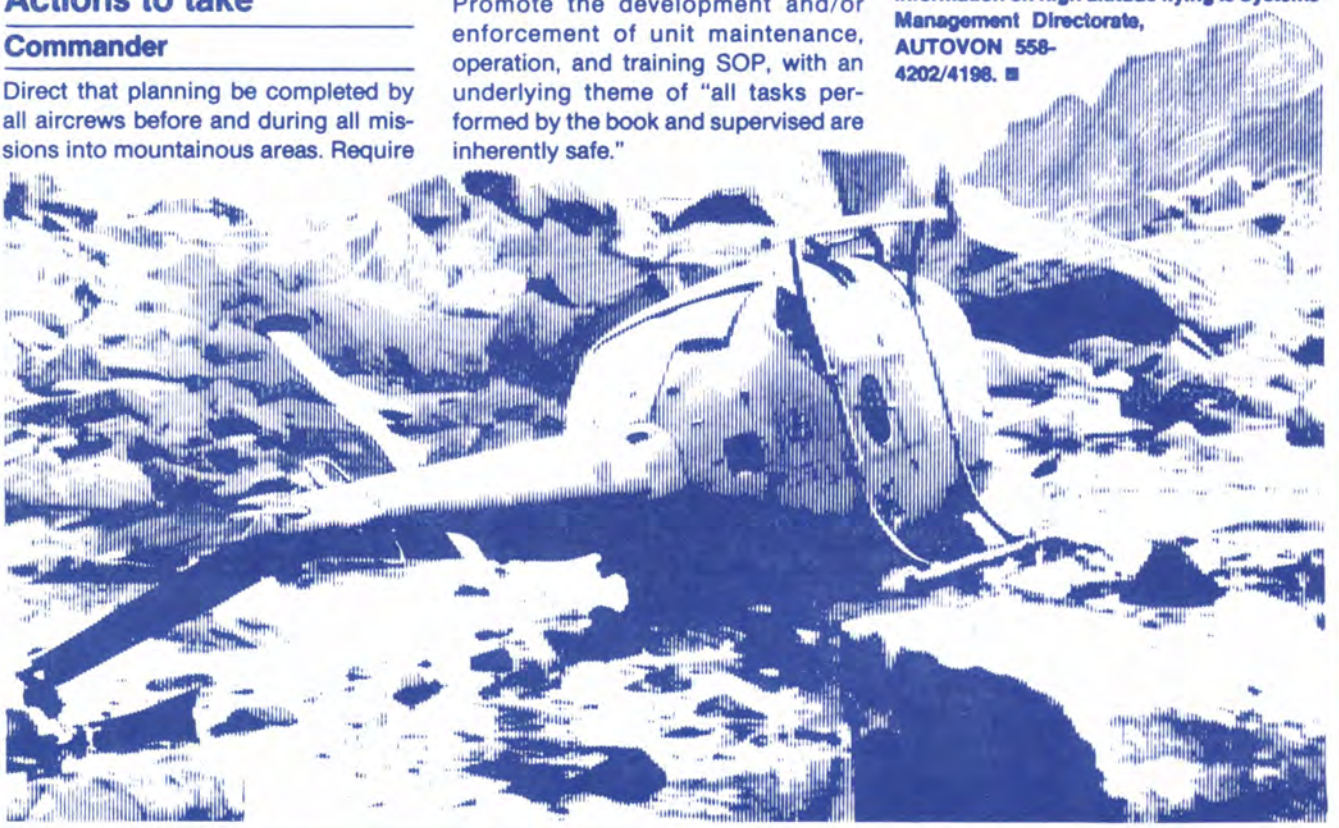
Operations officer

Select aircrews based on crew experience and high altitude currency in coordination with unit IP/SIP. Randomly check unit aviators' proficiency in the interpretation of performance planning data.

All crewmembers

Read "When Will We Learn About Mountain Flying?" in the July 1982 U.S. ARMY AVIATION DIGEST.

Point of contact at the Safety Center for information on high altitude flying is Systems Management Directorate, AUTOVON 558-4202/4198. ■



Mishap briefs

☐ (C series) Hang start was caused by malfunction of fuel control. ☐ (A series) Fuel control linkage had just been installed. During preflight, pilots noticed fuel control quadrant pointer was slightly below 30 percent mark. IP told pilot that engine might shut down if throttle was rapidly rolled to engine idle stop. IP said he would gradually roll throttle off. During flight, IP gave pilot forced landing at a hover. Pilot had a tight grip on the throttle, and IP was unable to gradually roll off throttle. When IP forceably reduced throttle, engine quit.

Fixed wing

C-12 Class E mishaps ☐ (A series) Left engine torque decreased during final approach. Caused by failure of fuel control. ☐ (A series) Vertical vibration occurred and aircraft rolled right and pitched down. Left engine propeller was feathered and aircraft landed. Caused by internal engine failure.

U-8 Class E mishap ☐ (F series) When gear handle was placed in up position during takeoff, landing gear did not retract. Caused by stuck landing gear actuator adapter switch.

Maintenance

UH-1 Class E mishaps ☐ (H series) Master caution light came on. Caused by loose cannon plug. ☐ (H series) Master caution and IFF lights came on. Cannon plug was not seated properly. ☐ (H series) Master caution and transmission oil lights came on. Transmission oil pressure was zero. Preformed packing in transmission oil filter was twisted, allowing oil to leak out. ☐ (H series) Rattling noise was heard from tail rotor drive shaft during shutdown. Three of four hanger bearing assemblies were assembled incorrectly. Cotter pins were missing. ☐ (H series) Crew smelled electrical odor in flight. Metal washer was shorting out variable resistor for console lights, causing hot resistor and burning wires.

UH-60 Class E mishap ☐ Transmitter temperature strip lights came on during landing. Caused by loose cannon plug.

AH-1 Class E mishaps ☐ (S series) Transmission oil temperature rose above red line. Cannon plug on oil temperature gauge was not secured correctly. ☐ (S series) Pilot felt cyclic control binding and heard grinding noise during hover. Caused by incorrectly lubricated swashplate and improperly adjusted cyclic friction.

CH-47 Class E mishaps ☐ (C series) No. 1 and No. 2 flight hydraulic pressure gauges fluctuated during takeoff. Flight control hydraulic system had not been bled correctly and contained trapped air. ☐ (C series) Pilot's floor microphone switch was forced through floor when it was pressed. Screws holding switch were not secure.

OH-58 Class E mishaps ☐ (A series) Master caution and hydraulic lights came on. Caused by leak at fore and aft servo return line fitting. Fitting was not torqued correctly. ☐ (A series) N_2 bled off and low rotor rpm light came on during takeoff. Caused by loose retaining nut on bleed air line.

T-42 Class E mishap ☐ As gear was retracted, No. 2 alternator output went to zero amps and cockpit filled with electrical smoke. White smoke was seen coming from behind No. 2 engine. Engine cooling baffles had chafed a hole in fuel manifold.

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

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The right choice

When in-flight emergencies occur, aviators sometimes pass up suitable landing sites and try to make it to the nearest airfield. Not so with a YC-7 crew who had a fire in their right engine. They were only 10 minutes from an airfield, but they would probably not have reached it had they continued flight.

After taking off from an airport and just before reaching the assigned altitude of 6,000 feet msl, the crew saw the right generator light come on. The copilot tried to reset the generator but was unsuccessful. A few minutes later, a popping sound was heard, and the right engine quit. As shutdown and feathering procedures were accomplished, the crew chief announced that the right engine was on fire. The copilot closed the fuel and oil shutoff valves to the right engine and activated one of the engine fire extinguishers, but it did not put out the fire. Activation of the second extinguisher also did not put out the fire. An attempt to blow out the fire by diving to increase airspeed was unsuccessful and resulted in a loss of 1,500 feet in altitude.

The pilot called approach control to tell them about the emergency. Approach control advised of an airfield about 10 minutes' flying time away. The crew decided the field was too far away and that the aircraft should be landed as quickly as possible. A cotton field was chosen as the most suitable landing site. The airplane was landed without further damage. The engine fire could not be extinguished with an onboard aircraft fire extinguisher. A civilian fire truck arrived within a few minutes, and the fire was extinguished with water from the truck.

The engine fire started as a result of failure of the right engine generator. An object was thrown through the wall of the generator cooling duct adapter and penetrated a nearby fuel line. Sparks and bits of molten metal from the generator started the fire. Pieces of teflon and other debris clogged the fuel pump, causing fuel starvation and failure of the engine. As the aircraft descended, the fire was fed by a combination of fuel and oil.

The pilot had more than 5,000 fixed wing hours and the copilot had more than 3,000 fixed wing hours. The highly experienced crew's sound judgment and quick, positive action limited damage to the engine. Because of the intensity of the fire, had the crew tried to continue flight to the airfield, it is doubtful aircraft integrity would have been maintained long enough to make a safe landing.

Don't let mission accomplishment, pride, or coercion cause you to try to fly an aircraft that may fail you at any moment. When you get the first warning that something may be wrong, select a suitable landing site, put your aircraft down, and leave it down. ■

Followups

Additional information on mishap briefs previously published

Utility helicopters

UH-1 Class A mishap in 7 Apr 82 issue (8235) ☐ IP initiated simulated engine failure at a hover. Pilot overreacted and placed aircraft in a left bank and drift. Aircraft landed hard and rolled on its left side. IP did not adequately guard the flight controls and was late with corrective action.

UH-60 Class A mishap in 24 Feb 82 issue (8227) ☐ Aircraft was landed after illumination of several caution lights. During shutdown, ground personnel saw fire in the vicinity of the flight control cowling. Aircraft sustained fire damage to the main rotor pylon sliding cover in the area of the No. 1 hydraulic pump. No. 1 hydraulic pump module failed, generating sufficient heat and pressure to act as a source of ignition for a fire that developed between the hydraulic pump and transfer module. Hydraulic fluid was the source of fuel for the fire, and ignition occurred when super-heated hydraulic fluid came in contact with oxygen as the fluid was forced out by overpressurization of the hydraulic pump module.

UH-60 Class A mishap in 24 Mar 82 issue (8233) ☐ Aircraft crashed through trees during PIC qualification evaluation flight. Both pilots were killed, and there is not enough information available to determine a definite cause. However, it is thought that the crew, either on approach or departure from a clearing, allowed the aircraft to enter the trees. Corrective action was either too late or was ineffective in stopping the descent.

Attack helicopters

AH-1 Class A mishap in 7 Oct 81 issue (8162) ☐ During autorotation with turn, rated student pilot placed the aircraft in a nose low and out-of-trim attitude, resulting in a dangerously high rate of descent. Student pilot panicked and froze on the controls, hindering the IP's recovery of the aircraft. Aircraft hit a pole, severing the tail boom. Aircraft then hit the ground and came to rest on its left side.

8162

8235

AH-1 Class A mishap in 24 Feb 82 issue (8228) ☐ Crew chief walked into tail rotor blades during maintenance operational check and was killed. Witnesses saw crew chief rush toward the rear of the aircraft in what is suspected to be an attempt to complete his tasks as quickly as possible and get inside out of the cold, damp weather.

AH-1 Class A mishap in 17 Mar 82 issue (8232) ☐ Four AH-1Gs were flying VFR toward a pass. Weather deteriorated and the lead aircraft flew into clouds. Crew became disoriented and control was lost. Aircraft hit the side of a hill and was destroyed.

Observation helicopters

OH-6 Class B mishap in 16 Dec 81 issue (8215) ☐ Pilot heard unusual noise and noticed TOT fluctuation. Steep approach was begun to an open field from 700 feet agl. Engine failed as aircraft descended through 50 feet agl, and aircraft landed hard. One or more of the fourth stage compressor rotor blades failed because of fatigue originating from corrosion pitting. Pilot, although aware of an existing engine problem, did not adquately plan an approach into an open field after receiving indications of an impending engine failure. He chose to land downwind, with a steep approach angle and slow forward airspeed.

8146

OH-58 Class A mishap in 1 Jul 81 issue (8146) ☐ While operating at an altitude of about 40 feet above 80- to 90-foot trees, a gross weight of 2,764 pounds, and density altitude of 2,280 feet, and with winds of 14 to 20 knots, pilot allowed his airspeed to decrease below effective translational lift while attempting a right turn. As a result of entering this critical environment, pilot demanded more power than the engine was capable of providing. This led to an engine and main rotor droop and loss of tail rotor effectiveness. Aircraft began spinning to the right, hit the tops of the trees, and crashed in a nose-down attitude.

OH-58 Class B mishap in 4 Nov 81 issue (8206) ☐ Mishap was downgraded to Class C. Approach to 9,300 feet msl unimproved landing zone was terminated at 5-foot hover. When additional power was applied to gain forward airspeed, aircraft settled. Directional control was lost as aircraft began to turn to right. Aircraft came to rest on sloping landing zone. Caused by inadequate mountain flying experience and incomplete flight planning.

OH-58 Class A mishap in 3 Mar 82 issue (8229) ☐ Aircraft was being operated at or near maximum gross weight. Pilot attempted tight right turn 20 feet above treetops. Airspeed was allowed to decrease to near zero during the turn. Tail rotor effectiveness was insufficient to prevent the turn from progressing into a spin. After five or six revolutions, aircraft crashed into 75-foot trees. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class B mishap □ (H series) Aircraft landed hard during autorotation at night. Tail rotor, 90-degree gearbox, and tail rotor drive shaft were damaged. 8273

UH-1 Class E mishaps □ (H series) Aircraft developed severe vibration. Caused by erosion of teflon area of rod end bearing. □ (H series) Crew smelled smoke and landed. Cigarette ash had blown onto personal equipment bag and pillow and was smoldering. □ (H series) Engine oil temperature rose during hover/taxi. Caused by failure of anti-ice valve. □ (H series) Aircraft was approaching LZ. About 1 foot off the ground, pilot heard several loud cracking sounds. Postlanding inspection revealed scratch and dent in main rotor blade. LZ was marked with white plastic held down by thin wire tent stakes. When plastic was pulled up by rotorwash, tent stake entered rotor system. □ (M series) Vertical vibration became so violent that aircraft was almost uncontrollable. Caused by failure of feather bearing.

UH-60 Class C mishaps □ Power control lever was moved from off to idle position during engine flush operation. Rotor system engaged, and main rotor tiedown, which was still attached to main rotor blade, damaged tail rotor paddles and main rotor blade. □ Main rotor blades hit tree during landing. All four blades were damaged.

Attack helicopters

AH-1 Class C mishaps □ (S series) Pilot applied excessive collective during autorotation, causing tail rotor blade to hit runway. □ (TAH-1S) Rated student pilot was performing low-level autorotation. When aircraft touched the lane, student pilot pulled collective abruptly, causing aircraft to balloon about 10 feet into the air. IP took control, and aircraft landed hard.

AH-1 Class E mishaps □ (S series) When throttle was advanced to full open, engine oil pressure was not in the green. Caused by malfunction of engine oil pressure transducer. □ (S series) Tail rotor controls became sluggish during takeoff, and aircraft yawed from side to side. Caused by yaw SCAS failure.

Cargo helicopters

CH-47 Class A mishap □ (B series) As aircraft was taking off, rotorwash picked up a piece of plywood. Plywood hit and killed a soldier on the ground. 8274

CH-47 Class E mishaps □ (C series) Crew felt severe jolts throughout airframe, which continued during landing and taxi. Caused by failure of left vibration dampner assembly. □ (C series) Utility pump shaft sheared during APU start. □ (C series) Rotor tachometer generator failed during hover.

Observation helicopters

OH-58 Class C mishap □ (A series) While practicing right pedal antitorque maneuver, pilot allowed aircraft to touch down with skids about 10 degrees right of direction of landing. Left skid touched down just before right skid. After both skids were on the ground, spike knock was felt.

OH-58 Class E mishaps □ (A series) N_2 dropped during hover for takeoff. Caused by failure of fuel control. □ (A series) Noise was heard and slight vertical vibration was felt. About 1 minute later, tip of main rotor blade exploded and excessive vertical vibration was felt. Caused by corrosion and bonding failure of tip cap. □ (A series) Master caution and hydraulic lights came on. Splined area in tachometer generator failed and would not allow power to

(continued on back page)

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**2**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	1-25 Aug	**6**	**5**
	September	1	0	September		
	Total for Year	43	29	Total to Date	**47**	**33**

Operation Alert

Ground handling aircraft—not by the book

The number of aviation maintenance accidents increased by 79 percent during CY 81 over CY 80. Towing or ground handling of aircraft was the most dominant accident type, produced the highest cost, and resulted in the most days lost because of personal injury.

Typical accident profile

Ground handling wheels will be installed and a tow bar attached to the helicopter tow rings. A servicemember helping to move the helicopter from the washrack to the hangar will lift the tail boom to position the aircraft for hookup to the tug. As the helicopter becomes supported on the ground handling wheels, it will begin to slowly roll down the slope of the washrack. The servicemember will lift the tail boom higher to put friction on the front of the skid and stop the aircraft. The aircraft will continue to roll backward, with the right skid cap catching the edge of the washrack drainage ditch. The nose of the aircraft will rise and the tail flex into the sod, resulting in tail boom damage.

Actions to take

Commander

Immediately require the following of your personnel:

Safety officer

Evaluate unit operations to identify unsafe or potentially unsafe acts or hazards. Advise and recommend to your commander and maintenance officer accident prevention policies and countermeasures designed to reduce or eliminate ground handling and towing accidents.

Maintenance officer

Require that written procedures (i.e., standing operating procedures, technical manuals, and policies) are followed when moving aircraft. Require that sufficient personnel are used in the performance of aircraft ground handling and towing tasks. Require that ground handling equipment is maintained.

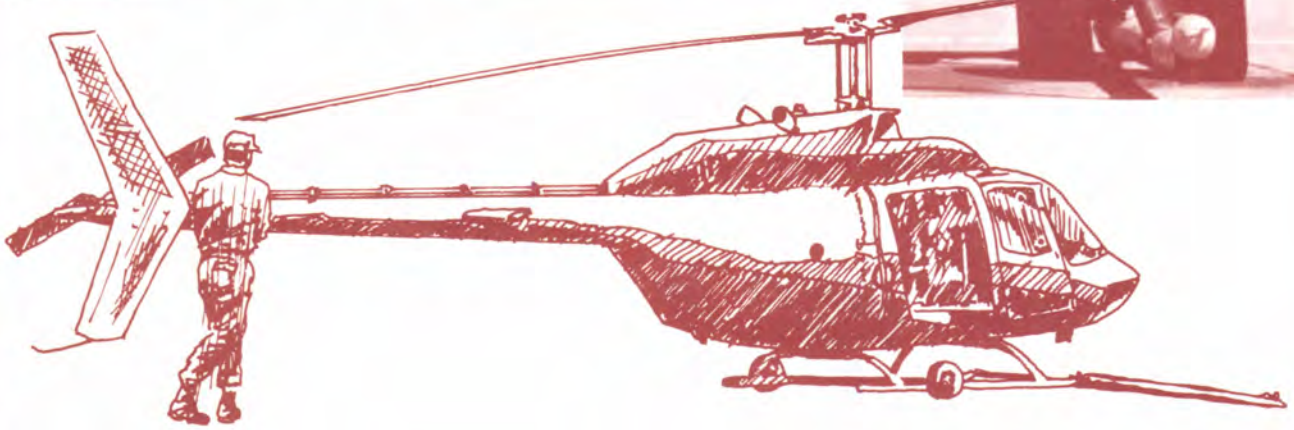
Maintenance NCO

Conduct training on the use of ground handling equipment provided for the movement of aircraft in and around maintenance hangars. Supervise the movement of aircraft while using ground handling equipment.

Mechanic/crew chief

Know your specific duties and observe all safety precautions when moving aircraft. Report any unsafe acts or unserviceable equipment to your supervisor for corrective action.

Point of contact at the Safety Center for information on ground handling accidents is Systems Management Directorate, AUTOVON 558-4202/4198. ■



"Operation Alert" messages focusing on critical aircraft safety problems will be featured frequently in FLIGHTFAX. Cut these pages out and display where aviation personnel will see them often.

Mishap briefs

hydraulic pump. □ (C series) As pilot flew over tops of hills, he encountered extremely low clouds. Pilot started right, downwind turn and slowed aircraft to 10 knots. Aircraft entered settling with power condition 10 feet above trees, and pilot applied remaining torque. Low rpm audio and light activated. Aircraft then lost tail rotor effectiveness and made two 360-degree turns. Pilot was able to land in field, with no damage.

Fixed wing

C-12 Class C mishap □ (A series) Right inboard engine cowling came open during takeoff roll and separated from aircraft.

C-12 Class E mishap □ (C series) When landing gear handle was placed in up position after takeoff, gear remained down and locked and landing gear relay circuit breaker popped. Gear handle was returned to down position and aircraft landed. Caused by failure of safety switch.

U-21 Class B mishap □ (A series) During simulated single-engine landing, with No. 1 engine at zero thrust, IP commanded single-engine go-around. Pilot advanced No. 2 throttle, and selected gear and flaps up. Aircraft started to roll left. IP took control, advanced No. 1 engine, and could not stop roll. IP retarded both throttles and landed straight ahead. Both engines and belly of aircraft were damaged. 8275

Maintenance

UH-1 Class E mishaps □ (H series) Master caution and transmission oil hot lights came on during takeoff. Caused by loose wire at temperature sensor. □ (H series) Engine would not top out during topping check. Pilot decreased collective gradually until torque gauge read 43 pounds. Crew heard loud noise and aircraft shook. Pilot entered autorotational descent. Power-on landing was made. Fuel control was not adjusted correctly. □ (H series) As rotor was coasting down, copilot exited aircraft and heard strange noise coming from drive shaft area. Crew opened drive shaft and discovered foreign object inside No. 4 shaft. Bearing assembly was assembled incorrectly. Cotter pin was not installed on retaining nut, and nut came off retaining bolt.

AH-1 Class E mishap □ (S series) Aircraft started to rock back and forth during shutdown. Front cross tube mounting bolts were loose. Bolts were not torqued correctly.

C-12 Class E mishap □ (A series) Pilot noticed oil seeping on No. 2 engine cowl during climb. Prop shaft seal had been installed backwards during engine overhaul.

Messages received

• Safety-of-flight emergency technical message concerning one-time inspection of UH-60A main rotor servo input link bearings (UH-60A-82-13, 150025Z Aug 82). Summary: Tentative findings of a recent UH-60 accident revealed that one of the primary main rotor servo input link bearings was displaced. Displacement could have been caused by impact. Bearings are retained by a staking process. Should the staking loosen, it could lead to improper control of the servo drive linkage. All UH-60 aircraft, S/N 77-22714 through 81-23592, will be inspected before their next flight. Contact: Robert Lawyer, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

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. 10, No. 46 □ 1 Sep 1982

Take a second look...it costs you nothing

It is regrettable that this issue must report the worst Army aviation safety record in recent years. The fiscal 82 record through the end of August is the worst since FY 77, when the Army began recording aircraft accidents as we now know them (Class A, B, C, etc); although flying hours have remained relatively constant during these years. The FY 77 Class A accident rate per 100,000 flying hours was 2.94. Through 11 months of this fiscal year, with another month still to go, the rate stands at 3.33. Hopefully it will stop here. But if the past 11 months are an indication of what the final picture will look like, then the FY 82 Class A aircraft accident record will match or exceed any year since FY 74.

Class A Countdown by Year

Fiscal Year	Class A Aircraft Accidents	Fatalities
77	**44**	**25**
78	**45**	**54**
79	**39**	**18**
80	**37**	**26**
81	**43**	**27**
82*	**49**	**33**

*Through 31 Aug

FY 82 Class A Accident Countdown by Month

	Month	FY 81 Class A Accidents	FY 81 Fatalities	Month	FY 82 Class A Accidents	FY 82 Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**2**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	August	**8**	**5**
	September	1	0	September		
	Total for Year	43	29	Total to Date	**49**	**33**

Aircraft accident fatalities, disabling injuries, and dollar losses ($48 million plus for all aircraft accidents so far this fiscal year) are all on the increase. Quite frankly, these losses clearly show a breakdown in flight discipline and, in certain cases, a lack of responsible supervision.

The record shows that 35 of the 49 Class A accidents so far this fiscal year have involved crew or supervisory error. It's up to you as commanders and aviators to stop this trend ...and stop it you must. Any success in reversing this upward trend will be directly related to the amount of effort you put forth in applying the costly lessons learned from past accident experience.

Lives need not be lost nor aircraft wrecked. Accidents can be prevented if commanders and aircrews act and react in a truly professional manner. Take a second look at your aviation safety record. Is it the result of professional planning and performance, or is it just a matter of luck?

Colonel Joseph R. Koehler
Commander, U.S. Army Safety Center

Before the first snow

Thoughts of winter operations may seem remote to some of you. But winter flying, with all of its hazards, will soon be a reality to troops in Germany and other areas where cold weather and snow come a little early.

Winter flying requires specialized techniques. Now is the time to learn or review these techniques, before you have to use them. Units operating in cold weather are responsible for conducting a thorough training program. And pilots are responsible for learning all they can about the conditions in which they fly.

Operation over snow-covered terrain is hazardous, to say the least. Pilots can be trapped in whiteout situations almost before they realize it.

Accident No. 1

Four Hueys were on a troop insertion mission. The formation prescribed was a diamond formation from liftoff until the mission was completed. The flight platoon leader received the mission from the infantry platoon leader with a request for an immediate departure. This permitted only a sketchy briefing and no time for flight planning.

The troops were loaded and the aircraft took off. After 25 minutes in flight, the pilot of the lead aircraft decelerated and began an approach toward the wood line of a large, open snow-covered field. Both the pilot and copilot of the No. 3 aircraft were surprised—the copilot because he did not recognize the field ahead of them as the coordinates of the first LZ that had been briefed, and the pilot because he had begun to overtake the lead aircraft before he realized lead was decelerating in an approach without advance warning. The No. 3 pilot was able to regain his relative position in the flight and maintained that position almost until he landed.

During termination of the landing, rotor-induced blowing snow developed, and the pilot lost outside visual reference with everything except the top of the tree line to his front. The copilot, looking down through the chin bubble on the left side, told the pilot he thought they were moving backwards. The pilot did not sense any backward movement but, almost simultaneously, he saw the trees on the horizon tumble as the aircraft rolled right and came to rest inverted.

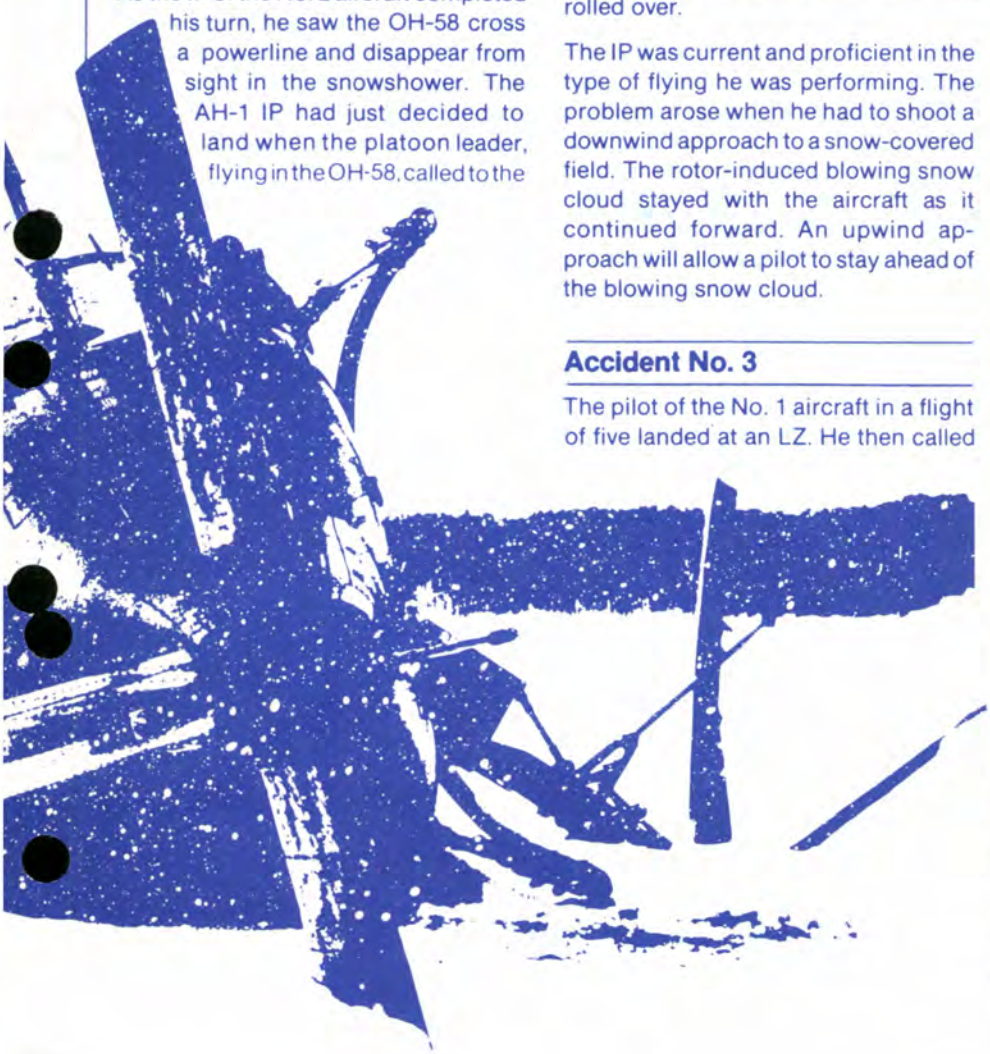
Contrary to instructions in TC 1-12, the flight leader led the four aircraft in a close diamond formation to a landing in a snow-covered field, instead of spacing them out at 15- to 30-second intervals. This resulted in enough rotor-induced blowing snow for the No. 3 pilot to become disoriented. The flight leader was not aware of the instructions in TC 1-12.

Accident No. 2

As an OH-58 and two Cobras were taking off from a field site, visibility began to decrease because of light snow. Snowshowers and one-half mile visibility had been forecast. Fresh, loose snow about 6 to 8 inches deep covered the ground. The IP in one of the AH-1s

momentarily lost sight of the lead OH-58 during takeoff because of blowing snow and closed his interval to 200 to 300 meters. The two Cobras followed the OH-58, with the weather rapidly deteriorating. Crossing a ridge line and seeing heavy snow moving toward them, the OH-58 pilot said he was going to make a right turn and return to the takeoff point.

As the IP of the No. 2 aircraft completed his turn, he saw the OH-58 cross a powerline and disappear from sight in the snowshower. The AH-1 IP had just decided to land when the platoon leader, flying in the OH-58, called to the pilots to pick a spot and land. The AH-1 IP picked what appeared to be a level spot and began his approach. On final at about a 5-foot skid height, the aircraft was completely engulfed in rotor-induced blowing snow. The IP became disoriented but couldn't go around because of the powerlines ahead of him. He applied aft cyclic to continue his landing. The AH-1 hit the ground with the right skid and then the left skid and rolled over.



The IP was current and proficient in the type of flying he was performing. The problem arose when he had to shoot a downwind approach to a snow-covered field. The rotor-induced blowing snow cloud stayed with the aircraft as it continued forward. An upwind approach will allow a pilot to stay ahead of the blowing snow cloud.

Accident No. 3

The pilot of the No. 1 aircraft in a flight of five landed at an LZ. He then called the pilots of the other aircraft to tell them about a blowing snow condition in the LZ. The pilot of the second aircraft landed without incident. He then picked up his OH-58 to move it to the east side of the LZ to make room for the other aircraft in the flight. A right pedal turn was made and a forward hover was begun. Rotorwash recirculated the snow, causing the pilot to lose ground reference. Collective was applied, but the left skid hit the ground while the aircraft was drifting left. The OH-58 rolled onto its left side.

Although warned of the recirculating snow conditions in the LZ, the pilot hovered his aircraft at 2 to 5 knots and 2 to 5 feet agl instead of using an airspeed just above translational lift or a high hover. When the helicopter became engulfed in the snow, the pilot became momentarily confused as to whether he should reduce altitude to ground taxi or add power to climb above the recirculating snow. By the time he decided to do the latter, the left skid had dug into the snow.

TC 1-12 contains some excellent information on cold weather flying techniques. It discusses the techniques aviators should use to improve depth perception, how to determine the condition of the snow, the effects of rotor and propeller wash on snow, en route techniques, and landing to and taking off from terrain covered by snow. Aviators should be thoroughly familiar with these techniques. Pilots should also be familiar with FM 1-51 and appropriate training and operators manuals.

Can we go through one winter without a whiteout accident? The only way we can is for each unit involved in snow operations to establish an effective training program that will insure pilots are knowledgeable and capable of safely operating their aircraft over snow-covered terrain. Do it now! ■

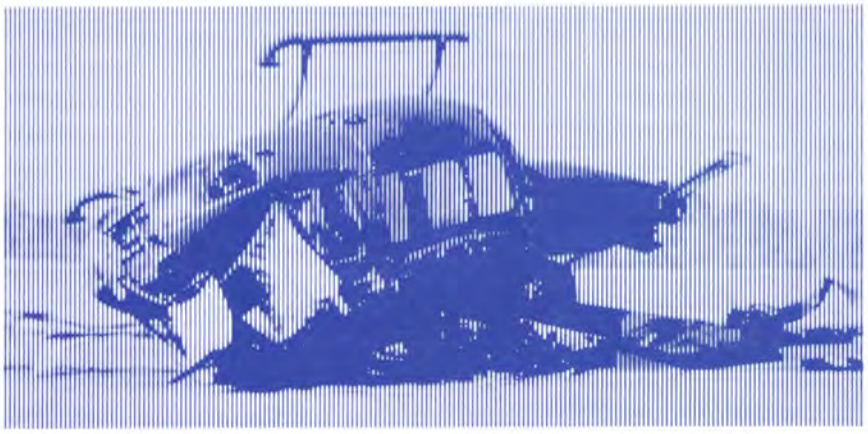
Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps □ (H series) PIC told pilot to shoot approach to the ground because LZ would be dusty. Pilot terminated approach at a hover and aircraft began to drift to right. PIC lowered collective. Right skid hit ground, and aircraft rolled right and came to rest upside down. 8276 □ (H series) Aircraft was cleared to land on sod next to runway. Pilot allowed aircraft to touch down hard and then attempted to recover. Aircraft became airborne again. IP got on the controls and tried to help pilot. Aircraft flipped inverted, rolled, and came to rest upright. One fatality and two injuries. 8277 □ (H series) Pilot overshot proposed landing site and terminated approach at a high hover. While hovering back to landing site, aircraft had an engine power degradation or settled with power. Throttle was closed and hovering autorotation attempted. Aircraft landed hard and rolled over. Four injuries. 8278

UH-1 Class E mishaps □ (H series) Crew felt moderate vibration and heard whistling and thumping noises. Caused by skin separation on bottom of leading edge of main rotor blade. □ (H series) Cyclic and pedals became stiff during landing. Caused by failure of hydraulic irreversible valve. □ (H series) Copilot's windshield wiper was inoperative and pilot's wiper was out of adjustment and ineffective. Rain became so heavy vision was totally obscured. Mission was aborted. Unit had put off replacing defective motor and adjusting the system for several weeks. □ (H series) Crew heard loud popping sounds and aircraft yawed during hover. Caused by engine failure. □ (H series) Crew smelled smoke and landed. During shutdown, severe vibration was felt in airframe. Caused by failure of No. 1 hanger bearing. □ (M series) Master caution and transmission oil pressure



lights came on. Postflight inspection revealed main transmission oil sump filter gasket was blown and most of the main transmission oil had been lost.

UH-60 Class E mishaps □ Aircraft would not respond to pedal inputs properly during taxi. Aircraft was brought to hover to check controllability. Pedals were binding enough that directional control was hard to maintain. Caused by defective yaw trim servo. □ Master caution light and stabilator light and horn activated. Caused by failure of lower stabilator actuator.

Attack helicopters

AH-1 Class C mishaps □ (S series) Aircraft landed hard during termination of autorotation. Push-pull tubes and viscous dampner mount were damaged. □ (S series) IP initiated simulated engine failure at 100 knots. Pilot reduced collective and decelerated to 70 knots. IP noticed out-of-trim condition to left and main rotor overspeed of 107 percent.

AH-1 Class E mishaps □ (S series) Master caution and No. 1 hydraulic lights came on and loud squeal was heard. Running landing was made. Caused by ruptured hydraulic line. □ (S series) Oil was seen draining from oil cooler compartment during shutdown. Caused by failure of oil ball valve. □ (S series) Loud noise was heard during hover, followed by slight left yaw and rapid increase in tgt. Caused by bleed band malfunction. □ (S series) Master caution and transmission oil bypass lights came on. Caused by broken wire on oil bypass switch.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Screws on No. 2 side of engine start manifold broke, allowing cover to separate. □ (A series) Crew heard popping sound from rear of aircraft and heard gears slowing down. Several caution lights illuminated. Caused by failure of APU motor pump quill shaft. □ (B series) No. 1 engine would only accelerate to 75 percent N_1 during hover check. Caused by failure of fuel control unit.

Observation helicopters

OH-58 Class B mishap □ (A series) Low rotor rpm light and audio activated during flight. Pilot reduced collective and started an approach straight ahead. Pilot increased collective during the approach to reach his intended landing area and aircraft landed hard. 8279

OH-58 Class C mishap □ (C series) Main rotor blade hit tree during NOE flight, damaging tip of blade.

(continued on back page)

Stacom

Standardization Communication □ Directorate of Evaluation & Standardization, USAAVNC, Ft. Rucker, AL 36362 □ STACOM 83 □ 1 Sep 1982

Operators Manual and Checklist update

Listed below are the effective dates of the current aircraft operators 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	3, 6 Nov 80	Jul 78	1, 14 Jan 81
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	25 Mar 77	7, 23 Nov 81	Feb 77	7, 27 Nov 81
209-10-1	RU-21A/D	28 Feb 77	9, 4 Feb 82	Mar 77	6, 23 Nov 81
213-10	OV-1D/RV-1D	4 Aug 78	6, 24 Feb 82	Nov 78	3, 12 Dec 81
214-10	RU-21B/C	15 Mar 77	9, 30 Nov 81	Apr 77	7, 23 Nov 81
215-10	U-21G	11 Mar 77	6, 23 Nov 81	Apr 77	5, 23 Nov 81
215-10-2	RU-21H (GR-V)	29 Dec 78	4, 27 Nov 81	Dec 78	3, 27 Nov 81
216-10	U-3A/B	11 Dec 78	2, 5 Apr 82	Dec 78	1, 9 Feb 82
	C-12A	8 Jan 80		Jan 80	
	C-12C	1 Dec 78	1, 31 Oct 79	Jan 79	
TO1C-7A-1	C-7A	1 Oct 70	10, 11 Jan 80	Oct 70	13, 11 Jan 80
	C-12D	28 Mar 80		Mar 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	2, 21 Aug 81	Dec 78	1, 2 Feb 79
210-10	UH-1D/H	18 May 79	15, 25 Feb 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	2, 1 Oct 80	Mar 77	2, 10 Oct 79
217-10-2	CH-54B	15 Apr 77	2, 10 Oct 79	Mar 77	3, 4 Aug 82
219-10	UH-1B	16 Jan 69	18, 31 Oct 81	Dec 68	8, 11 Apr 79
220-10	UH-1C/M	8 Sep 80	9, 14 Jan 82	Sep 80	2, 11 Jan 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	9, 30 Oct 81	Nov 79	4, 15 Apr 82
228-10	OH-58A	7 Apr 78	21, 22 Apr 82	Jul 78	11, 12 Mar 82
233-10	TH-55A	30 Sep 76	4, 2 Jul 82	Oct 76	5, 11 May 82
234-10	AH-1S (MOD)	17 Nov 76	13, 5 Feb 82	Nov 76	3, 30 Nov 79
235-10	OH-58C	7 Apr 78	26, 8 Jun 82	Jul 78	14, 19 Apr 82
236-10	AH-1S (PROD)	11 Jan 80	3, 14 Apr 82	Jan 80	1, 2 Apr 82
237-10	UH-60A	21 May 79	15, 20 Aug 82	Dec 78	11, 4 Aug 82

DES is aware of the fact that -10 and CL changes have not generally been sent to the field at the same time. TSARCOM, with the cooperation of TAG, has taken action to finalize -10 and CL changes simultaneously and have them remain together through printing and distribution. Users can expect simultaneous delivery in the future.

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

OH-58 Class E mishaps □ (A series) N_2 bled off to 92 percent. Caused by N_2 governor failure. □ (C series) Vibrations were noticed in controls during flight. Caused by failure of hanger bearing bracket. □ (C series) Hydraulic warning light came on and hydraulic boost was lost. Caused by failure of packing retainer on pressure output fitting. □ (A series) Transmission oil pressure light came on. Caused by failure of pressure switch.

Fixed wing

C-12 Class C mishap □ (C series) Aircraft had landed for passenger dropoff. No. 1 engine was shut down and No. 2 engine was placed in low idle. Crew change was made. While IP was refiling IFR flight plan, pilot started No. 1 engine. No. 2 engine tgt reached 840° C. for 10 seconds.

C-12 Class E mishap □ (A series) As aircraft was climbing, cabin altitude and rate of climb for cabin pressurization stopped climbing and then started descending. Pilot selected a higher altitude on pressure controller, but cabin psi differential increased and cabin altitude decreased. Pilot returned to airfield and landed. Pressure controller malfunction caused excessive differential pressure inside cabin.

T-42 Class C mishap □ Because of restricted visibility due to heavy rain, IP requested a full-stop landing on the runway. During landing roll after touchdown, aircraft began hydroplaning toward right side of runway. Directional control was lost because of water covering runway and crosswind conditions. To keep from running off runway, IP applied takeoff power to go around. As aircraft lifted off runway, landing gear was raised. Gusty winds and turbulence caused aircraft to settle and hit runway, damaging left propeller assembly and landing gear door.

Maintenance

UH-1 Class E mishap □ (H series) Master caution light came on. Caused by loose wire.

UH-60 Class C mishap □ No. 1 engine air inlet assembly separated from aircraft during flight. Assembly was not installed correctly.

CH-47 Class E mishap □ (A series) Oil was seen dripping from forward transmission area into cockpit during flight. Leak was caused by pinched oil filter O-ring.

Messages received

• Maintenance information message concerning AH-1 cross tube fairings (MIM-82-AH-1-02, 201500Z Aug 82). It is permissible to fly the AH-1 with cross tube fairings removed. Left and right cross tube fairings must be removed in pairs. When fairings are removed, cross tubes must be painted to conform to aircraft color scheme.

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

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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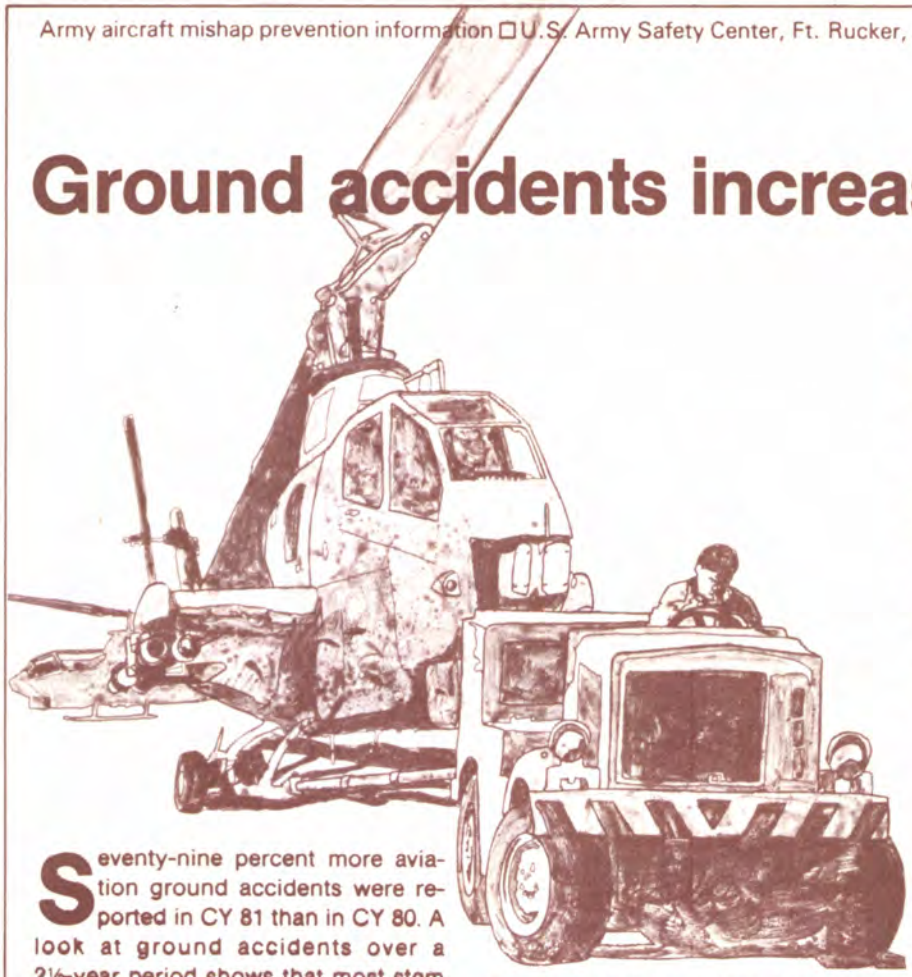
Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 47 □ 8 Sep 1982

Ground accidents increasing



Seventy-nine percent more aviation ground accidents were reported in CY 81 than in CY 80. A look at ground accidents over a 2½-year period shows that most stem from inattention, carelessness, violation of established procedures and regulations, or simply from a lack of knowledge. One of the biggest problem areas concerning ground accidents is associated with towing or ground handling of aircraft.

• A tug was being backed to hook up to a UH-1. When the tug was about 1 foot from the helicopter tow bar, the driver stepped on the brake. The brake pedal was adjusted lower than the accelerator. The driver's foot was pressing both the brake and the accelerator. The tug hit the helicopter, turning it sideways. The tail of the UH-1 hit another UH-1, causing more than $27,000 in damages.

• A soldier was seen towing a C-12 at an excessive speed from a hangar. As the tug passed another hangar, the driver tried to turn the aircraft 90 degrees. The left wing tip hit the hangar doors. The unit SOP required wing walkers, but they were not being used.

• An AH-1 was being towed from its parking pad to the hangar. The tug bogged down. The driver mashed the accelerator and the tug jumped forward, causing the vertical fin of the aircraft to hit the vertical fin of a parked aircraft.

• An individual with very limited experience in operating a tug was driving at a high rate of speed. As he tried to turn left in front of an aircraft, he lost control of the tug. The tug hit the nose of the aircraft.

• A CH-47 was being pushed out of a hangar by a tug. Three blade watchers were positioned at the forward rotor to clear the hangar door. As the aircraft was pushed forward, the tiedown rope attached to an aft blade caught on the dampner retaining bolt of a rotor blade stored on a horizontal blade rack. This blade was then pulled into another stored blade, causing $34,000 in damages. An aft blade watcher could have prevented this accident.

But aircraft do not have to be moved to be damaged.

• Two soldiers were trying to remove the main rotor blades from the blade hub assembly. The blades were mounted on a blade assembly hub stand. Although the task required more than two people to safely accomplish, the soldiers tried to remove the blades by themselves. Nobody else was available and the soldiers had been told to get the job done as soon as possible. While one soldier held the end of the rotor blade, the other soldier knocked out the main rotor retaining pin. Because of the sudden weight shift, the soldier holding the blade dropped it to the floor. The sudden imbalance also caused the other blade to fall.

• The supervisor had gone in search of a special tool needed to remove main rotor blade retaining pins. In the meantime, two mechanics decided to remove the blade pin with a wrench. The hub assembly tilted as one of the mechanics tried to remove the pin. The mechanic holding the blade was unable to keep it from rotating about the retaining pin. The blade was damaged to the tune of $7,000. A large trash can was being used as a work platform, and coke cases were being used to support the blades.

Ground accidents

• A fuel truck was driven too close to a parked helicopter at night. The truck hit the tip of a tail rotor blade of the UH-1. The ramp was partially lit by floodlights.

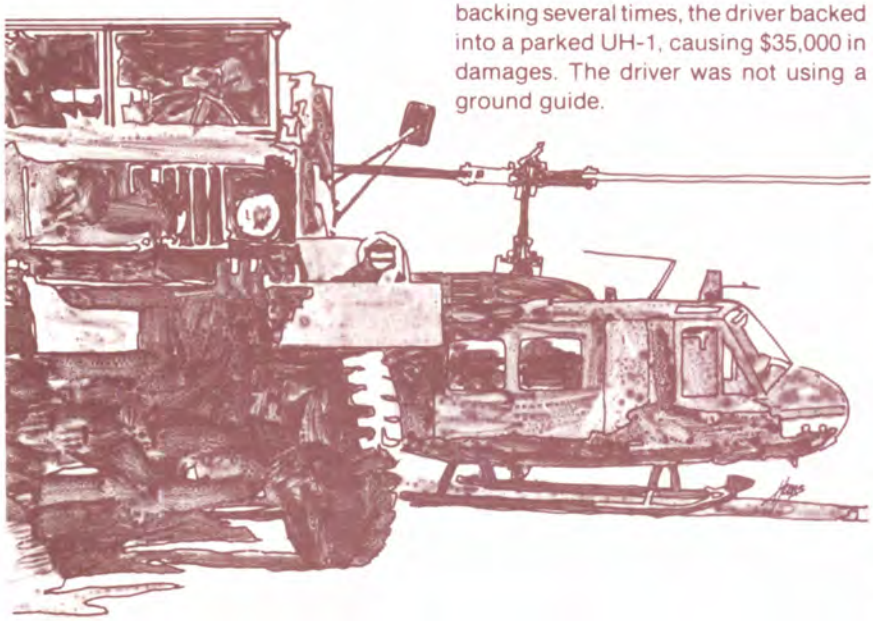
• The blades of two helicopters were damaged beyond repair when a rubber mallet and shop brush were used to try to remove ice from the blades. No blade covers were available and no deice fluid was on hand, in stock, or on order. Unit personnel had not received any training on ice removal or damage prevention.

Ground accidents not only hinder mission accomplishment, but they are also **costly.**

• As a mechanic was working in the pilot's compartment of an AH-1, he noticed the safety wire on the cover over the wing-store jettison switch was broken. He flipped the cover up. As the mechanic started to exit the aircraft to get some safety wire, his knee hit the uncovered jettison switch, triggering the firing mechanism and jettisoning the rocket pods and tow missile launchers. Ground safety pins were not installed. This accident cost $49,000.

• A mechanic went to the flight line to check a malfunctioning fuel gauge on a CH-47. There was no one available to start the auxiliary power unit. The mechanic had watched APU starts several times, so he decided he could start an APU. Not knowing that training and written authorization were required, the mechanic started the APU. When he noticed that the No. 2 hydraulic boost caution light did not go out as it should have, the mechanic shut down the APU and turned off the battery. Hydraulic fluid then began to enter the cockpit. A maintenance team had been working on the aircraft and had disconnected the pilot valves on all upper dual boost actuators. When the mechanic started the APU, hydraulic pressure caused the actuators to fully extend, ramming the swashplates into the stops at the top of the vertical shafts. Both swashplates had to be replaced, at a cost of $21,000.

• A truck driver, who had received his license only 2 weeks before, was having problems backing his truck. He decided to find an area on the airfield and practice backing. He chose an open space near the hot refueling area. After backing several times, the driver backed into a parked UH-1, causing $35,000 in damages. The driver was not using a ground guide.



Something must be done to stop these accidents . . . and that something begins with supervision. Supervisors must supervise. And a positive safety attitude must be established within the unit. If the supervisors of the people in the unit are safety conscious, the rest will follow suit. If new people coming into the unit find a hurry-up, just-get-it-done, careless attitude, they will soon adopt this same type of attitude.

Commanders and supervisors must insure that all written and established policies and procedures are followed. Take the initiative to develop procedures when there are none and to change any that may be potentially unsafe. Take positive disciplinary action for deviations from established policies and procedures. Since equipment and personnel change periodically, an ongoing OJT program is essential. Insure OJT programs are being conducted, including initial, refresher, and remedial training.

It is the maintenance supervisor's responsibility to insure that adequate personnel are available for the job and that equipment is serviceable and adequate for the job to be done. Make sure your personnel understand your instructions. Continually stress the need for safety precautions.

Safety officers should evaluate unit operations to identify unsafe acts and determine cause factors and trends. Recommend to your commander and maintenance officer countermeasures to reduce or eliminate ground accidents.

What it all boils down to is mechanics and ground crews being thoroughly trained in and familiar with the equipment they will be using and the aircraft they will be handling. This knowledge, plus close supervision, strict adherence to established procedures and a positive safety attitude, will reduce costly ground accidents. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class C mishap □ (H series) IP heard loud noise during NOE flight and landed. Bullet hole was found in tail boom.

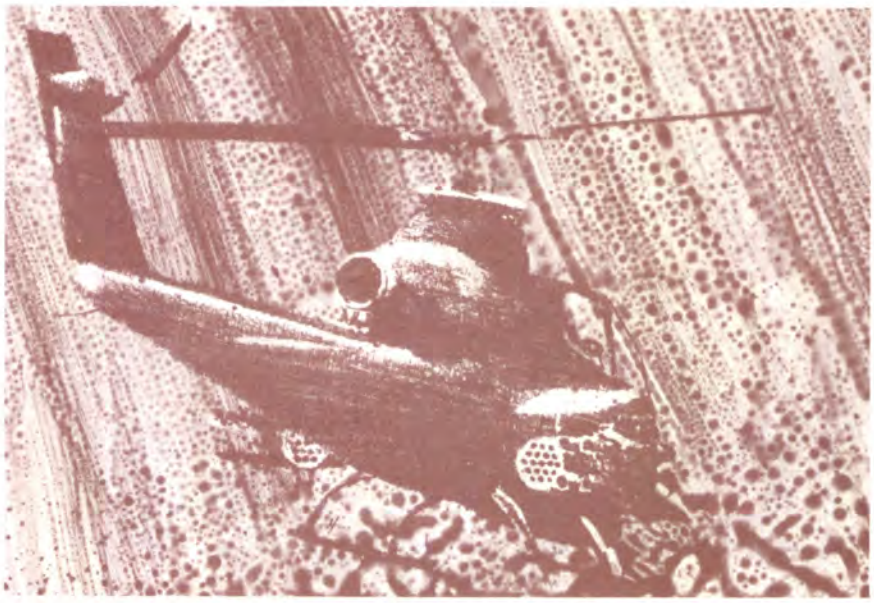
UH-1 Class E mishaps □ (H series) Engine stopped during flight. Aircraft was autorotated to confined area. Main fuel switch had shorted out, causing main fuel valve to close. □ (H series) Master caution and hydraulic lights came on, and feedback was felt in controls. Caused by failure of hydraulic pressure line to collective servo. □ (H series) Fore and aft cyclic binding during takeoff was caused by defective bellcrank below left lateral servo. □ (H series) Engine oil temperature rose to 112 degrees and egt rose to 610 degrees on downwind for landing. Caused by failure of customer bleed air valve. □ (H series) Insufficient right pedal was available to trim aircraft during descent. When additional pressure was applied, ratcheting feeling was felt through pedals. Aircraft was landed. Caused by failure of tail rotor servo. □ (M series) Master caution and transmission oil pressure lights came on during takeoff. Transmission oil pressure gauge dropped to zero. Caused by blown gasket.

UH-60 Class C mishap □ Pilot in left seat noticed aircraft drifting to left and told copilot in right seat. As control input was initiated, main rotor blades hit trees to left of aircraft.

UH-60 Class E mishap □ Transmission oil pressure dropped to 30 psi. Caused by failure of oil pressure sensor.

Attack helicopters

AH-1 Class C mishap □ (S series) Crew chief performing daily inspection discovered spread cross tubes. Six autorotations had been done during previous flight.



AH-1 Class E mishaps □ (G series) Low rpm audio came on and engine N_2 dropped to zero. Caused by failure of tachometer generator. □ (S series) When told to make power recovery from simulated engine failure, pilot reduced collective and turned his attention to torquemeter. Rotor rpm began climbing. When throttle was advanced, rotor rpm oversped to 110 percent.

Cargo helicopters

CH-47 Class E mishaps □ (C series) Postflight inspection revealed evidence of blade separation in pocket No. 3 of forward rotor blade. Caused by failure of bonding. □ (C series) No. 1 engine transmission oil pressure dropped to zero. Caused by failure of oil pressure transducer. □ (B series) Engine oil low caution light came on. Caused by failure of indicator housing assembly.

Observation helicopters

OH-58 Class A mishap □ (A series) Aircraft was brought to 6- to 8-foot hover into 15- to 20-knot headwind. As pilot hovered right, he allowed nose of aircraft to turn right into crosswind condition. Aircraft began slow, uncommanded turn to right. As tail of aircraft swung into the wind, rate of turn accelerated. Aircraft control was lost during the first spin. Pilot rapidly lowered collective pitch and aircraft landed hard and rolled onto left side. 8280

OH-58 Class E mishaps □ (A series) Transmission oil hot light came on. Transmission oil cooler hose was blocked with water, causing transmission cooler not to receive air flow. □ (A series) Master caution and transmission chip detector lights came on. Caused by failure of transmission. □ (A series) Engine-out light came on as throttle was reduced to engine idle during landing. Caused by failure of sensor. □ (C series) Transmission oil pressure dropped during takeoff. Caused by malfunction of pressure transmitter.

Fixed wing

C-12 Class E mishaps □ (A series) After takeoff, pilot noticed cowling on left engine had dislodged. Latch was apparently loose and vibration caused it

to release. □ (C series) No. 1 engine would not start. Starter brushes were worn beyond limits.

OV-1 Class E mishaps □ (D series) Pilot applied reverse thrust at approximately 75 knots groundspeed during rollout. Aircraft swerved violently to right. Pilot placed power levers in idle and controlled aircraft with full braking action. Caused by failure of No. 1 engine power lever reverse thrust microswitch. □ (RV-1D) Pilot noticed erratic airspeed and altitude indications during climbout. Altitude indicator remained at 100 feet until aircraft passed 2,500 feet. Caused by wasp nest inside pitot static openings.

T-28 Class E mishap □ Pilot received unsafe gear indication. Visual inspection by tower personnel indicated gear was down and locked. Aircraft was landed with no problem. Caused by failure of microswitch landing gear indicator due to corrosion and rust.

U-21 Class E mishaps □ (RU-21H) Left fuel gauge indicated 75 pounds in nacelle tank, and transfer pump gave no indication of fuel transfer. Caused by malfunction of nacelle fuel probe. □ (A series) IP had initiated single-engine operation at 8,000 feet. Engine would not restart. One ignition tube was bad and one spring was broken on inside of ignitor box. □ (A series) Right fuel boost pump light and crossfeed came on. Caused by failure of fuel boost pump.

Maintenance

UH-1 Class E mishaps □ (H series) Low fuel light came on during landing, with 340 pounds of fuel indicated. Caused by incorrectly seated flapper valve. □ (H series) Application of power during recovery from descent resulted in loud noises, slight tail rotor control loss, and increase in egt. Bleed band was out of adjustment. □ (H series) Fire warning light came on during takeoff. Fire detection system element was not tightened correctly. □ (H series) Two loud bangs were heard from engine as aircraft was hovered during HIT check. Inlet guide vanes were out of rig.

UH-60 Class E mishap □ Stabilator failed during flight and would not reset. Computer connector was not secure.

CH-47 Class E mishap □ (C series) No. 1 engine oil low light came on and oil pressure gauge showed decreasing oil pressure. Visual inspection confirmed oil leak from No. 1 engine. Caused by incorrect washer stack-up in main oil filter, which caused pressure against locking mechanism on oil filter.

OH-58 Class E mishap □ (A series) Aircraft developed severe high frequency vibration during hover. Master caution and tail rotor chip detector lights came on. Postflight inspection revealed two small washers were not installed in tail boom. Suspect lack of washers caused tail rotor gearbox to be misaligned.

U-21 Class E mishap □ (RU-21H) Crew noticed brief flash of white light in cockpit during runup. On climbout, crew again saw white flash in area of fuel circuit breaker panel. Aircraft landed without incident. Incorrect electrical connector was installed on main power lead to fuel management panel. Connector was bent during installation, causing metal fatigue. When connector broke, main power lead shorted out.

Messages received

• Maintenance information message concerning removal of fuel control heater assembly on OH-6/OH-58 helicopters with T63-A-700 turbine engines (MIM-82-T63-MEA-03, 260845Z Aug 82).

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

FY 82 Class A Accident Countdown

		FY 81			FY 82	
	Month	Class A Accidents	Fatalities	Month	Class A Accidents	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**2**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	August	**8**	**5**
	September	1	0	1-8 Sep	**4**	**5**
	Total for Year	43	29	Total to Date	**53**	**38**

Operation Alert

CH-47/CH-54 cowling losses

CH-47/54 accidents caused by loss of or inadvertent opening of cowlings in flight have increased recently. So far this fiscal year, seven CH-47/54 accidents due to loose/unsecured and lost cowlings have been reported. Damage costs exceeded $75,000.

Typical accident profile

The aircraft will be on a service mission which originated at an established airfield or heliport. The crew will be experienced. There will be no urgency involved in meeting a takeoff or mission time. The engine cowling will come open shortly after takeoff, causing damage to the aircraft.

Actions to take

Commander

Direct by-the-book maintenance and inspection procedures by all unit personnel.

Aviator

Preflight by the book! Check and secure all cowlings/fairings/access panels before ground runs and flights.

Flight engineer/crew chief

Perform daily inspections by the book. Check for and remove all foreign objects when cowlings/fairings and access panels are open.

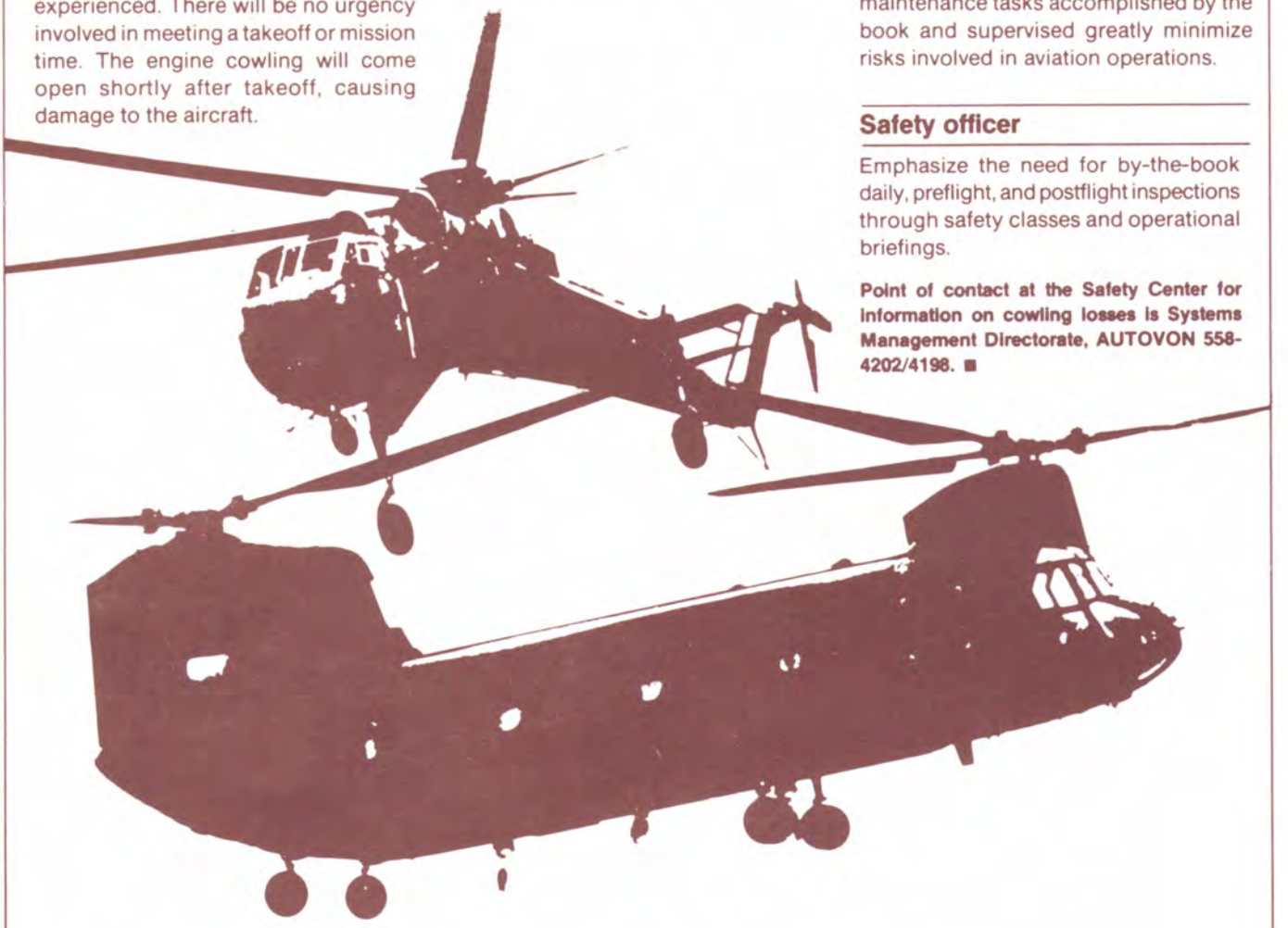
Maintenance officer

Review maintenance SOP for clarity as to task accomplishment and supervisory responsibility. Foster an atmosphere within your maintenance activity that maintenance tasks accomplished by the book and supervised greatly minimize risks involved in aviation operations.

Safety officer

Emphasize the need for by-the-book daily, preflight, and postflight inspections through safety classes and operational briefings.

Point of contact at the Safety Center for information on cowling losses is Systems Management Directorate, AUTOVON 558-4202/4198. ■



Recap of TSARCOM and AVRADCOM messages

Following is a list of AIG 8881 addressed messages transmitted by TSARCOM and AVRADCOM from 1 April through 30 June 1982.

UH-60A-82-06 Safety-of-flight maintenance mandatory message concerning one-time inspection of pilot/copilot seat rubbing bar

UH-60A-82-07 Maintenance mandatory inspection of main transmission beam fastener hardware

GEN 82-03 Safety-of-use message restricting all high performance internal rescue hoists from life missions other than urgent

GEN 82-04 Safety-of-use maintenance notice on CCAD hot line use—clarification and recision of TSARCOM maintenance notice message

GEN 82-05 Safety-of-use maintenance advisory message concerning the use of the AN/ALQ-144 IR jammer

AH-1-82-04 Safety-of-flight emergency technical message concerning one-time inspection of AH-1 pitch change tubes

AH-1-82-05 Safety-of-flight emergency technical message concerning one-time inspection of pitch change tubes

AH-1-82-06 Safety-of-flight maintenance mandatory message concerning installation and inspection of the new pitch control tubes

AH-1-82-07 Maintenance advisory message on canopy removal system

AH-1-82-08 Safety-of-flight maintenance mandatory message concerning ungrounding of the Kaman main rotor blades

AH-1-82-09 Maintenance mandatory message on daily inspection of castellated nut, pitch change tubes

UH-1-82-02 Safety-of-flight maintenance mandatory message concerning inspection of all UH-1H main rotor blades for oversize and/or improperly installed skin patches

CH-47-82-02 Safety-of-flight technical message concerning one-time inspection of CH-47B/C rotor blade shock absorbers

CH-47-82-03 Safety-of-flight technical message concerning one-time inspection of connection link clevis fitting

CH-47-82-04 Safety-of-flight technical message concerning one-time inspection of CH-47B/C rotor blade nose caps

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

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 10, No. 48 □ 15 Sep 1982

An alternative to panic

In every human being, there is an inherent psychological condition which appears during times of extreme threat or duress. Medical authorities tell us that, during these times, our bodies shift into a hyperactive state. While in this state, our minds speed up fantastically, our muscles can develop super-human strength, and our entire system undergoes some type of chemical change. All of this sounds great, a little like changing into an instant superman.

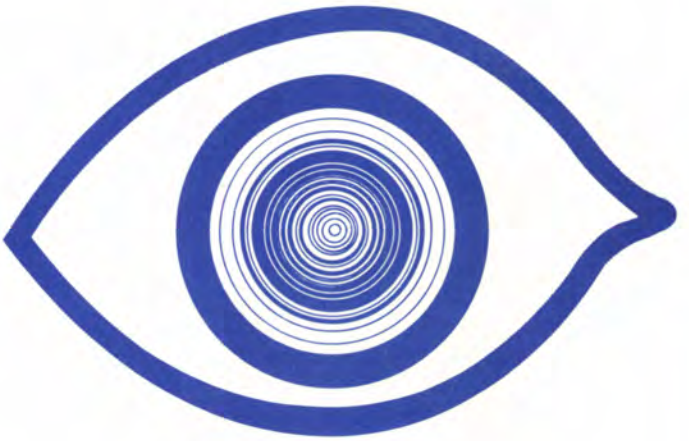
You're probably wondering just what this has to do with flying. Let me try to explain. Contrary to how good the above superman image is, quite the opposite is true. This condition which I've described above is actually the predecessor for **panic,** a condition that has probably killed more pilots than all of the aircraft mechanical malfunctions combined. Prior to panic setting in, the mind speeds up in an effort to find a solution to the immediate problem before it, but as the mind hunts for a solution, the hunting itself brings on panic. The reason for this is that the brain actually becomes less productive, not more productive during this time. Tunnel vision sets in, the eye muscles constrict causing slowing or stopping of eye movement. Panic then sets in, all reason leaves us, and we tend to lash out wildly. If this weren't enough, while in this panic state, we tend to concentrate upon a fixed solution, whether it be right or wrong.

We can all remember reading at one time or another about the pilot flying in IMC who comes screaming out of the clouds, fully intact, only to pull back on the yoke with all his might, and "**snap,**" so long wings and tail. Where he wouldn't have even popped a rivet, the pilot ends up making his **final** landing.

Humans, unlike other animals on this earth, have an integrated part of our makeup called emotions. While these emotions usually work great in most normal everyday situations, they tend to hamper solutions to in-flight emergencies, especially when the emotion involved is panic. There isn't much we can do at the present time to protect ourselves against emotions, especially since they are an integral part of our human makeup. Hopefully, someday medical science may come up with a cure for emotions, but until that time, we are stuck with them. But don't give up hope. There are some preventive steps which can be taken to prepare us for those fateful moments.

For pilots, probably the best weapon against panic is experience. When the gear fails to retract on takeoff, the 20-hour student might panic for an instant. The fact that the gear is down... the aircraft doesn't accelerate as it normally would . . . trying to remain below gear placard speeds . . . etc. . . . well to say the least, it is distracting and since it is a fulltime job to fly the darn airplane in the first place, the 20-hour student is in no position for surprises. On the other hand, the multi-thousand-hour veteran pilot would probably react to the same situation by reciting a few chosen words, fixing the problem, and continuing along his merry way. There is, however, one major flaw to this "experience is the best solution." It seems one has to survive many hours and years worth of panic situations before one develops some immunity to panic.

An approach which one can adopt much quicker than waiting all those years for experience is knowledge. The pilot who understands the characteristics of a compressor stall is less likely to ➤



An alternative to panic

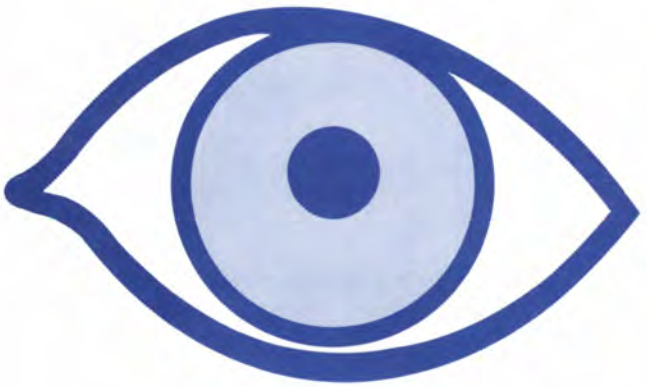
panic the first time he encounters engine roughness with or without audible pulsations. This is not to say the knowledgeable pilot will sit there and yawn through an engine fire/failure situation, but instead will do everything in his power to solve the problem by pulling the fire switch, cutting off the throttle, and observing checklist discipline. Sure his heart is pounding, but with the knowledge of how to handle the situation, this pilot is not succumbing to panic or indecisiveness. This pilot's mind is working effectively to solve the problem along with maintaining control of his aircraft.

If you look closely at the above situation, you'll notice the pilot went through some exact actions to solve his problem with the engine fire/failure. These procedures are known as "critical action" items. Critical action items constitute the minimum required steps to be taken by a crewmember to insure survival in a given emergency situation. If one enacts these procedures over and over until they are firmly implanted in the mind, these critical action items may just get the pilot out of a calamity, even if his brain quits on him.

By drilling these critical action items into our brains, we are, in effect, acknowledging the fact that our brain may go on vacation during times of dire stress. This leaves the pilot confused at a time when he needs to be in full command. We therefore automatically avoid doing something dumb by having these robot-like actions memorized. So while the conscious mind is crying out with panic and your heart is pumping out blood faster than an Oklahoma oil well, your subconscious is reacting—throttle—cut off, fire switch—pull, starter switch—ground start, etc. The whole thing boils down to this: In an emergency, a person must have the rational intelligence upstairs in order to take the proper steps.

All pilots have, at one time or another, heard of or read the phrase, that during an emergency, "be calm." This seems like good solid advice, but there is a problem with this phrase. Each human being has his or her own psychological makeup, which is one reason no two of us are exactly the same. Because of this, we have our own inbred stress tolerances. These tolerances allow some of us to take on more problems at a given time than another would be able to do in the same period of time. It seems therefore that to believe that a simple statement of "be calm" would be of any great help in reacting to an emergency in a proper and rational manner is one of wishful thinking.

Probably the best advice I've heard for an emergency situation comes from my Undergraduate Pilot Training (UPT) days. Briefly stated, the advice was "Wind the clock." When things go wrong there is a momentary period of shock, and during this period, human beings have a natural tendency to grab for something without really thinking about what they are doing. Realizing that even UPT studs are human beings, it was stressed that if we should find ourselves in an emergency situation we should "wind the clock." This would give us something to grab for during our momentary period of shock, plus it insured that the clock was always wound. In fact, during my UPT days, I don't ever remember finding a clock that wasn't wound, and very tightly at that. H H M M M . . . It is far better to wait a second and collect your wits than to go off half cocked, flipping switches and moving levers, changing a minor problem into a major one.



In conclusion, no amount of preparation can assure a pilot 100 percent immunity to mental blackouts or panic during those fateful moments of dire stress. But by having the necessary knowledge and skill, the odds are in the pilot's favor that he will be able to cope with his emergency without panic. ■

—from COMBAT CREW
LT Garry M. Schull
916AREFS

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps □ (H series) Aircraft, on tactical service mission, crossed a treeline where mortar positions were located. As aircraft was flying about 10 feet above the trees, mortars began firing almost directly below the aircraft. Pilot began steep right bank as evasive maneuver. While in the turn, he applied additional collective pitch, which resulted in rotor and engine rpm bleed-down. Aircraft settled into trees and hit the ground in nose-low, left bank. 8281 □ (H series) Aircraft was on training flight. After six approaches, crew began to practice slope operations. IP decided to demonstrate to pilot a method of improving his control touch by hovering around a tree. As they were hovering around the tree, the pilot told IP they were approaching higher terrain to the right of the aircraft. IP pulled collective pitch, but aircraft skid hit a dirt mound. Main rotor blade hit ground and aircraft rolled inverted and came to rest on its roof. 8282.

UH-1 Class E mishaps □ (H series) Engine developed partial power during takeoff. Caused by failure of fuel control. □ (H series) Loud popping and whistling noises were heard during flight. Main rotor blade skin had debonded from honeycomb on underside of blade. □ (H series) High frequency vibrations were felt in cyclic, collective pitch, and pedals. Caused by failure of hydraulic pump. □ (V series) During final approach to stadium parking lot, pilot and copilot saw electrical wires start swinging toward aircraft. Pilot applied power to stop descent, but both main rotor blade tips hit and broke the wire. Crew did not anticipate additional clearance needed when rotorwash caused wire to start swinging. □ (V series) Tail boom was seen to be shaking during runup. Inspection revealed upper left tail boom fitting had cracked 3½ inches to rear of tail boom bulkhead. Eight of 28 aircraft inspected showed problems developing in the same area. QDR has been submitted. □ (H series) Master caution and hydraulic lights came on. Caused by failure of hydraulic pressure switch. □ (H series) When windshield wipers were turned on, copilot saw fire coming from circuit panel over pilot's head. Pilot's windshield wiper shaft was bent, causing shaft to bind and motor to overload. Speed resistor and wires overloaded, causing fire. Shaft may have been bent when used as a handhold.

UH-60 Class C mishaps □ Loud noise was heard and aircraft vibrated. No. 1 engine immediately oversped. Single-engine landing was made. Flexible coupling on engine shaft assembly bolts sheared at input module, causing flex pac to separate and engine to disengage. □ Postflight inspection following night vision goggle mission revealed 50 feet of barbed wire trailing behind aircraft. Wire was also wrapped around tail wheel axle. Fuselage forward of tail wheel was cut.

Attack helicopters

AH-1 Class E mishaps □ (S series) Ammeter indicated 200 amps. Caused by thermal runaway of battery. □ (S series) Airspeed indicators were inoperative during takeoff. Caused by failure of pitot static line. □ (S series) Engine oil pressure light came on during runup. Caused by failure of oil pressure switch.

Cargo helicopters

CH-47 Class B mishap □ (YCH-47D) A.c. and d.c. beep failed during external sling load training. Running landing was made at airfield. On shutdown, aft main rotor blade struck forward blade and fuselage. Sheetmetal was torn and electrical wires severed. Postflight inspection revealed damper mount on main rotor blade broke, allowing blades to mesh and strike fuselage. 8283

CH-47 Class E mishap □ (B series) Oil was seen leaking in aft compartment from C box area. Caused by cracked fitting in transmission oil line.

Observation helicopters

OH-58 Class E mishaps □ (A series) N_2 dropped to 93 percent and low rpm audio activated. Caused by failure of overspeed governor. □ (A series) Cyclic and pedals became very stiff. Caused by failure of magnetic brake. □ (A series) Transmission oil pressure light came on. Caused by failure of pressure switch. □ (A series) Master caution and d.c. generator lights came on. Caused by failure of d.c. generator.

Fixed wing

C-12 Class E mishap □ (A series) Three deer jumped out of grass and ran in front of aircraft during landing roll. One deer was struck by No. 2 propeller, resulting in bent blade.

U-8 Class E mishap □ (F series) Engine oil pressure decreased during climb. Suspect internal engine failure.

Maintenance

UH-1 Class C mishap □ (H series) Crew chief used wooden pole with grease pencil taped to its end to track tail rotor blade. Pole hit and damaged blade. Crew chief said he was aware of the proper procedure but felt rushed into using an improper method.

UH-1 Class E mishaps □ (V series) Noise was heard and master caution and hydraulic lights came on. Collective irreversible valve O-ring was installed incorrectly. □ (H series) As aircraft was being refueled, crew chief saw fluid leaking underneath aircraft. Metal hydraulic fluid line had chafed against

Mishap briefs

transmission bulkhead, causing loss of fluid. □ (H series) Cargo hook would not operate properly during runup. While crew chief was repairing hook, he saw hydraulic fluid leaking from hydraulic filter. Washer was not installed behind preformed packing on input side of hydraulic filter assembly. □ (H series) Flight controls became stiff during takeoff to hover. Master caution and hydraulic lights came on, and loud grinding noise was heard. Hydraulic leak was caused by incorrectly torqued nut backing off and blowing seal.

UH-60 Class E mishap □ Main transmission oil temperature exceeded 100° C. for 2 minutes as aircraft was hovering with slingload. Transmission oil cooler was clogged with grass particles.

AH-1 Class E mishaps □ (S series) As power was increased above 82 percent torque, engine N_2 and rotor rpm decreased. Incorrect maintenance procedure on throttle linkage caused restricted fuel flow to engine. □ (S series) As aircraft was landing, d.c. circuit breaker panel shifted forward and shorted three circuit breakers against mount. Previous maintenance on panel was not entered in logbook. Panel was unsecure. □ (S series) With 85 percent torque applied during hover, engine began to decelerate to 91 percent N_2 rpm. Piece of tape was found covering TI inlet inside particle separator. Main fuel line between fuel filter and fuel control had collapsed, restricting fuel flow to engine. □ (S series) Rotor rpm deteriorated during autorotation. Caused by incorrectly adjusted pitch change links.

OH-58 Class C mishap □ (A series) After necessary weights were added to tail rotor, wire was removed from accelerometer but accelerometer was left attached to tail rotor gearbox. Test pilot and mechanic proceeded with test flight. On termination of flight, crew discovered accelerometer was missing and tail rotor blade and vertical fin were damaged.

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Accidents	FY 81 Army Fatalities	Month	FY 82 Class A Accidents	FY 82 Army Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**2**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	August	**8**	**5**
	September	1	0	1-15 Sep	**11**	**13**
	Total for Year	43	29	Total to Date	**60**	**46**

Messages received

• Safety-of-flight technical message concerning one-time inspection of UH-1B/H/V, EH-1H, and EH-IX aircraft scissors and sleeve assembly for possible defective bolt (UH-1-82-04, 282100Z Aug 82). Summary: Investigation of a recent accident and subsequent teardown analysis revealed that the scissors assembly bolt sheared some time during the crash sequence. Aircraft will be inspected for defective bolts. Contact: Dick Mooy, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning one-time inspection of UH-60 tail rotor servo (UH-60A-82-14, 031900Z Sep 82). Summary: Two tail rotor servo bolts used to attach input arm linkage to power pistons or loose huck bolt collars on the servo assembly are suspect safety items. Message gives instructions for replacing bolts and servo assemblies. Contact: Lyell Myers, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

• Safety-of-flight maintenance mandatory message concerning daily inspection of UH-60 primary servo input rods (UH-60A-82-15, 031915Z Sep 82). Summary: The primary main rotor servo input link bearings are retained by a staking process. Should the staking loosen, it may lead to improper control of the servo valve drive linkage. This message imposes a special inspection of the input links to insure secure staking before the first flight of each day. Contact: Robert Lawyer, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.

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

Operation Alert

U-8/U-21 landing gear actuator failures

Five landing gear actuator failures have been reported this fiscal year. Two of them resulted in collapsed gear during landing.

Typical accident profile

The aircraft will be on a service mission. The first indication of trouble will be failure of one of the gear to retract or extend.

Actions to take

IP/SIP

Continue fixed wing aviator reinforcement training and evaluation on landing gear malfunction emergencies.

Aviator

Know and be able to apply the emergency procedures for landing gear malfunction.

Maintenance officer

Insure by-the-book maintenance is being accomplished.

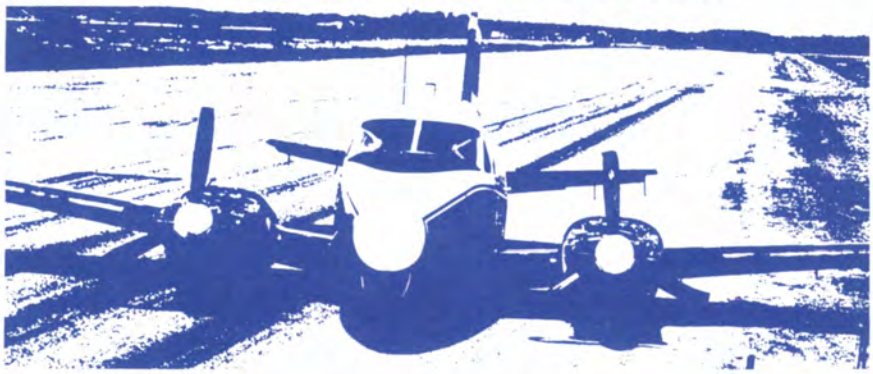
Maintenance supervisor

Supervise maintenance personnel during the removal, inspection, and lubrication of the actuator to insure these tasks are accomplished in accordance with the applicable maintenance manual. Submit a recommendation for change of procedures when an error is discovered in a maintenance manual.

Mechanic

Remove, inspect, install, and lubricate the actuator in accordance with the applicable maintenance manual.

Point of contact at the Safety Center for information on landing gear actuator failures is Systems Management Directorate, AUTOVON 558-4202/4198. ■



THE 10 COMMANDMENTS OF AVIATION SAFETY

I Know your personal limits and the limitations of your crew.

II Know your aircraft and its performance limitations.

III Know your plan—carefully preflight, prepare performance charts, conduct hover checks—and fly your plan.

IV Know proper loading for anticipated flight conditions.

V Know normal mission parameters and avoid marginal operations.

VI Know the wind and avoid low-level downwind operations.

VII Know your pilot-in-command authority and don't be pressured or rushed.

VIII Know and be ever wary of weather.

IX Know and obey established directives.

X Know the joy of professionalism—think safety and fly safely!

—thanks to CW3 Ray Christopher, ASO, 441st Medical Detachment, Kentucky National Guard

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The package deal

An IP and two rated student pilots were on a CH-54 transition training flight. After a short period of slope landing and takeoff practice, the IP maneuvered the aircraft over a slingload weighing 10,300 pounds. With the slingload suspended 26 feet below the landing gear, and while flying over a confined area, the IP initiated a simulated single-engine emergency procedure by beeping the No. 2 engine off line. As the aircraft reached short final, the approach was lower and slower than normal. The load hit trees, then the ground, and the helicopter crashed through the trees and was destroyed.

The IP's normal routine included preparing a performance planning card with his students before each flight. But on this flight, he deviated from his routine and skipped the procedure. As a result, he was not aware of the power required to place the load on the ground with zero airspeed.

Webster says routine means the habitual performance of an established procedure. It is a fact that established procedures are necessary for safe aircraft performance. It is also a fact that thorough planning is a routine requirement for safe mission accomplishment.

Aircrews are responsible for making a mission work. They must blend planning and preparation with aircraft performance to produce a complete mission package. The accident record shows that all too often aircrews shortcut mission planning and preparation, setting the stage for an accident before the aircraft is cranked. The following recent cases are typical.

• The crew of a UH-1, without getting a weather briefing, took off in conditions below night VFR minimums. About 5 minutes after takeoff, the pilot became disoriented. He placed the Huey in a descending left turn at an estimated airspeed of 40 knots and 100 feet agl over unfamiliar snow-covered terrain. The helicopter crashed and was destroyed. The pilot was ill prepared to cope with the loss of outside references. He had done no instrument work since graduating from flight school 8 months earlier. The only weather time in his records was 2 hours as copilot during flight school.

The package deal

• An OH-58 pilot took off on a tactical service mission without doing a map reconnaissance of the intended route. He did not brief his passenger on identification of hazards, map symbols, or assistance in obstacle avoidance. Flying about 350 feet agl, the OH-58 crossed a valley and then passed over higher terrain. As the pilot approached the higher terrain, the flight path appeared deceptively clear of obstacles. After traveling about 400 yards at 35 feet above the ground, the pilot saw electrical cables in front of him. The helicopter hit three of the cables and crashed. The cables were marked on the pilot's and passenger's maps.

• While trying to cross a ridge at 12,000 feet msl, a UH-1 pilot demanded more torque than was available and engine rpm deteroriated below 5700. The aircraft entered a right turn and crashed. The crew had not computed cruise, climb, and landing performance data. They normally operated near sea level, where they were concerned only with takeoff performance data.

• An OH-58 pilot took off on a mission without reviewing performance data, filling out a performance planning card, or calculating weight and balance. He was not aware of power available or required for his flight. While flying about 100 feet agl, the pilot began a right turn, which placed the aircraft in a tailwind condition. A combination of slow forward airspeed, high gross weight, reduction of lift because of the right bank, and the tailwind caused the aircraft to settle. The pilot demanded more power than was available, and main rotor rpm bled off. As the tail rotor became ineffective, the aircraft entered an uncontrollable spin and crashed.

Mission planning is a requirement. In each of these accidents, **required** planning actions were ignored by experienced pilots. But planning should be just as routine as the preflight inspection. And when the routine actions fall apart, the mission often does, too.

The goal is successful mission accomplishment. Of course, no one can guarantee the success of every mission. But risks can be greatly reduced, beginning at the planning stage. What goes into sound planning will differ depending on the mission, but safety and success are linked to crew preparation, planning, and performance. It's a package deal. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps □ (H series) Aircraft had picked up injured civilian and departed for hospital. Pilot was following a river with high cliffs on each side. Aircraft completed a steep right turn and then rolled into a steep left turn. At this point, aircraft was 60 to 70 feet above the river. During the left turn, main rotor blades hit the top of a tree. Pilot lost control and aircraft hit a rock cliff. Five fatalities. 8284 □ (H series) Aircraft hit wire while flying at cruise

airspeed 100 feet above water. Wire severed tail rotor drive shaft. Crew flew aircraft to the edge of the water. Airspeed was allowed to dissipate to the point that aircraft went into a spin and crashed. Four injuries. 8285 □ (H series) Flight of four was making an approach to a landing zone which had a dirt road running through its center. Pilot of lead aircraft terminated his approach at a hover over the dusty road. Rotor downwash created a dust cloud around the aircraft. Pilot lost visual reference. Right skid hit the ground. Application of collective pitch resulted in the aircraft rolling onto its right side. 8286 □ (H series) During first supervised solo flight, student brought aircraft to normal hover from landing. Aircraft entered accelerated spin to right and made several 360-degree spins. Student pilot applied full left pedal and lowered collective. Aircraft landed hard. 8287

UH-1 Class E mishaps □ (H series) Vertical fin cowling came open in flight. Crew did not insure cowling was fastened before flight. □ (H series) Master caution and engine chip detector lights came on. Caused by failure of bearings in engine. □ (H series) Crew saw smoke coming from engine compartment during runup. Caused by oil leak between compressor and combustor section. □ (H series) Transmission oil pressure light came on. Caused by failure of oil pressure switch.

UH-60 Class C mishap □ Aircraft developed severe 1:1 vibration. Failure of antiflap shaft caused antiflap cam to interfere with main rotor blade coning.

Attack helicopters

AH-1 Class C mishaps □ (S series) During low-level autorotation to sod, pilot applied excessive initial pitch at 10 to 15 feet. Aircraft gained 2 to 3 feet of altitude. IP took control, allowed aircraft to settle to 3 to 5 feet, and applied remaining pitch to cushion landing. Aircraft touched down with low main rotor rpm. Before skid toes touched ground, crew felt severe jolt from behind the cockpit. Inspection revealed cracked right rear transmission mount and evidence of mast bumping. □ (S series) Rotorwash from departing AH-1 caused main rotor of parked AH-1 to flex down and hit tail rotor drive shaft cover. Main rotor blade was secured by aft blade only.

AH-1 Class E mishaps □ (G series) Lateral movement of cyclic became difficult during flight. Running landing was made at airfield. Both crewmembers were required to move cyclic laterally. Duct tape and rubber gasket blew out of air duct, causing freezing condensation from environmental control unit to build up and bind cyclic lateral control. □ (S series) Transmission oil bypass light came on and oil temperature increased. Caused by failure of oil bypass switch.

Cargo helicopters

CH-47 Class E mishaps □ (C series) IP positioned No. 1 engine condition lever to ground for simulated engine failure. N_1 stabilized at 65 percent. No. 1 engine would not respond when condition lever was positioned to flight. Caused by electrical malfunction in engine wire bundle assembly. □ (B series) No. 1 engine made growling noise, followed by split torque needles and drop in N_1. Inspection revealed engine nose box had failed, dumping gearbox oil into engine. □ (C series) Torque needles split during before-takeoff check. No. 1 engine N_1 dropped to 40 percent and rpm dropped to 230. Caused by malfunction of fuel control.

Observation helicopters

OH-58 Class E mishaps □ (A series) N_2 fluctuated during takeoff. Caused by failure of overspeed governor. □ (A series) Engine oil bypass light came on. Oil was seen spraying from right side of engine after landing. Caused by failure of helicoil at assembly gearbox to No. 1 bearing on compressor assembly. □ (A series) Crew, on ferry flight, filed a flight plan into an airport where there was no jet fuel. Aircraft was refueled with aviation gas 100 low lead. About 35 minutes after takeoff, fuel boost pump light came on. Pilot elected to continue flight. About 40 minutes later, engine failed.

Aircraft yawed and pilot entered autorotation to field. Successful landing was made. ☐ (A series) Swishing sound was heard during flight. Postflight inspection revealed one-third of forward blade tip cap had broken off. Suspect impact with flying debris.

Fixed wing

C-12 Class C mishap ☐ (C series) As aircraft entered clouds, flash was seen on right side of aircraft. Postflight inspection revealed lightning strike to propeller.

C-12 Class E mishap ☐ (A series) During preflight, pilot saw fluid dripping from T fitting on left brake line. Caused by failure of O-rings.

U-21 Class E mishaps ☐ (A series) Engine failed while aircraft was taxiing after landing. Caused by failure of fuel control. ☐ (A series) IP initiated single-engine operations at 10,000 feet. Engine could not be restarted. Four ignition tubes were bad and one glow plug was broken.

OV-1 Class E mishap ☐ (RV-1D) IP noticed hydraulic pressure on left engine at zero psi, followed by fluctuation of No. 2 hydraulic pressure. Caused by failure of hydraulic line.

Maintenance

AH-1 Class E mishaps ☐ (S series) Whining noise was heard and master caution and No. 1 hydraulic lights came on. During running landing, pedals became stiff. Loss of hydraulic fluid was caused by loose hydraulic line fitting. ☐ (S series) Cyclic would not move laterally during runup. Incorrect cyclic servo replacement prevented hydraulic fluid from reaching lateral servo.

CH-47 Class E mishap ☐ (C series) When IP pulled No. 2 engine to ground, torque measuring system failed. Caused by broken wire on engine torque transmitter.

C-12 Class E mishap ☐ Cabin door caution light came on during climb. Microswitch actuator was out of adjustment.

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Accidents	FY 81 Army Fatalities	Month	FY 82 Class A Accidents	FY 82 Army Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**2**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	August	**8**	**5**
	September	1	0	1-22Sep	**11**	**13**
	Total for Year	43	29	Total to Date	**60**	**46**

Messages received

- Safety-of-flight maintenance mandatory message concerning one-time inspection of UH-60A tail rotor servos (UH-60A-82-17, 091500Z Sep 82). Summary: This message rescinds TSARCOM message UH-60A-82-14. NAS 625H4 bolts with CS head markings or previously overtorqued NAS 625H4 bolts will be replaced. This message also requires replacement of servo assemblies which have broken bolts or loose huck bolt collars. Contact: Lyell Myers, TSARCOM, AUTOVON 693-3300, commercial 314-263-3300.
- Maintenance information message concerning changes to CH-47A/B/C operators manuals (MIM-82-47-07, 021830Z Sep 82).
- Maintenance information message concerning UH-60A tiedown/rappelling fitting assemblies (MIM-UH-60A-MEA-82-04, 080800Z Sep 82).
- Maintenance information message concerning T700-GS-700 engine primer nozzle/fuel injector TBO, revised operational engine HIT and anti-ice check, and revised power turbine speed limits (MIM-T700-82-MEA-04, 091510Z Sep 82).

Changes to TMs

The following changes to TMs have been released:

- Change 4, dated 17 Sep 82, to TM 55-2840-231-23.
- Change 24, dated 6 Oct 82, to TM 55-1520-228-10.
- Change 17, dated 14 Jun 82, to TM 55-1520-214-23.
- Change 28, dated 13 Aug 82, to TM 55-1520-235-10.
- Change 9, dated 29 Apr 82, to TM 55-1520-228-PM.

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

T53 fittings—there is a difference

Two general types of union fittings are commonly used with fluid-carrying lines: restricted and nonrestricted. Failure to properly identify them and insure the correct type is installed can cause serious problems.

A restricted fitting in the P3 port of a T53 fuel control unit (bleed band actuator to fuel control line) will cause the bleed band to close early. The bleed band may remain closed and not respond to sudden power changes. The result can be engine surge. In addition, a restricted fitting in this location will prevent proper adjustment of the bleed band.

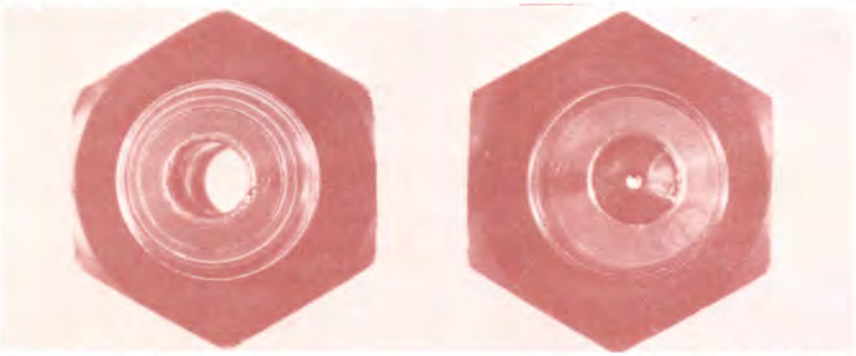
A restricted fitting installed in the No. 3 and No. 4 main bearing scavenge line (at the engine accessory gearbox end) will prevent proper oil drainage and cause high temperatures. The result will be early failure of the bearings and carbon seals.

Conversely, nonrestricted fittings installed in the lower pressure outlet ports of the fuel control unit can cause the fuel pressure warning light to come on. They can also result in a leaking fuel pressure transmitter from pressure surges. Five fuel control units were replaced on a single T53 engine before wrong fittings were identified as the cause of low fuel pressure indications. Mechanics didn't spot the cause sooner because, first, the fittings remain with the hoses—not the fuel control unit—and second, the two types of fittings look identical. Both are the same size, color, and shape.

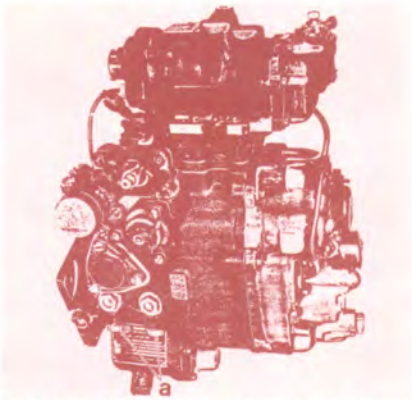
Yet, the solution is simple. LOOK THROUGH THEM. The inside diameter of the nonrestricted fitting (P/N MS24392D4, NSN 4730-00-834-9560) is large and remains constant throughout its entire length. However, the bore of the restricted fitting (P/N 204-060-670-1, NSN 4730-00-675-3239) does not remain constant. Near one end is a plug with a .027- to .032-inch hole drilled through it. Since there is only one drilled plug in each restricted fitting and since this plug is located near one end of the fitting, you must be sure to look completely through any fitting you are trying to identify to insure its type.

Once fittings have been identified, following TM procedures during maintenance will prevent installation of the wrong type. The manual stipulates "restrictor" where a restricted fitting is to be installed. However, even without a manual, you need to simply remember that restricted fittings must be used in the two bottom fuel pressure outlet ports of the T53 fuel control unit. These ports are located just above the fuel control data plate (see photo). All other union fittings used on T53 engine bleed air, fuel, and oil lines are to be nonrestricted. ■

All look-alikes are not alike.

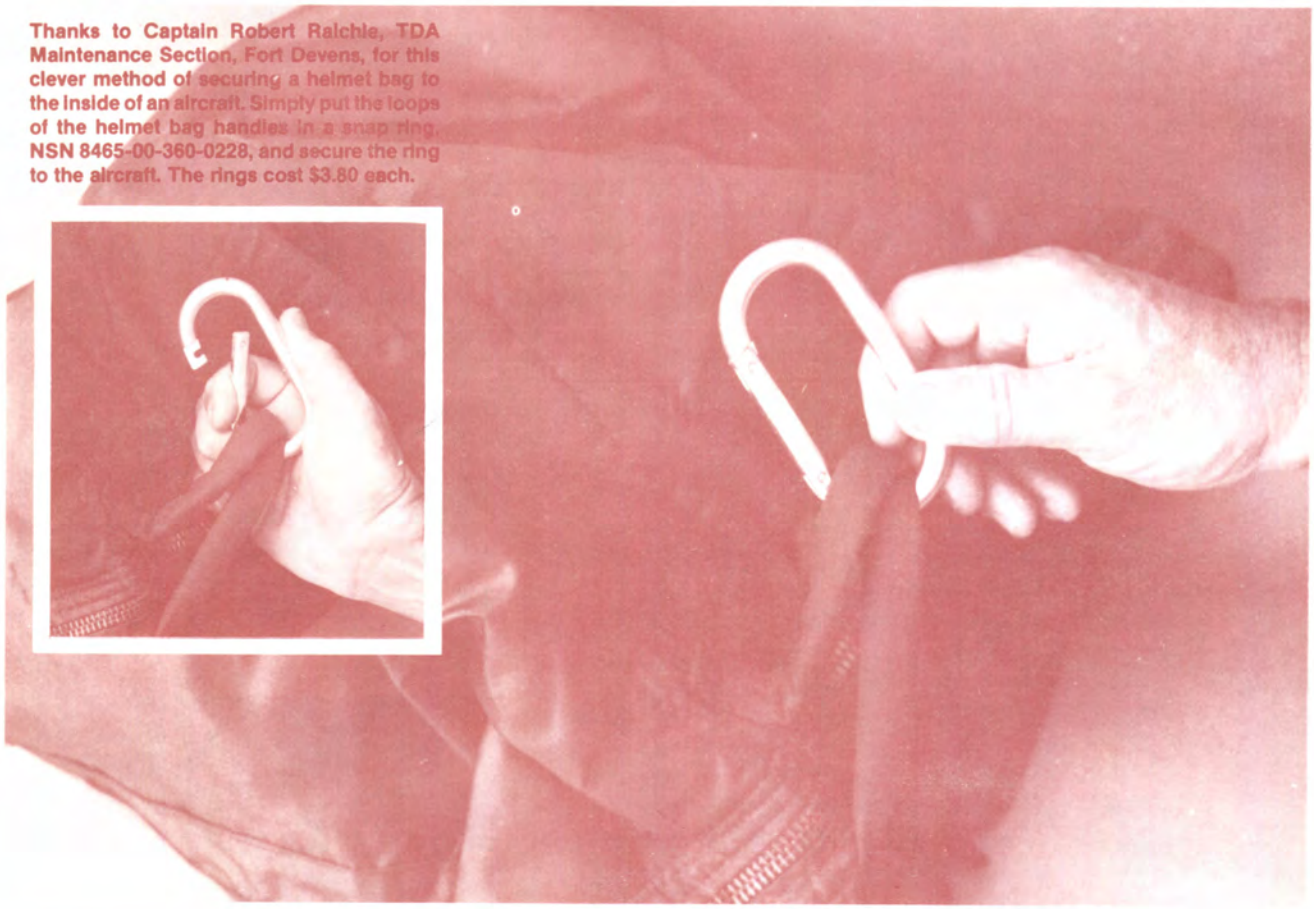


Fitting on left is nonrestricted while one at right contains restrictor at one end. Only by looking completely through fittings can you positively identify type.



Restricted fittings must be used in two lower ports (item a) of T53 fuel control unit.

A good idea



Thanks to Captain Robert Ralchle, TDA Maintenance Section, Fort Devens, for this clever method of securing a helmet bag to the inside of an aircraft. Simply put the loops of the helmet bag handles in a snap ring, NSN 8465-00-360-0228, and secure the ring to the aircraft. The rings cost $3.80 each.

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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Published by the
United States Army Safety Center
Fort Rucker, Alabama 36362

Volume 10
Number 5
28 October 1981

Flightfax

US Army Aviation Training Library
Fort Rucker, Alabama 36360

A look at FY 81 and the months ahead

Although our analysis of FY 81 aviation mishaps is not yet complete, our ongoing study reveals some distressing trends. A breakdown of FY 81 mishaps according to class shows that Class A mishaps increased over the previous 2 years, and Class B and C mishaps exceeded those of FY 80. The total number of Class A, B, and C flight mishaps during **FY 81 not only exceeds that for FY 80 but also is the greatest number of mishaps occurring during any one of the past 5 years.**

Currently, the dollar cost for FY 81 mishaps stands at about $38 million—a dollar loss almost equal to that of FY 80. After all the data is collected, this cost is expected to rise to an amount greater than that for any of the preceding 5 years.

Our ongoing study of fiscal 81 mishaps has revealed no new causes or cause factor patterns from those of the previous 4 years. **Crew error continues to remain the single greatest cause of all classes of mishaps.** A special study of FY 81 Class A mishaps shows that flight experience plays no significant role as far as crew error is concerned. Crew error mishaps involved high time aviators as frequently as less experienced ones.

Overall, the cause factors followed a pattern established during the previous years. The greatest problem areas continue to be:

- **Faulty decisionmaking or judgment.**
- **Inattention to required tasks.**
- **Excessive or improper motivation.**
- **Inadequate unit training.**
- **Improperly designed equipment.**

Because of the greater number of aircraft and hours flown, rotary wing aircraft are involved in proportionally more mishaps than fixed wing aircraft. Helicopters were involved in 41 of the 43 Class A mishaps in fiscal 81.

During the past 5 years, helicopters have been involved in 90 percent of the Class A mishaps. In FY 81, the rotary wing Class A mishap rate per 100,000 flying hours was 2.8 compared to 1.1 for the fixed wing fleet. The overall Class A mishap rate for fiscal 81 was 2.6.

Rotary wing mishap experience

Utility helicopters. These are the most numerous rotary wing aircraft, and as could be expected, they have accounted for almost half of the Class A helicopter mishaps during the past 5 years.

The 19 UH-1 Class A mishaps during FY 81 represent a substantial increase over the 13 that occurred in FY 80 and the 12 in FY 79.

This increase in mishaps resulted in 14 fatalities or twice the number that occurred in FY 80 and in FY 79. In addition, this rise in number of UH-1 Class A mishaps was largely responsible for an increase of approximately $6 million in damage costs above that for each of the two preceding years.

Crew error was a definite factor in 65 percent of the FY 81 Class A mishaps involving utility helicopters. Most of these crew errors involved violation of regulations and procedures and exceeding aircraft limitations.

Although in previous years the UH-60 has not figured significantly in mishap experience, two Class A UH-60 mishaps occurred in FY 81. These resulted in damage costs of $2.5 million.

Observation helicopters. The number of OH-58 mishaps and their dollar cost have remained relatively constant for 5 years. Fatalities related to OH-58 mishaps have ranged from a high of 8 in FY 78 to none in FY 79. Four occurred in FY 81 as a result of nine Class A mishaps.

Again, crew error persists as the most significant cause factor.

Crew violation of regulations, established procedures, and SOPs, and exceeding aircraft limitations, particularly during terrain flight, were the greatest causes of OH-58 mishaps, especially wire and tree strikes.

Insufficient training for the type of mission to be flown and inadequate supervision contributed to crew error as a cause factor.

Materiel problems were instrumental in many of the OH-58 mishaps. These problems included unexplained power losses associated with the T63-A-700 engine, and loss of directional control because of inadequate tail rotor thrust.

Pilot expertise and the availability of suitable forced landing areas prevented additional serious mishaps following engine failures. However, several Class A mishaps occurred after directional control was lost during terrain flight—even though the aircraft involved in these mishaps were being operated within the published operating parameters.

In addition to the nine OH-58 Class A mishaps, there was one OH-6 Class A mishap with one fatality in fiscal 81.

Cargo helicopters. CH-54 aircraft were involved in one Class A mishap and CH-47 aircraft were involved in two Class A mishaps in FY 81. These mishaps resulted in three fatalities and damage costs of more than $4 million.

As with other aircraft, crew error was the number one cause factor. Crew error was a definite factor in 72 percent of the Class A mishaps over the past 5 years, and was the cause of the three Class A mishaps in FY 81.

Inadequate crew coordination, violation of regulations, and exceeding aircraft operating limitations were the principal errors committed. Other than the failures associated with the CH-47 engine beep trim system, materiel failures do not indicate any significant trend for A, B, and C mishaps.

Attack helicopters. While the number of Class A mishaps involving AH-1 and TH-1 aircraft have remained fairly constant over the past 5 years, the seven Class A mishaps in FY 81 exceeded the number for FY 80.

Four of the seven Class A mishaps in fiscal 81 were caused by materiel failure, **the other three by crew error.**

Fixed wing mishap experience

Fixed wing aircraft have shown a downward trend in Class A mishaps from seven in FY 77 to two in fiscal 81. **Again, as was the case with rotary wing aircraft, crew error was the single greatest cause of Class A, B, and C fixed wing mishaps,** and the aircraft most often involved in FY 81 were the OV-1 and the U-21. These two aircraft have also accounted for most of the fixed wing mishaps during the past 5 years. Further, these were the only types of fixed wing aircraft involved in Class A and B mishaps during the past 3 years.

The one OV-1 Class A mishap for FY 81 resulted in two fatalities and damage costs of more than $2.1 million. The U-21 Class A mishap resulted in two injuries and $403,000 in damage cost. A definite cause has not yet been determined in the OV-1 mishap, but crew error was a definite factor in the U-21 crash.

The months ahead

The fiscal 81 mishap record clearly shows that the number one cause of aviation mishaps is crew error. **The root cause of these crew error mishaps was a breakdown in professional discipline.** In most cases, the personnel flying the aircraft or supervising the flights violated regulations and established procedures.

The job of reducing crew error mishaps in the months ahead rests squarely with those supervising flight operations. Commanders must increase the supervision and discipline of aircrews and require them to operate the aircraft according to regulations and established procedures.

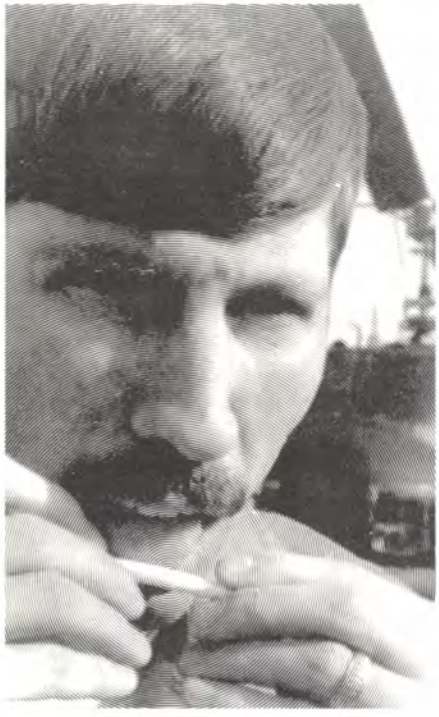
A large number of aircraft mishaps could have and will be prevented through discipline, preferably self-discipline, but in the absence of self-discipline, then applied discipline.

When aircrews have not had the benefit of a supervisor who knows and assumes his safety responsibility, then crew error is a command failure. ■

Shortfax

Crewmembers involved in mishaps may be tested for marijuana usage

While few aviation mishaps have been reported in which marijuana usage by maintenance personnel or aircrewmembers was a factor, it is well known that social marijuana smoking is not an uncommon practice among servicemembers.



The principal ingredient in marijuana is tetra hydrocannabinol (THC). THC is many times stronger than alcohol in its ability to produce intoxication, and, unlike alcohol which is metabolized by the body in a matter of hours, THC is retained in the body for long periods of time, as much as 30 days after the use of marijuana.

The absence of documented marijuana-caused mishaps may be grossly misleading since proof of impairment is, for all practical purposes, difficult at the present time. However, proof positive of marijuana usage is relatively easy to determine due to the long periods of time that THC is retained in the body.

In addition to tests for blood alcohol content after mishaps, crewmembers may now be tested for marijuana. When crewmembers use marijuana, they knowingly medically disqualify themselves for flying. Now, if they are involved in a mishap, that disqualification **may be discovered.** ■

We goofed!

In FLIGHTFAX, Vol. 9, No. 48, dated 16 September 1981, we reprinted an article from USAF FLYING SAFETY magazine on the subject of crashing and burning. The article was based on Air Force—not Army—experience, and we would like to set the record straight on postcrash fires in Army aircraft and the wearing of Nomex.

First off, the article stated that the most critical factor in aircraft fires was the inhalation of toxic fumes. While this is correct for transport aircraft, it is not true for Army aircraft, with the possible exceptions of survivable accidents involving fire with the U-21 and C-12.

The article stated that Nomex will eventually burn and that the fiber will have lost the flight suit's thermal protection long before the suit burns. Tests conducted by the U.S. Army Aeromedical Research Laboratory have shown that the Nomex fiber does not actually burn; it chars. However, as long as there is even charred fabric present the wearer is receiving thermal protection.

The Air Force article mentioned that disheveled flight suits increase the possibility of injuries in a fire. This is not

true. A problem with Nomex is that it shrinks when exposed to heat. A too-small flight suit or too-fat aviator or too-short pants or arms on the flight suit allow no room for shrinking and the suit splits and exposes bare skin. Your flight suit should not be disheveled but it should be loose fitting.

The article encouraged the wearing of thermal underwear for added fire protection. Never should this be interpreted to mean thermal underwear as sold in department stores or the PX. These are polyester/nylon blends and they melt when exposed to heat. Because they melt at low temperatures, they can tick to skin and cause serious burns nder Nomex which itself has not been damaged. The only acceptable underwear is standard issue Army cotton, cotton-wool, or similar retail items. Nomex long johns like those used in automobile racing are available on the retail market. Army issue arctic quilted dacron batted insulated underwear is also a no-no. There have been many instances where the aircrewman died because of his melted underwear and the cigarettes in the pocket of his Nomex flight suit weren't even scorched.

Our apologies for any confusion this article caused. ■

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 1981.

Broken Wing Award recipients

CW2 Walter H. Allen III
Troop D (Air), 1st Squadron,
124th Cavalry, Texas Army
National Guard,
Austin, Texas

CW3 James L. Browning
B Troop, 4th Squadron, 7th Cavalry,
APO San Francisco 96358

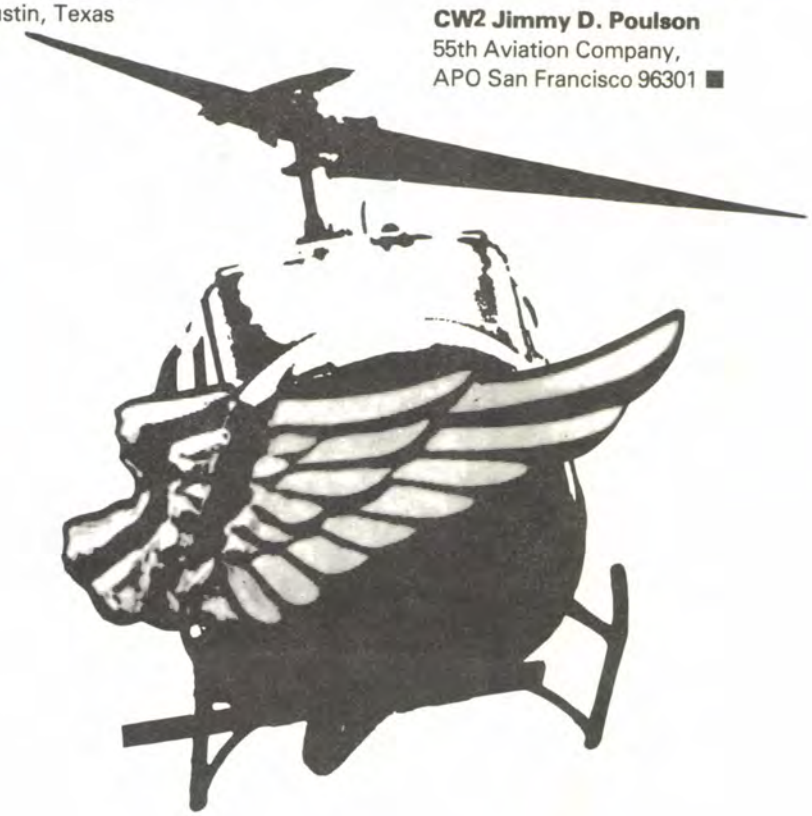
Captain Edwin T. Congdon
Vermont Army National Guard
Burlington, Vermont

CW2 Noel T. Cowart
197th Infantry Brigade, Fort Benning

CW2 Jon C. Jenson
Colorado Army National Guard,
Buckley ANG Base, Aurora, Colorado

CW2 Gary W. Lindroth
C Company, 7th Combat
Aviation Battalion,
7th Infantry Division, Fort Ord

CW2 Jimmy D. Poulson
55th Aviation Company,
APO San Francisco 96301 ■



FY 82 USASC safety courses

The Aviation Safety Officer Course (7K-F12) is an 8-week aviation/ground accident prevention course with emphasis on technology, aviation medicine, psychology, management, communications, reporting and investigating. Active Army and Reserve component commissioned officers and warrant officers and DA civilians may attend. Commissioned and warrant officers must be rated aviators and presently assigned or programed for assignment as an aviation safety officer. Obligated service for active duty commissioned and warrant officers is 1 year.

ASO Course Schedule

Class	Start	Close
82-1	15 Oct 81	11 Dec 81
82-2	28 Jan 82	26 Mar 82
82-3	29 Apr 82	25 Jun 82
82-4	29 Jul 82	24 Sep 82

The Aviation Mishap Prevention Management Course (7K-F13) is a 2-week course on mishap prevention concepts and programs, with emphasis on preaccident planning, airfield surveys, investigation, human factors, and aircraft design and performance. Active Army and Reserve component enlisted personnel in grades E6 through E9 in aviation-related MOSs (67 series, 68K, 71P, and 93J, H) performing at firstline supervisory level in Army aviation units and staffs may attend the course. DA civilians in grades GS-5 through GS-9 and Army contract maintenance supervisors may also attend. Obligated service for active duty enlisted personnel is 9 months.

AMPM Course Schedule

Class	Start	Close
82-1	30 Nov 81	11 Dec 81
82-2	1 Mar 82	12 Mar 82
82-3	14 Jun 82	25 Jun 82

The Aviation Mishap Prevention Course (7K-F14) is a 2-week course on the fundamentals and techniques inherent in the daily performance of the aviation safety officer's job. The course examines man, machine, and environmental factors bearing upon safety in aviation operations, planning, and supervision. Active Army and Reserve component commissioned and warrant officers, DA civilians, and contract maintenance civilians may attend. Commissioned and warrant officers must be rated aviators. There is no obligated service.

AMP Course Schedule

Class	Start	Close
82-1	19 Oct 81	30 Oct 81
82-2	18 Jan 82	29 Jan 82
82-3	22 Mar 82	2 Apr 82
82-4	12 Jul 82	23 Jul 82

The Range Safety Course is a 2-week course. This course is designed to provide training which emphasizes the safety aspects of ranges and range operations for full-time safety careerists and military personnel having responsibility for developing, enforcing, approving, or advising on such matters. This course is recommended for all civilian safety careerists in grades GS-7 through GS-13. The course is also considered appropriate for military personnel having range safety or range control responsibilities.

RS Course Schedule

Class	Start	Close
82-1	4 Jan 82	15 Jan 82
82-2	5 Apr 82	16 Apr 82
82-3	19 Jul 82	30 Jul 82

The Army Safety Program Management Course (7K-F9) is a 2-week course. This course is designed to provide safety training emphasizing advanced safety management and staff techniques to Army civilian and military personnel engaged in full-time safety management or key safety-related duties of considerable responsibility and scope. This training is recommended for civilian safety careerists GS-9 and above and is appropriate for field grade officers in safety-related command and staff positions at division, installation, or higher levels. These personnel will be expected to remain assigned to safety-related positions for a period of at least 1 year.

ASPM Course Schedule

Class	Start	Close
82-1	31 May 82	11 Jun 82
82-2	2 Aug 82	13 Aug 82

The Fundamentals of Army Accident Prevention Course (7K-F15) is a 2-week course. This course enables the student to develop and program accident prevention measures appropriate to intermediate levels of tactical or installation organizations on a full-time basis. The course is recommended for civilian safety careerists in grades GS-5 through GS-7. This course is also appropriate for company grade officers, warrant officers, and noncommissioned officers E5 and above. Selected civilian wage board personnel in supervisory positions will also benefit.

FAAP Course Schedule

Class	Start	Close
82-1	28 Sep 81	9 Oct 81
82-2	1 Feb 82	12 Feb 82
82-3	3 May 82	14 May 82
82-4	13 Sep 82	24 Sep 82

Further information on Army Safety Center courses can be found in DA Pam 351-4, dated January 1980. ■

Selected mishap briefs

uh1 **Class A mishap** ☐ (V series) Engine malfunctioned during maintenance test flight. Pilot entered autorotation and aircraft landed hard. Blades flexed and severed tail boom, and main rotor blades left aircraft. 8203

Class E mishaps ☐ (H series) Transmission oil pressure gauge dropped to zero. Caused by failure of transmission oil pressure indicator. ☐ (H series) Main generator and master caution lights came on and crew smelled fumes. Caused by failure of voltage regulator. ☐ (H series) Growling sound was heard from transmission area. Hydraulic light came on and hydraulics failed. Running landing was made. Locally manufactured inlet tube assembly on left side of hydraulic filter failed at fitting, causing loss of hydraulic fluid. ☐ (V series) Master caution light came on during landing. Caused by failure of master caution box.

uh60 **Class C mishap** ☐ As aircraft was on final approach, internal access door came off, blew out of aircraft, and hit main rotor blades.

ah1 **Class E mishaps** ☐ (G series) Smoke was seen coming from battery compartment during flight. Caused by defective battery. ☐ (S series) During approach to confined area, engine noise decreased and low rpm audio activated. Intake was clogged with vegetation. ☐ (S series) Alternator light came on and crew noticed smoke fumes in cockpit. Caused by failure of alternator.

ch47 **Class E mishaps** ☐ (B series) No. 1 engine oil pressure dropped to 18 psi during runup. Caused by failure of oil pump. ☐ (B series) No. 1 flight hydraulics boost system went to zero during hover/taxi. Caused by failure of flight boost pump. ☐ (C series) Forward transmission indicated less than 10 psi during runup. Caused by failure of pressure transducer.

ch54 **Class E mishap** ☐ (A series) Hoist oil pressure light came on when aircraft was landed to pick up load, and crew saw and smelled smoke. Caused by rotten hydraulic line.

oh6 **Class E mishap** ☐ Master caution and oil cooler bypass lights came on during flight. Aircraft was landed at airport. Oil pressure was zero and engine oil temperature was 150 degrees when engine was shut down. Caused by oil leak.

oh58 **Class B mishap** ☐ (A series) Aircraft spun and hit tree, severing tail boom, spreading skids, destroying chin bubble, and damaging tips of main rotor blades. 8204

Class E mishaps ☐ (A series) During hot refueling operation, red indicator

(continued on next page)

FY 82 Class A Mishap Countdown

	Month	FY 81 Class A Mishaps	FY 81 Fatalities	Month	FY 82 Class A Mishaps	FY 82 Fatalities
1st Qtr	October	2	2	1-28 Oct	**5**	**3**
	November	5	4	November		
	December	1	1	December		
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**5**	**3**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

Mishap briefs

button on nozzle indicated fuel tank was full. Shutoff handle was pulled down. As nozzle was removed from receptacle, fuel began spraying aircraft. Suspect grit or debris prevented nozzle from being completely closed when it was removed from receptacle. ☐ (C series) Pilot rolled throttle to idle detent and engine failed during practice autorotation. Caused by failure of fuel control. ☐ (C series) Earlier autorotations revealed rotor rpm to be adjusted in mid to high green area. As IP entered 180-degree autorotation turn, rotor rpm was noted above 110 percent. Power recovery was made and flight terminated. Main rotor blades will be sent to depot for inspection, and power train will be inspected. Aircraft was fielded with autorotation rpm higher than recommended, although technically within limits.

c12 **Class E mishap** ☐ (A series) After takeoff, pilot noticed oil on No. 2 engine nacelle. Caused by unsecured engine oil cap.

ov1 **Class E mishap** ☐ (D series) No. 1 propeller rpm rose to 1900 on go-around. Rpm could not be reduced with power lever or prop lever. Caused by failure of propeller control governor.

u21 **Class E mishap** ☐ (G series) About 30 minutes into flight, fuel began siphoning from right nacelle fuel cap. Cap was incorrectly secured.

Maintenance

uh1 **Class E mishaps** ☐ (H series) Airspeed indicator failed to register during takeoff. Indicator was installed incorrectly. ☐ (H series) N_2 bled to 6400 rpm as collective pitch was applied during contour flight. Caused by dirty compressor section.

uh60 **Class E mishap** ☐ Pressure return line from pilot assist module to transfer module developed severe leak during runup. No. 2 hydraulic system and backup system emptied. Line had chafed against rivet on control access floor.

ch47 **Class C mishap** ☐ (YCH-47D) No. 2 engine was slow to accelerate to flight position during start. As engine stabilized in flight, engine torque indication dropped to zero and engine N_1 began to surge. Inspection revealed a portion of an engine inlet FOD ring (donut) had been ingested. Engine FOD screens were installed. They had been installed with donut in inlet.

Class E mishap ☐ (C series) Crew chief saw hydraulic fluid leaking from vicinity of utility hydraulic pump during runup. Caused by loose jam nut on utility hydraulic pump line.

oh58 **Class E mishap** ☐ (A series) Engine failed during runup. Caused by insufficiently torqued filter housing.

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

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mishap prevention
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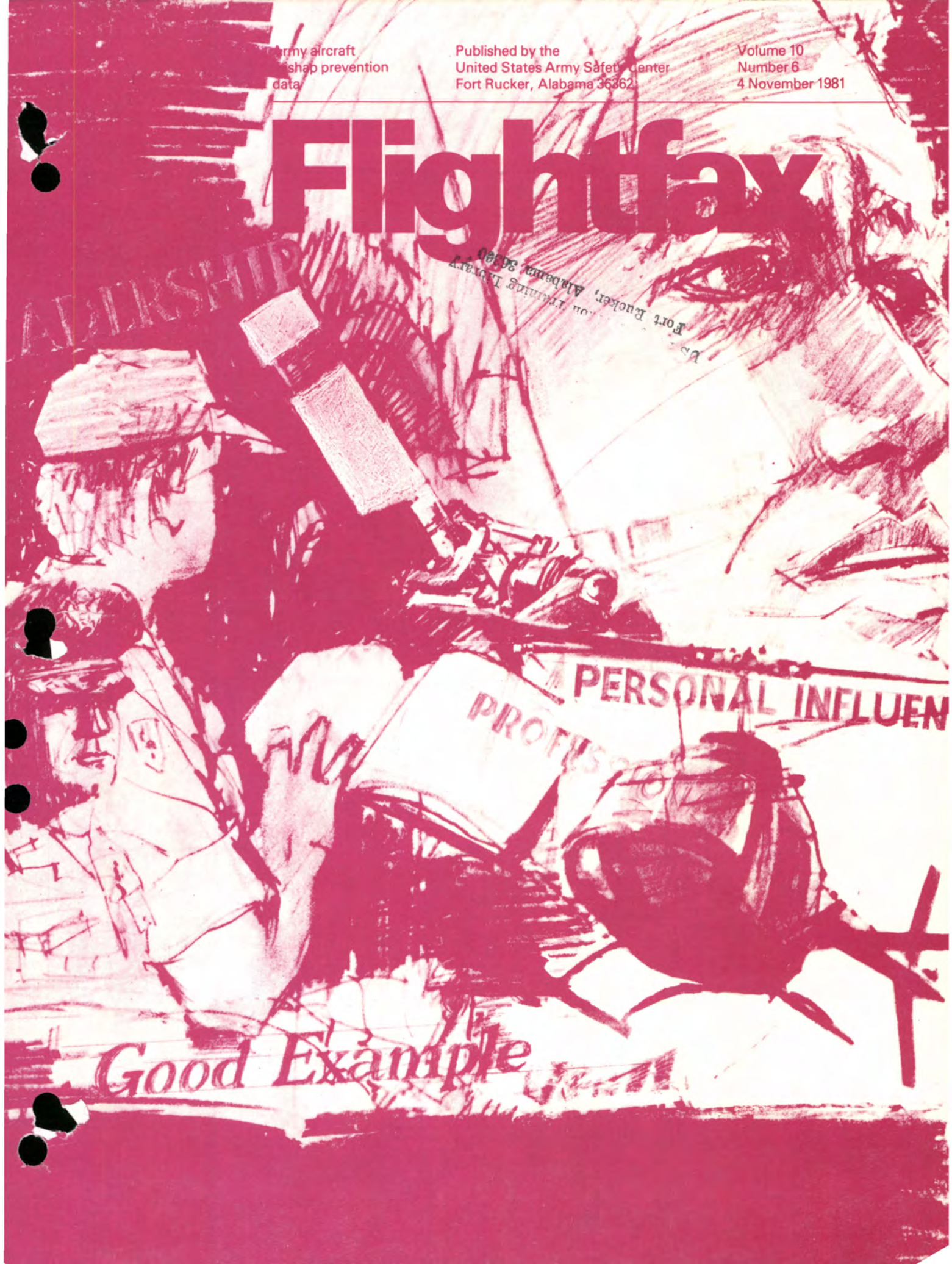
Published by the
United States Army Safety Center
Fort Rucker, Alabama 36362

Volume 10
Number 6
4 November 1981

Flightfax



Good Example

Power to prevent mishaps

In the compass, magnetic force serves to guide us; in the telephone, radio, and television set, to communicate; in ignition coils and magnetos, to spark our gasoline engines; in generators, to light our cities; in electric motors, to operate our appliances. The list goes on and on. Yet, despite daily reliance on this invisible force, we are seldom conscious of its existence. There is also a type of magnetism that can prevent aircraft mishaps. It is different from that produced by the flow of electric current. Nevertheless, it is magnetism just the same. It is personal influence.

While the force exerted by personal influence cannot be measured in units of newtons or dynes, the results it produces serve as positive proof of its existence. And don't underestimate its power. It is one of the most effective safety tools available. Unfortunately, misused it can cause mishaps just as readily as it can prevent them.

Each person radiates this magnetic power during all his waking hours. It can't be turned off. So it is applied in a positive manner to improve safety or in a negative way to thwart it.

Personal magnetism is transmitted in different ways: by example and instruction; by a positive or negative attitude; by request or directive coupled with some form of supervision; and even by complete indifference to a given situation. Often physical presence is sufficient to exert a powerful influence on others. Have you ever been part of a group telling shady stories when a minister unexpectedly walked in? What happened to those shady stories? Personal influence, in one form or another, is an ever-present force that can be used constructively or destructively. Its proper application is essential to safety in Army aviation.

Some years ago, the commander of one aviation unit insinuated it would "look good" if down time for scheduled PE inspections could be reduced. Obligingly, maintenance supervisors adopted a policy of returning aircraft to the flight line as soon as PE inspections were completed and signed off—even though long lists of discrepancies uncovered had not yet been cleared. These were left for flight line mechanics to correct. On paper, down time for scheduled inspections was substantially reduced. However, the end result was an increase in aircraft rejections by pilots as well as a rise in number of both in-flight problems and precautionary landings.

A somewhat similar situation arose when the commander of another aviation unit demanded a higher overall aircraft availability rate. The mechanics obliged him by taking every available shortcut they could devise. When excessive

When it has been determined that aircrews have not had the benefit of a commander who knows and assumes his safety responsibility, crew error is then command failure.

magneto drop could be corrected by opening the points, no further effort was made to determine and eliminate the true cause of the problem. If a landing gear oleo strut was low, it was inflated to the proper extension without insuring the piston seals were serviceable and hydraulic fluid had not been lost. Likewise, mechanics used torque wrenches if they were handy; otherwise, they relied on the sense of "feel"—except when the item being torqued happened to be a critical one. This kind of hurry-up maintenance increased aircraft availability for only a short time. As could have been predicted, the end result was an increase in number of pilot writeups, aborted missions, and unscheduled maintenance.

Yet, these aren't isolated instances. Each year there are problems of a similar nature. How many emergencies and mishaps have occurred because a mechanic failed to install a cotter pin? A connection was improperly tightened? A hydraulic line was inadequately secured? An inspector was lax? An MWO was not complied with?

Bad habits are not taught in the classroom. Students aren't shown how to force a part in place; they aren't allowed to service an aircraft until it is properly grounded; nor are mechanics encouraged to perform maintenance without referring to appropriate technical manuals.

And the mechanic is not to be singled out. Pilots and other aviation personnel are equally vulnerable to temptations that drastically affect safety. More than 20 years ago, one student pilot decided to put on a "special" show for his girlfriend's benefit. After performing a series of aerobatic maneuvers over her house, he came in low, rolled his aircraft inverted—and promptly nosed into the ground. Some years later, another pilot decided to put on a one-man performance for his family who were spending the day at the beach. During a sharp pullup and tight turn following a near-ground-level pass, the aircraft stalled out and crashed before the eyes of the pilot's horrified wife and children.

During the same time period, another pilot lifted off in IMC on a VFR flight plan. Severe turbulence, thunderstorms and possible tornadoes were forecast. He crashed shortly after takeoff.

Before each of these missions, others knew of the pilot's intent. Yet, no one made any effort to prevent any of these flights or even advise against them. Could this silence have been interpreted as consent? One thing is certain: Analysis of these and other mishaps clearly establishes the human element as the predominant mishap cause factor.

Granted, a fuel pump shaft can shear and cause fuel starvation. This has happened. But what about the mechanic who plugs a disconnected fuel line with a candy wrapper, then forgets to remove it when he reconnects the line? When the engine is started, fuel pressure partially dislodges the plug, permitting full flow. Then at some point during flight, the wrapper blocks the line, causing engine failure and a mishap. This also has happened.

Failure of pilots to perform proper preflight inspections has caused numerous mishaps—some fatal. So has failure to either positively secure or remove all loose items in helicopters scheduled to be flown with doors off.

And what about such common hazards as wires? Flying low level when it is not required by the mission, failure to perform ground or air reconnaissance before landing at unfamiliar sites, and failure to mark wire locations are just a few causes of wire strike mishaps. In one case, an aircraft on a low-level training mission struck wires and crashed. The pilot did not have a hazards map in his possession; had not received a thorough mission briefing; and was unsure as to the exact location of his landing zone, the altitude at which he would be flying, or the precise route he would follow. Any wonder the aircraft struck wires?

(continued on next page)

Power to prevent mishaps

Where do such unsafe practices come from? Since bad habits are not taught, how do they develop? Is it left up to each individual to figure out how to violate regulations; disregard TMs, checklists, and procedures; and take unnecessary risks? Or does he get help from others? In far too many instances, human error can be traced to direct or indirect personal command influence.

A simple "they're rated" paired two inexperienced pilots for an administrative flight. The price? One aircraft.

The same type of result was attained by a He's-instrument-rated-so-put-him-on.

An I-can-catch-up-on-my-sleep-later attitude cost a pilot his life.

The veteran pilot who likes to display his ability to perform low-level maneuvers, disregard checklists and procedures, violate regulations, and take unnecessary risks is going to entice some new pilot to do likewise. Where the veteran pilot may get by on skill, the novice most probably will not. Eventually, the veteran will likely fall victim to a situation he helped create.

A few years ago, a training plane from a military installation made headlines when it smashed into the side of a bridge while supposedly in the landing pattern. Could the subsequent discovery that other pilots frequently tested their skill by flying under the bridge have had any bearing on this mishap?

Can flying be 100 percent safe under all situations? Not any more than crossing the street or driving to work. In a combat environment, risk becomes an integral part of every mission. Marginal weather cannot be allowed to stop a flight necessary to evacuate wounded, or to supply reinforcements and equipment to soldiers cut off from their unit by the enemy.

Valor, coupled with training, experience, and ingenuity, is a major factor in winning battles and saving lives. But valor should never replace common sense. We must always bear in mind that the new aviator, particularly the younger person, is endowed with an overabundance of vitality, curiosity, and an adventurous spirit. There is nothing he can't do—particularly if he is encouraged to do it, has seen it done, or is left to his design while he gains experience.

Influence should begin at the top. The commander who is conscientious; follows prescribed procedures; abides by regulations and exercises sound judgment sets, by example, the course for his subordinates to follow. If he is lax; if he is guilty of breaking or bending regulations; if he does not select pilots to meet mission requirements; if he does not concern himself with conditions around his airfield; if he does not insist on each individual doing his job efficiently and in a professional manner, then he has lost his sense of direction. In time, those following him will lead others down the same path.

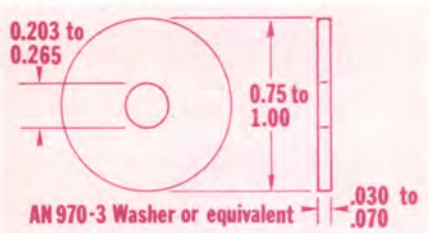
By actions and words, by refusal to lend the stamp of approval to improper methods or procedures, by the example set, commanders have the power to prevent mishaps through personal influence. ■

Shortfax

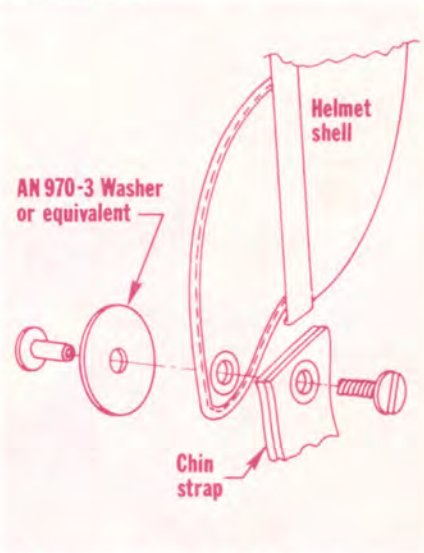
Helmet chin strap modification

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:



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

Interest in ELTs growing

The pros and cons of emergency locator transmitters (ELTs) in Army aircraft have been argued for some time now. In fact, the first article on the subject was published in the PEARL section of the ARMY AVIATION DIGEST in October 1979. Sure, the Army has signal devices such as flares, signal mirrors, and survival radios, but how effective are these items if you are knocked unconscious or sustain broken bones in a crash and are unable to use them?

The current DA policy pertaining to ELTs is stated in DA message, DAMA-RQD, 241910Z Jul 81. "Hq DA continues to support ELTs for aircraft in remote or isolated areas and other areas where a bona fide need exists." The article entitled "Emergency Locator Transmitters . . . Why Wait?" in the August 1981 AVIATION DIGEST again identified the ELT as a viable means of locating and rescuing downed aircrew personnel and their passengers.

Interest in ELTs appears to be growing. The DARCOM Project Officer for Aviation Life Support Systems suggests that each aviation unit evaluate its need for ELTs. As appropriate, units should then forward their requests for use of ELTs, with justification, through the appropriate chain of command to HQ, TSARCOM, ATTN: DRCPO-ALSE. This information will be used to assess the extent of interest and need for ELTs within the aviation community. ■

Selected mishap briefs

uh1 **Class C mishap** ☐ (H series) During shutdown, crew chief noticed drive shaft cover for No. 4 and No. 5 tail rotor drive shafts was not secured. Postflight inspection confirmed that drive shafts were scored and three sets of clamps were damaged. Drive shaft cover was torn by clamps. Pilot closed but did not secure drive shaft cover during his preflight. He assumed crew chief would secure cover, and crew chief assumed pilot had secured covers since they were closed.

Class E mishaps ☐ (H series) Master caution and transmission pressure lights came on and transmission oil pressure gauge dropped to zero. Postflight inspection revealed transmission oil had been blowing out through transmission oil filter gasket. Caused by failure of female coupling half. ☐ (H series) Master caution light came on. Caused by malfunction of fault function indicator panel. ☐ (H series) Engine oil pressure light came on and engine oil pressure gauge went to zero. Caused by excessive leak around bleed band.

uh60 **Class E mishap** ☐ Crew chief saw oil leaking above cargo door on right side during hover. Caused by crack in accessory gearbox.

ah1 **Class C mishap** ☐ (S series) When copilot took action to evade simulated ground fire during NOE screening mission, both main rotor blades hit treetops, causing skin damage to blades.

Class E mishaps ☐ (G series) Master caution and No. 1 hydraulic lights came on. Caused by malfunction of pressure transmitter switch. ☐ (S series) Main inverter failed during landing.

ch47 **Class E mishaps** ☐ (C series) No. 1 flight boost gauge dropped to zero. Master caution, No. 1 flight boost, and No. 1 SAS lights came on after landing. Caused by cracked pressure line to No. 1 flight boost system. ☐ (C series) Transmission chip detector light came on during night takeoff from LZ. Caused by deterioration of aft transmission. ☐ (C series) No. 1 engine oil pressure dropped to zero during flight. Caused by failure of oil pressure transmitter. ☐ (C series) Excessive vibration in flight was caused by defective absorber assembly.

oh58 **Class A mishap** ☐ (A series) Aircraft, flying at NOE altitudes and low airspeed, spun to right and crashed into trees. Two injuries. 8205

Class B mishap ☐ (A series) Engine began to decrease during termination of approach. Full collective pitch was applied, directional control was lost, and rotor rpm decreased below 220. Tail of aircraft settled into small depression as pilot applied full forward cyclic in an attempt to level aircraft. Mast bumping caused transmission centering device to be ripped out. 8206

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	1-4 Nov	**0**	**0**
	December	1	1	December		
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**6**	**3**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

Class E mishaps ☐ (A series) As pilot was transitioning from approach to hover, hay-drying tripod about 25 feet from aircraft blew apart. One of the wooden tripod legs blew up into rotor blades. Both blades were dented. Tripod was near a tree line and not visible to crew. ☐ (C series) As crew was unloading aircraft, rotorwash from passing UH-1 blew unsecured right rear passenger door off aircraft. ☐ (C series) When power was reduced for approach, N_2 went to 103 percent for 3 seconds. Pilot increased collective and N_2 dropped to 98 percent. Caused by governor failure.

ov1 **Class E mishap** ☐ (D series) Pilot saw that No. 1 hatch lock was open during flight. Aircraft was preflighted at night, possibly causing engine latch to appear closed.

u8 **Class E mishaps** ☐ (F series) Pilot closed throttles on touchdown and No. 1 engine quit. Caused by failure of idle cutoff switch. ☐ (F series) No. 1 engine surged during flight. Power was reduced and surging continued. Caused by broken top compression ring, which chipped No. 1 cylinder on engine and damaged spark plug.

u21 **Class E mishap** ☐ (RU-21H) Fuel was seen siphoning from left outboard fuel cell during climb. Caused by crimped rubber seal on fuel cap.

Maintenance

uh1 **Class E mishaps** ☐ (H series) Pilot noticed egt gauge indicating 90 degrees during flight. Crew chief had installed egt gauge with incorrect washers and screws, resulting in gauge malfunction. ☐ (H series) Fire warning light came on during flight. Caused by loose cannon plug on engine cowl. ☐ (H series) Crew smelled JP4 fumes during flight. Aircraft was landed, and fuel was seen leaking from start fuel line at fuel control. Caused by incorrect seating between start fuel hose and elbow as a result of overtightening during installation.

ah1 **Class E mishap** ☐ (S series) SCAS roll channel kicked right during flight. Roll channel card was out of adjustment.

ch47 **Class E mishap** ☐ (C series) Master caution and No. 2 engine oil low lights came on. Crew chief had removed engine oil filter cap before flight to service engine oil system and did not replace cap, causing loss of oil.

oh58 **Class E mishap** ☐ (C series) All electrical power was lost when generator was taken off line during shutdown. Inspection revealed overheated battery and electrolyte overflow in compartment. Voltage regulator was incorrectly set at 30 volts.

Messages received

• Safety-of-flight maintenance mandatory message concerning maintenance procedures check for OH-58 aircraft (OH-58-81-08, 202130Z Oct 81). Summary: This message provides a maintenance procedures check for OH-58 aircraft. DA Technical Bulletin 55-1520-223-30-10, as well as applicable maintenance and operators manual changes, will be forthcoming. Contact: Charles Cioffi, TSARCOM, AUTOVON 693-1666, commercial 314-263-1666.

• Safety-of-flight maintenance notice concerning AH-1 main rotor blade (AH-1-81-32, 211940Z Oct 81). Message requires an inventory and clarifies the use of AH-1S main rotor blade.

• Safety-of-flight maintenance notice concerning the service life of IR suppressors on AH-1 aircraft (AH-1-81-33, 221330Z Oct 81).

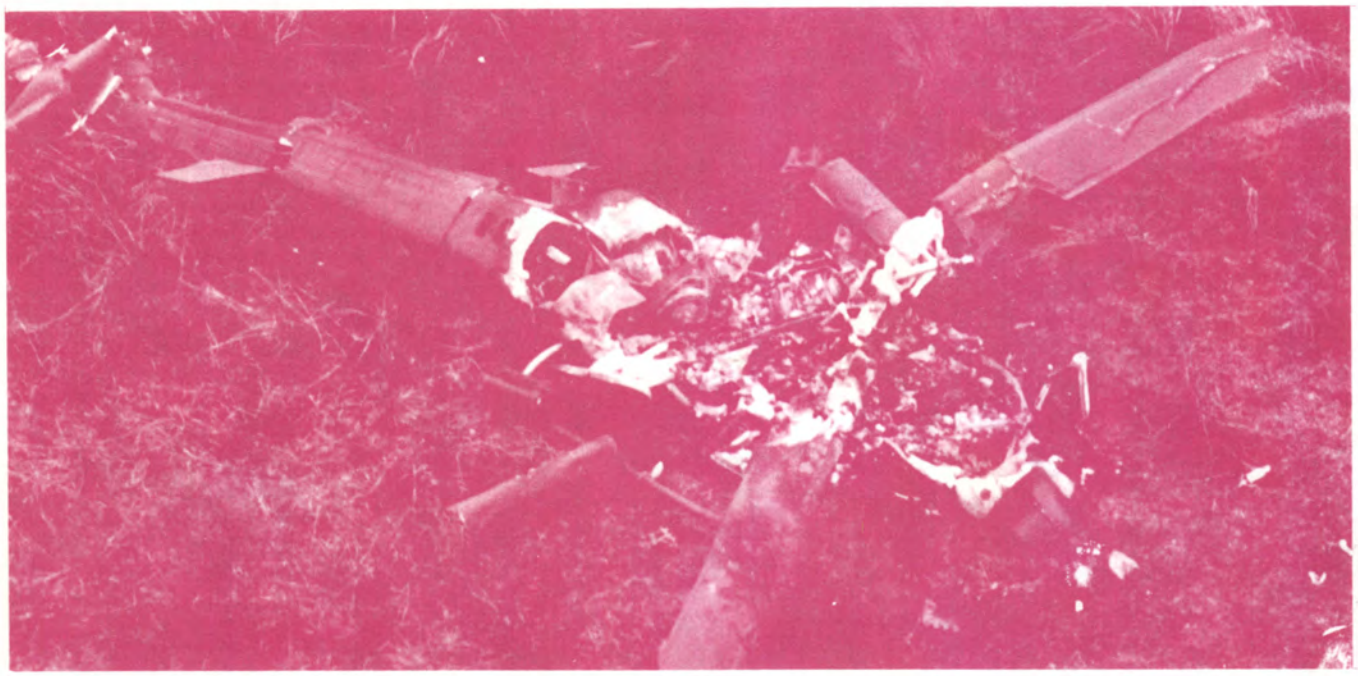
For more information on selected mishap briefs, call AUTOVON 558-4202/4198.

Changes to TMs

The following changes to TMs have been published:

• Change 15, 21 Sep 81, to TM 55-1520-214-23, for OH-6A.

• Change 15, 22 Sep 81, to TM 55-1520-228-10, for OH-58A. ■



The purpose of realistic training is to produce combat-ready aircrews and equipment. A smoking hole does neither. The resources lost or destroyed on the way to the battle cannot favorably influence the outcome.

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Volume 10
Number 7
11 November 1981

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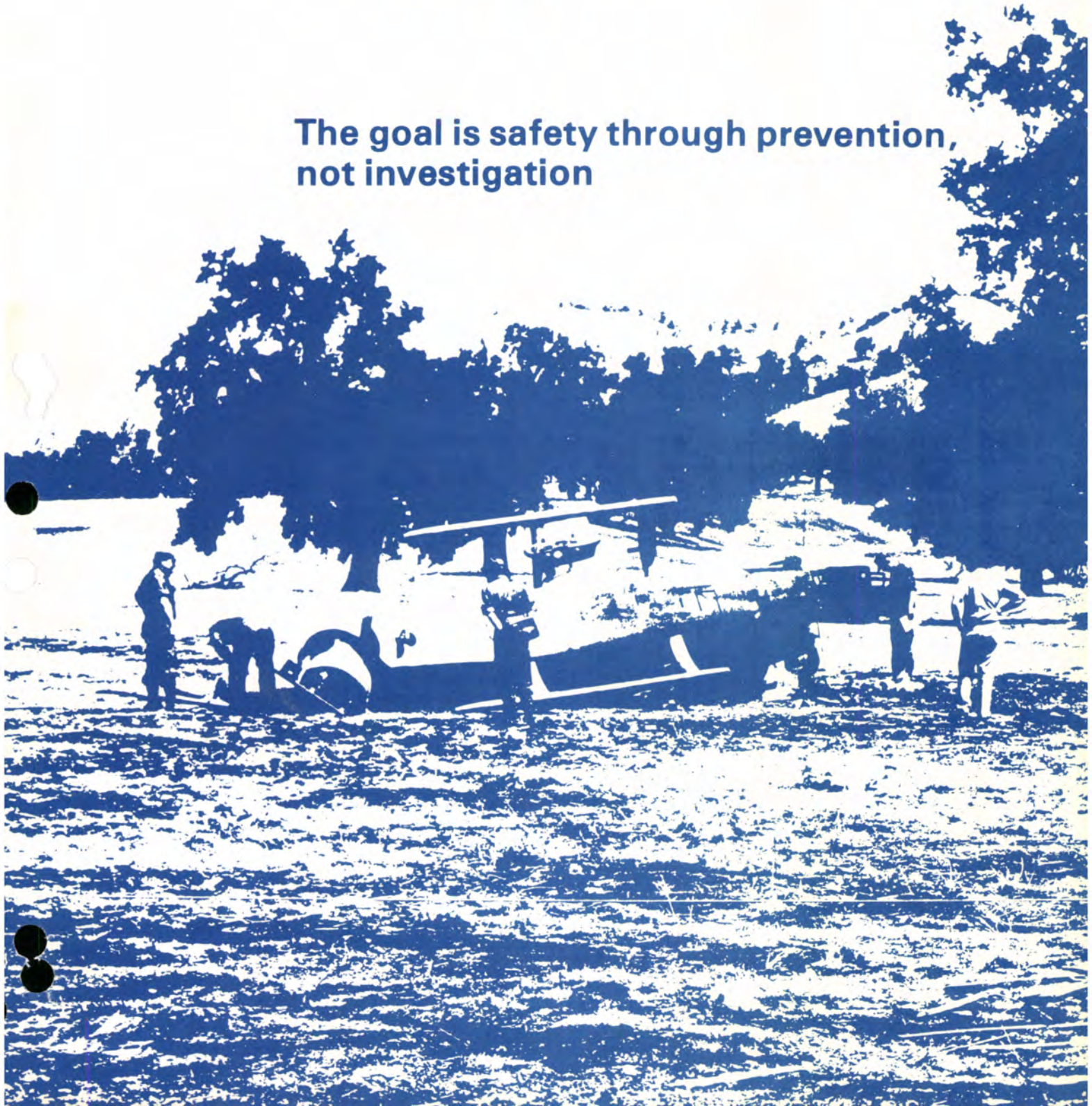
The goal is safety through prevention, not investigation



Mishap review

Synopsis

As the CH-47B pilot was ground taxiing, the aft rotor blades hit a light pole. Directions and clearance were given by a crew chief outside the aircraft and one inside the aircraft.

History of flight

The CH-47 was flown from its home field to a civilian airport to be used in a static display. Arriving at the airport, the copilot, who had been flying the aircraft, completed a running landing. The pilot then 4-wheeled, ground taxied the aircraft from the runway to the parking ramp, using the proper steering and brakes. The copilot guarded the controls in the ground taxi position.

The aircraft was stopped as it approached the parking ramp. One of the crew chiefs was told to exit the aircraft and ground guide it to the designated parking site. The other crew chief stayed in the rear of the aircraft to help clear it. The pilot then taxied within 36 feet of a light pole and made a 90-degree right turn following the hand signals of the ground guide positioned in front of the aircraft. During the turn, the three aft rotor blades hit the pole, causing $105,000 in damages. A piece of one blade damaged a tail rotor blade of a parked AH-1.

Crewmember experience

The 32-year-old pilot had more than 2,500 rotary wing hours, with more than 1,300 in CH-47Bs. The 25-year-old copilot had more than 200 rotary wing hours. More than 50 of these were in CH-47Bs.

Commentary

Both crew chiefs told the pilot he was clear to turn. The ground guide directed the pilot to make a turn to the right, assuming he would make a gradual turn. Instead, the pilot attempted a sharp right turn. The ground guide could not accurately judge the proximity of the pole and the rotor disc from his position. The crew chief inside the aircraft could not see the aft rotor tip path plane and the top of the pole because of his position in the rear of the aircraft.

The pilot was aware of the obstructions, the turning radius of the aircraft, and the requirement to properly position ground personnel. However, he did not position his taxi director and blade watcher as shown on page 8-11, TM 55-1520-227-10-1. He elected to use only one ground guide while relying on the inside crew chief for clearance of the aft rotor system. ■

Shortfax

Does the shoe fit?

With the concurrence of HQDA, the Army Safety Center sent a message (USASC GEN 81-05) to the field in April 1981 relieving units of the requirement to use the DA Form 2397 as an investigative and reporting tool for Army aircraft mishaps that had a dollar cost of $2,000 or less. The message pointed out that a PRAM prepared in sufficient detail and in accordance with the guidelines set forth in the samples displayed at examples A and B, Appendix D, AR 385-40, would suffice for these mishaps as a test concept until 31 December 1981.

To date, the results are mixed and the test only marginally successful. In many cases the PRAMs being received at the Safety Center do not contain sufficient information. In fact, they are no different from any other PRAM, and they are inadequate to make a valid contribution to mishap prevention. The key areas found most lacking are paragraphs 11, 12, 13, 14, and 15 which pertain to information on the specifics of the mishap; e.g., identifying and reporting **what** happened and **what** caused it.

If sufficient information is not readily available to meet the time requirements of the initial PRAM, then a supplemental PRAM should be submitted to provide the necessary information. Aviation safety officers in the field need to upgrade efforts in this area. Although the test was instituted with the intent to reduce your paperwork load, the Safety Center can ill afford to lose information vital to the analysis efforts in support of the aviation mishap prevention program.

So, if the shoe fits, wear it. Otherwise, continuation of the reduced reporting concept and efforts to increase the present dollar amount will be terminated. The alternative is that it will become necessary to return to the requirement for a complete DA Form 2397 investigation on Class C aviation mishaps after 31 December 1981, with the attendant workload, regardless of dollar amounts involved. It's not too late for you ASOs to turn it all around and show us you mean business! ■

Butane lighter explodes

This butane lighter blew up while it was lying on the dash of a parked car. Pieces of the lighter were found as far away as the rear window ledge. Intensified heat from the sun shining through the windshield probably caused the fuel in the lighter to expand to a point where the plastic container could not retain the pressure.

Items containing flammable products should not be left in the sun. They might explode at a very inconvenient time.

—thanks to CW3 Harold Hintze, 3d ACR, Fort Bliss ■

You can't legislate safety

One of our greater Americans, Benjamin Franklin, wrote that he once began a program designed to eradicate all of his vices. His technique was simple: Concentrate on one particular vice until it was eliminated and then start on another. By doing this he expected to be able to improve himself greatly within a short time. Unfortunately, he found that a vice once vanquished did not always stay conquered but could and would reappear when he let his guard down. He was unable to devote sufficient attention in the many directions required to effectively combat all of his vices at once. This experience of Ben Franklin's with his personal vices has direct application to the safety officer's job: the prevention of mishaps.

It has often been said that there are really no new accidents and this is generally accepted as true. The second half of that axiom is we just keep on thinking up new ways to repeat the same old mistakes, and that is a key to the prevention of mishaps. When investigations point to materiel fixes, we implement the solution. When investigations point to human error, we often find the particular solutions difficult to pin down. We do attempt solutions, often in the form of rules for crews to follow, but like Ben Franklin, to attain perfection we would soon find that we don't have the capacity to pay sufficient attention to all the rules required. If rules cannot be the total answer then what else is available?

One of the chief strengths of the Army aviator must be his ability to think in the air. Professionalism is another word for that ability, and **that** must be the target of the safety officer. His mishap prevention tools cannot be hit-or-miss rules that last until the next change of command, but must be a directed set of programs designed to foster professionalism in the face of its enemies: complacency, carelessness, and ignorance.

The job of the safety officer is not easy. The tasks are not well defined and the results are difficult to quantify. Some general guidelines are:

- Aviation safety is a growing field and the amount of information available to the ASO is tremendous. Use your resources wisely.
- The ASO must apply his knowledge to the task requirements to produce meaningful programs. What programs? Some examples: aircrew training, systematic follow-up of hazard reports, safety surveys, mishap trend analysis, safety information dissemination, program feedback.
- Once produced, such programs take time to become established. Good safet programs don't happen overnight. It takes use to make them work.
- Once established, safety programs must receive continued support. Without continuity, safety programs lose their effectiveness. Keep working.
- Finally, the job of ASO is never a permanent assignment. To insure long-term continuity and prevent duplication of work, the safety officer must provide for adequate turnover from one ASO to the next.

Rules and restrictions have a place, when situations that commonly produce mishaps can legislatively be prevented. But remember the old saying, "There are no new accidents . . ." The **real solution** lies with our professionalism as aviators. Ultimately, you can't legislate safety. It's a full time job of awareness for everyone. The goal is **safety through prevention, not investigation.**

—adapted from HOT DOPE SHEET, 2d Marine Aircraft Wing ■

Stacom

Operators Manual and Checklist update

Listed below are the effective dates of the current aircraft operators manuals and checklists with the number and date of the latest change. Please check your weekly AG Publication 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	2, 14 Nov 80	Jul 78	1, 14 Jan 81
204-10/3	OV-1B	9 Mar 79	2, 25 Mar 81	Feb 79	
204-10/4	OV-1C	10 Apr 79	2, 14 Jan 80	Apr 79	
208-10	T-42A	27 Feb 79		Feb 79	
209-10	U-21A	25 Mar 77	5, 6 Oct 80	Feb 77	5, 12 Jun 80
209-10-1	RU-21A/D	28 Feb 77	5, 24 Jul 80	Mar 77	4, 7 May 81
213-10	OV-1D/RV-1D	4 Aug 78	5, 9 Apr 81	Nov 78	1, 24 Dec 80
214-10	RU-21B/C	15 Mar 77	6, 1 Aug 80	Apr 77	6, 6 Jun 81
215-10	U-21G	11 Mar 77	4, 26 Jun 80	Apr 77	3, 12 Jun 80
215-10-2	RU-21H(GR-V)	29 Dec 78	1, 28 Jun 80	Dec 78	1, 12 Jun 80
216-10	U-3A/B	11 Dec 78	1, 3 Jul 80	Dec 78	
	C-12A	8 Jan 80		Jan 80	
	C-12C	1 Dec 78		Jan 79	
T01C-7A-1	C-7A	1 Oct 70	10, 11 Jan 80	Oct 70	13, 11 Jan 80

Rotary Wing TM 55-1520-	Aircraft	Basic Manual	Last Change	Basic Checklist	Last Change
209-10	CH-47A	9 Jan 79	2, 21 Aug 81	Dec 78	1, 2 Feb 79
210-10	UH-1D/H	18 May 79	10, 17 Apr 81	Feb 79	3, 21 Mar 81
214-10	OH-6A	17 Dec 76	9, 6 Jun 80	Dec 76	3, 20 Jun 80
217-10-1	CH-54A	8 Apr 77	2, 1 Oct 80	Mar 77	1, 13 May 77
217-10-2	CH-54B	15 Apr 77	2, 10 Oct 79	Mar 77	2, 22 Aug 79
219-10	UH-1B	16 Jan 69	17, 11 Feb 81	Dec 68	8, 11 Apr 79
220-10	UH-1C/M	8 Sep 80	8, 11 May 81	Sep 80	
221-10	AH-1G	18 Mar 80	1, 6 Nov 80	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	9, 30 Oct 81	Nov 79	2, 9 Apr 81
228-10	OH-58A	7 Apr 78	15, 22 Sep 81	Jul 78	7, 26 May 81
233-10	TH-55A	30 Sep 76	2, 14 Jul 78	Oct 76	4, 17 Oct 78
234-10	AH-1S (MOD)	17 Nov 76	12, 4 Apr 81	Nov 76	3, 30 Nov 79
235-10	OH-58C	7 Apr 78	21, 21 Sep 81	Jul 78	9, 29 May 81
236-10	AH-1S (PROD)	11 Jan 80	2, 20 May 80	Jan 80	
237-10	UH-60A	21 May 79	8, 18 Nov 80	Dec 78	9, 17 Aug 81

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.

Selected mishap briefs

uh1 **Class C mishap** ☐ (H series) Passenger became cold and tried to close cargo door. When crew chief saw what was happening, he told passenger to return door to original position. Before door could be returned, it blew off.

Class E mishaps ☐ (H series) Aircraft was not refueled before second flight of the day, and 30 minutes into flight, low fuel light came on. Pilot landed on golf course. Pilot did not check fuel before takeoff. ☐ (H series) Pilot and copilot heard whistling sound from rotor system. Main rotor skin had separated 6 inches from tip cap. ☐ (H series) Master caution light came on, followed by noise from transmission area. Running landing was made. Ruptured hose caused loss of hydraulics. ☐ (H series) Binding in tail rotor pedals was caused by failure of tail rotor servo. ☐ (H series) Master caution and hydraulic warning lights came on, and hydraulic pressure was lost. Caused by failure of irreversible valve.

ah1 **Class B mishap** ☐ (S series) Tail rotor hit ground as aircraft was preparing for rocket firing, damaging tail rotor, tail boom, and drive shaft. 8207

Class C mishaps ☐ (S series) As pilot pulled out of 140-knot slow dive during maintenance test flight, pilot's canopy door separated from aircraft. Door flew over top of canopy, hitting forward pylon fairing, pitot tube, and main rotor blade. ☐ (S series) While repositioning aircraft in parking area at night, IP misjudged distance of tail rotor clearance, and tail rotor hit bush.

Class E mishaps ☐ (S series) Rpm warning light came on during takeoff. Caused by malfunction of rpm warning box. ☐ (S series) During rapid refueling operation, pilot saw fluid leaking from oil cooler drain line. Caused by cracked transmission ball valve. ☐ (S series) Engine oil bypass and master caution lights came on. Oil reservoir was 5 quarts low. Pilot and crew chief did not check engine oil reservoir during daily and preflight inspections.

ch47 **Class C mishap** ☐ (B series) As aircraft was being taxied to runway, right aft gear drag brace split and gear hit belly of aircraft.

Class E mishaps ☐ (C series) No. 2 engine normal beep was extremely slow to respond during hover. Caused by malfunction of N_2 actuator. ☐ (C series) No. 1 torque and N_1 decreased and PTIT rose during flight. No. 1 engine then failed. Postflight inspection revealed inlet guide vanes had failed and were ingested into engine.

oh6 **Class E mishap** ☐ During attempted takeoff to hover, collective was extremely stiff, then went

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	1-11 Nov	**0**	**0**
	December	1	1	December		
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**6**	**3**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

to full up. Aircraft rose to about 20 feet before pilot could react and lower collective. Caused by simultaneous failure of support bracket and rod end assembly.

oh58 **Class B mishap** □ (A series) As lead aircraft in flight of six was hovering to parking area, crew was told to hold short of runway. Crew misinterpreted instructions and tried to cross runway while commercial airliner was on final approach. Tower again told crew to hold short as they approached runway at 20 to 30 knots. Rapid deceleration was made, and main rotor blades hit and severed tail boom. Aircraft spun several times and landed hard. 8208

Class C mishap □ (C series) Aircraft was on training mission at night. Pilot was using ground guide to help reposition aircraft. Darkness and blowing straw caused pilot to lose sight of ground guide, and main rotor blade hit tree limbs.

Class E mishaps □ (C series) Pilot heard humming noise, hydraulic pressure light came on, and hydraulics failed. Caused by cracked fitting. □ (A series) Loud banging noise was heard from rear of aircraft. Lower latch on battery compartment door had popped open, allowing door to vibrate against aircraft. □ (C series) Engine-out light came on during HIT check. Caused by failure of N_1 sensor. □ (C series) Loud noise and vibrations during NOE flight were caused by failure of hanger bearing.

c12 **Class C mishap** □ (C series) While passing through 14,000 feet, pilot noticed No. 1 engine access door locks were not fastened. During descent, door raised past normal open position and safety chain broke. Door and hinges were damaged. Pilot had arrived at aircraft about 20 minutes before scheduled takeoff and rushed his preflight. Because of incorrect use of checklist, he did not correctly secure door latches.

Class E mishap □ (C series) No. 2 engine fire pull handle light came on

during climb after takeoff. Aircraft was washed the day before and wiring harness was soaked, causing fire detector to short to ground.

ov1 **Class A mishap** □ (D series) Aircraft crashed and burned. Two fatalities. Details unknown pending investigation. 8209

u8 **Class E mishaps** □ (F series) Outboard cowling on right engine came open immediately after takeoff. Pilot did not note cowling during preflight. □ (F series) No. 1 engine ran rough for about 30 seconds, and engine chip detector light came on. Caused by failure of No. 4 cylinder. Broken pieces of piston and rings were found on chip detector sump.

u21 **Class E mishaps** □ (RU-21H) After 1 hour of flight at altitude, pilot complained of moderate pain under left and right shoulder joints. Pilot radioed ground operations to notify flight surgeon and describe symptoms. While pilot was waiting for advice from flight surgeon, pain started in lower right part of abdomen and both sides of chest. Flight surgeon advised a return to base with slow descent. Symptoms were diagnosed as bends, and pilot was treated for Class 2 decompression sickness. Flight surgeon recommended 100 percent (oxygen) prebreathing for all crewmembers going above 15,000 feet. □ (A series) No. 1 engine fuel boost pump failed during flight.

(continued on next page)

Mishap briefs

Maintenance

uh1 **Class E mishap** □ (H series) Copilot felt cyclic grip twist. Controls were transferred to pilot and aircraft was landed. Bolt in cyclic grip was not installed. Maintenance personnel did not replace bolt after working on cyclic and did not tell anyone that work had been done.

uh60 **Class E mishap** □ Excessive amount of engine oil was found on left side of aircraft during shutdown. Engine was leaking oil from around filler cap and starter. O-rings were not installed around starter.

ah1 **Class E mishap** □ (G series) Pilot heard high-pitched noise, and No. 1 hydraulic light came on. Running landing was made. O-ring on hydraulic line on elbow fitting was incorrectly installed.

ch47 **Class E mishaps** □ (C series) No. 2 generator light came on. Cannon plug on generator protection panel was not seated correctly. □ (C series) Knocking noise was heard in No. 1 engine area. Caused by loose engine hot airline clamp and loose cowling clamp.

oh58 **Class E mishap** □ (A series) Pilot noticed d.c. ammeter at 60 amps. After aircraft was landed, steam was seen coming from battery vents. Voltage regulator was out of adjustment, causing battery to overheat.

c12 **Class E mishap** □ (D series) No. 1 engine tgt gauge indicated 0° C. during flight. Caused by crimp in thermocouple wiring harness.

Messages received

- Maintenance information message on C-12 condenser failure (281600Z Oct 81).

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

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Published by the
United States Army Safety Center
Fort Rucker, Alabama 36362

Volume 10
Number 8
18 November 1981

US Army Aviation Center Library
Fort Rucker, Ala.

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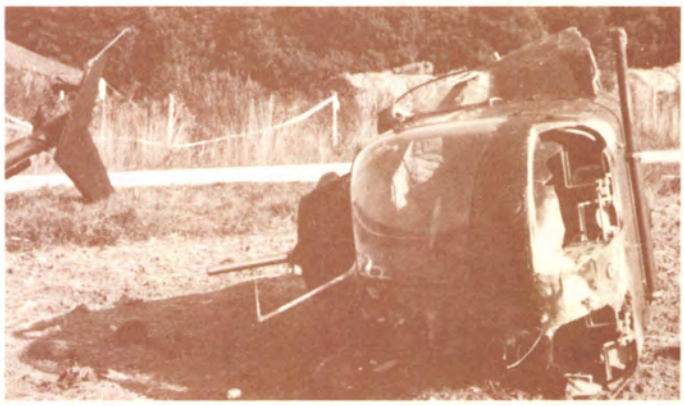


"The dominant factors appearing with alarming regularity in FY 81 class A mishaps were a breach of flight discipline on the part of aircrews and a persistent indifference on the part of commanders."

Who pays the price?

The following article is adapted from a presentation made by Colonel Edward E. Waldron II, commander, Army Safety Center, at the Army Aviation Training Symposium/Policy Committee Meeting at Fort Rucker, 16 through 20 November.

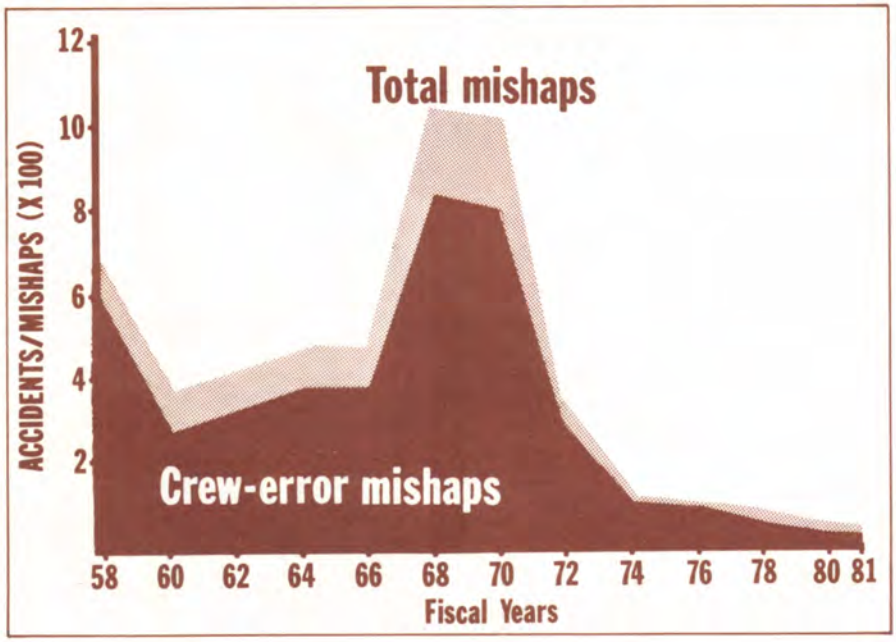
The single greatest drain on aviation resources continues to be crew-error mishaps. The persistence of the crew-error problem in a widely varying aviation environment is cause for great concern.

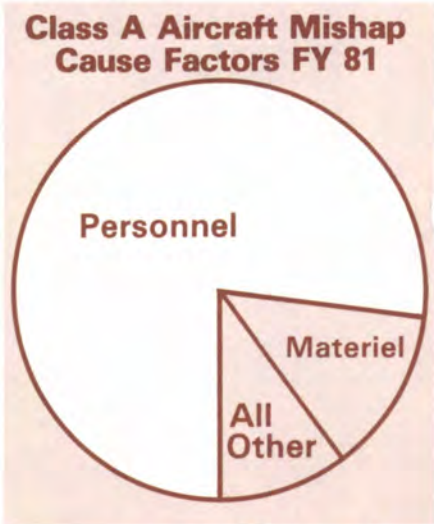
Generally speaking, almost 80 percent of all Army aircraft mishaps involve crew error. This percentage has remained virtually constant for 20 years.

The record shows that the proportion of mishaps involving crew error has not varied more than 10 percent since 1958 while:

- Aviation operations changed from peacetime to combat and back to peacetime.
- Annual flight time ranged more than 5 million hours from the highest to the lowest year.
- The number of aircraft mishaps ranged more than 1,000 from the highest to the lowest year.

FY 81 was a continuation of the same sad story. Analysis of the 43 Class A mishaps during fiscal 81 showed that the cause factors were neither new nor unique. Commanders and aviators just found new ways to repeat the same old mistakes and cause so-called "new" mishaps. In almost every case, the errors causing the mishap were the result of the people involved failing to do their jobs by the book. The mishaps were spread almost uniformly through the whole range of flight experience and across all the aircraft systems.





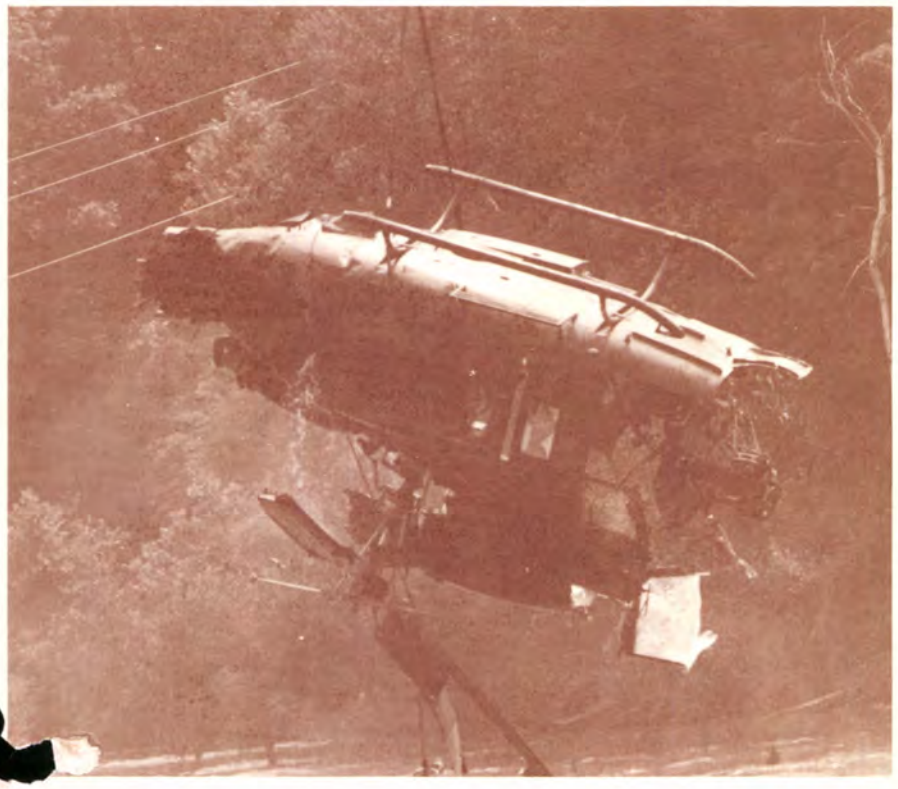
Human errors caused 77 percent of the FY 81 Class A mishaps. Materiel failure or malfunction was a cause in 13 percent, and training, weather and aircraft design were involved as a cause factor equally in the remaining 10 percent shown as "all other."

Seventy-seven percent of last year's Class A mishaps were caused by errors made by flight crews, instructor pilots, flight commanders, mission commanders, and unit commanders. The dominant factors appearing with alarming regularity were a breach of flight discipline on the part of aircrews and a persistent indifference on the part of commanders and supervisors.

Supervision, source of the problem

Traditionally, the blame for crew-error mishaps has been laid on the person at the controls of the aircraft at the time of the crash—usually the pilot. We feel this blame has been misdirected and, as a result, so have most of our prevention efforts.

Here is the irony of the whole aspect of safety: **Those charged with the responsibility for safety do not usually pay the consequences when safety supervision breaks down. The flight line mechanics and aircrewmembers pay the price in full for lack of proper and adequate supervision.** The term "pilot error" has been used to excuse a multitude of actions by commanders which have allowed or set the stage for flight-crew-error mishaps. The bottom line of the crew-error problem is that supervisors are to blame for these mishaps. How else can you explain sending an aircraft with an inoperative artificial horizon on a night mission in marginal weather when fully instrumented aircraft sat on the ramp? The crew, trying to maintain VMC under a low cloud layer, flew the Huey into high tension lines. The pilot was killed and the aircraft destroyed.



How can you explain pairing two young inexperienced aviators in one aircraft in a flight of five when the other aircraft in the formation are piloted by experienced aviators? The young aviators were unable to handle a mission which would have tested even experienced crews. They crashed making an ITO in marginal weather and all three occupants were killed.

How can you explain sending a single aircraft into a remote jungle area with the emergency locator transmitter for that aircraft sitting in the supply room instead of being installed in the aircraft? After more than a month of searching at a cost of more than $300,000 for air time alone, we gave up on finding the UH-1 and its three crewmembers.

Who pays the price?

How can you explain violating crew rest policy on a training mission into marginal weather conditions? The pilot became disoriented and flew the aircraft into the ground, killing himself, the copilot, and crew chief.

How can you explain a commander allowing a pilot, who was known to bend the rules, to remain on flight status after two flight violations had been filed against him, one for violation of procedures and one for "cowboying" the aircraft? The pilot buzzed several jeeps during a tactical exercise and finally succeeded in crashing into one of them, killing himself and destroying the aircraft.

How can you explain assigning a pilot IP duties on the U-21 after he had failed a standardization checkride in the C-12? Two weeks later, this IP gave a pilot a simulated single-engine failure on final approach and allowed the pilot to put the aircraft in a position from which a safe recovery was impossible. The IP told the pilot to go around. Because of position, altitude, airspeed, and the landing configuration, the go-around was contradictory to procedures. But the pilot tried it anyway. He applied max power to the single operating engine—the IP had not brought the other engine on. This caused the aircraft to roll and yaw left. The IP then reached for the controls, but he was too late.

Supervision, key to the cure

These are not isolated cases. They are typical examples of crew-error mishaps which clearly show that indifferent supervision is the source of the crew-error problem and responsible supervision is the key to the cure.

Regrettably, the accident record shows that flight safety has often been neglected within the overall effort of training a combat-ready force. The rationale for this, characteristically, has been "safety compromises realistic training."

While readiness is the primary mission, that mission can only be achieved by combining safety considerations with readiness training. Just as air and ground elements are integral parts of a single force, safety and readiness training work together to provide a combat-ready force.

Commanders can become so involved in the tactical scenario they forget that the purpose of realistic training is to produce combat-ready crews and equipment. A smoking hole does neither!

Senior commanders must insure that subordinate commanders do not use

tactical exercises as an excuse to completely disregard flight regulations and sound aviation management principles.

Realistic training must be safe training because safety is an integral part of all professional operations. We can't throw safety out the window when we get into combat. We should have learned that lesson in Vietnam.

Constant supervision and the elimination of substandard performance is the only way to keep aircrews from destroying aircraft and killing themselves and their passengers. To ignore or fail to correct unsafe acts and unprofessional behavior is a violation of the special trust and confidence placed in commanders.

Aviation safety depends on commanders. They either push the program or let it slide. It's a command responsibility and those flight line mechanics and aircrews will do whatever commanders decide. They will not practice safety unless commanders show them that violation of safety rules will not be tolerated.

Command action

Commanders have several powerful tools to use to reduce crew-error mishaps. First, improve the direct supervision of all flight operations through personal involvement. Second, increase the discipline of aircrews and force them to operate the aircraft according to regulations and time-proven procedures.

Pilots continue to disregard regulations and procedures, kill themselves and their passengers, and rack up millions of dollars in destroyed and damaged equipment because commanders allow them to get away with it.

Commanders have told me that because they are unable to be present in every cockpit, once the aircraft is off the ground the pilot is on his own. But I feel that even though each commander cannot be physically present in every cockpit on every flight, his presence can be felt in that cockpit. His presence would be the professional attitude that he has established through his own example and the requirements he places on his subordinates and crews.

Suspending pilots and IPs for procedure violations, recording unsafe acts and violations of regulations, and relieving aviators from flying duty with forfeiture of flight pay for flight discipline infractions—these are positive actions commanders may take to improve the discipline and professional performance of aircrews. **If you want to call it arm twisting, go ahead. Whatever its name, it is designed to establish and enforce procedures which in training or in combat will keep professional performance up to maximum levels.**

A great number of aircraft mishaps can be prevented through what is commonly called professionalism, a self-disciplined maturity coupled with competence demonstrated in all aspects of a mission.

Professionalism is the most essential safety ingredient. Any job done professionally is inherently safe. But if there is no professionalism, there is no safety. Human-error mishaps are especially deplorable because they are preventable.

The commander's special trust is the correction of safety errors before the fact. When senior commanders determine that flight personnel have not had the benefit of a commander who knows and assumes his safety responsibility, then crew error is in fact command failure.

Senior commanders won't tolerate failure in supply or maintenance management, or accept poorly trained and equipped soldiers, and, above all, will not excuse those who fail to show concern for the welfare of their troops.

Why should Army aviation be any different? ■

Selected mishap briefs

uh1 **Class C mishaps** □ (H series) Aircraft touched down on heels of skids and rocked forward during night landing in snow-covered LZ. Cross tubes were spread and one skid was damaged. Visibility was restricted during landing by blowing snow. □ (H series) IP entered autorotation in rainshower and lost contact with ground. Aircraft landed hard, damaging skids and cross tube.

Class E mishaps □ (H series) Left aft cyclic hardover occurred during in-flight hydraulics-off check. Hydraulic switch was immediately placed to "on" position and aircraft was landed. Caused by failure of servo irreversible valve. □ (H series) Loud banging noise was heard from engine compartment during hover. Caused by failure of compressor. □ (H series) Copilot decelerated excessively and rapidly lowered collective pitch, causing engine overspeed. □ (H series) Transmission oil pressure gauge fluctuated during flight. Caused by failure of gauge. □ (H series) Smoke was seen coming from above and behind pilot's head during hover. Caused by seized bearing in windshield wiper converter. □ (M series) Crew heard loud popping sound from engine during climb. Aircraft yawed right and rpm light came on. Engine rpm went to 7000. Pilot applied collective pitch and rolled throttle to flight idle. Copilot moved governor switch to emergency, and engine rpm fell off rapidly. Before pilot could enter autorotation and take manual throttle control, N_1 rpm was below 20 percent and falling. Postlanding inspection revealed separation of main pressure regulating valve diaphragm in fuel control assembly.

uh60 **Class C mishap** □ Aircraft was landed at refueling site. Ground guide signaled for pilot to taxi forward, which he did. Main rotor blades hit small tree, damaging tip caps.

Class E mishaps □ No. 1 engine failed during flight. Failure of inlet particle separator in impeller vane caused P-3 bleed air line to fracture. □ Low rotor warning light came on and low rotor rpm tone sounded. Caused by failure of signal data converter.

ah1 **Class E mishaps** □ (S series) Transmission oil pressure fluctuated during hover, followed by zero indication on gauge. Caused by failure of transmission oil pressure transducer. □ (TAH-1S) Cyclic was stiff in all quadrants during hover/taxi. Caused by failure of servos. □ (TAH-1S) Engine oil pressure light came on during takeoff. Caused by failure of oil pressure switch.

ch47 **Class C mishap** □ (B series) Pilot's door came off in flight, damaging three main rotor blades.

Class E mishaps □ (A series) Flight engineer saw hydraulic fluid leaking from No. 1 flight boost pump during ramp check. Caused by ruptured O-ring in flight boost line. □ (A series) No. 2 engine torque fell to zero and N_1 decreased to 63 percent during flight. Engine came on line spontaneously after about 15 seconds. Thirty seconds later, N_1 decreased to zero. Crew chief saw sparks coming from engine. Engine was secured and aircraft landed. Caused by bearing failure. □ (JCH-47C) Rotor tachometer generator failed during single-engine test flight.

oh6 **Class E mishap** □ Pilot applied excessive aft cyclic when he started right turn during 180-degree autorotation. Rotor oversped to 530 rpm. Pilot had not performed an autorotation with turn in 2½ years. His reaction time was slow and his control movements were excessive. IP was late with corrective action.

oh58 **Class E mishaps** □ (A series) Crew noticed N_2 rpm at 105 percent during takeoff. Power application brought N_2 rpm to 103 percent, but it again stabilized at 105 percent. Throttle was used to reduce rpm and aircraft was landed. Engine was changed because of overspeed. □ (A series) Rpm slowly decreased with governor switch in full increase during landing. Caused by failure of overspeed governor. □ (A series) Loud buzzing noise was heard from forward transmission deck during landing. Caused by failure of hydraulic pump.

c12 **Class E mishaps** ☐ (C series) Left engine oil pressure decreased below red line and then fluctuated between 20 and 50 psi. Caused by failure of oil pressure transducer. ☐ (D series) Master caution and left fire pull handle lights came on during flight. Caused by malfunction of fire detector.

u8 **Class E mishaps** ☐ (F series) Pilot saw fuel siphoning from No. 1 auxiliary fuel tank cap during climbout. Caused by deteriorated O-ring. ☐ (F series) Pilot saw vapor trail from left engine nacelle. On landing rollout, battery fumes were evident. Caused by thermal runaway of battery.

u21 **Class E mishap** ☐ (A series) No. 1 engine torque, fuel flow, and N_1 fluctuated during level-off. Oil pressure dropped to 65 pounds. Postflight inspection revealed No. 1 engine oil cap was not seated properly and O-ring was permanently compressed.

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	1-18 Nov	**2**	**0**
	December	1	1	December		
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
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	June	6	3	June		
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	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**8**	**3**

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Maintenance

uh1 **Class E mishaps** ☐ (H series) Master caution and hydraulic lights came on during final approach, followed by loss of hydraulic pressure. Running landing was made. Fitting which attaches hydraulic line to right cyclic servo had come loose, allowing hydraulic system to lose all fluid. ☐ (M series) No. 2 hydraulic light came on during recovery from low-level flight. Feedback was felt in controls and noise was heard from hydraulic pump. Running landing was made. Examination of No. 2 hydraulic system revealed that nut on tube assembly loosened and backed off nipple.

uh60 **Class E mishap** ☐ No. 2 hydraulic reservoir low light came on during HIT check. Hydraulic pump failed during shutdown. Pressure line from pump to transfer module had frayed through, causing loss of hydraulic fluid.

ah1 **Class E mishaps** ☐ (S series) Postflight inspection revealed hole in No. 2 drive shaft cover. Mechanic had left torque wrench in drive shaft tunnel, and pilot did not find it on preflight. ☐ (S series) Engine oil temperature increased during flight. Paper towel in engine oil cooler fan was obstructing air intake. The day before, crew chief working on leak in oil cooler

(continued on next page)

Mishap briefs

fan compartment placed paper towel in corner of compartment to soak up oil. He forgot about the towel. TI, pilot, and copilot overlooked towel because it was in a place which is not normally inspected.

ch47 **Class C mishap** □ (C series) During inspection of engines after maintenance operational check, foreign object damage was found in first and second stage of No. 2 engine compressor. Hinge pin on engine transmission fairing had worn in half, allowing it to slip out and be ingested into engine. Inspection of all unit aircraft found one other hinge pin badly worn.

Class E mishap □ (C series) Copilot's door fell off during takeoff. Caused by hole in door shaft. Lower door latch was not adjusted correctly and pin wore hole in door shaft.

oh58 **Class E mishap** □ (A series) Low rpm light came on and audio sounded. Throttle backed off about one-eighth of a turn. Caused by incorrectly rigged N_1 throttle cable.

Messages received

• Safety-of-flight emergency message concerning inspection of U-21, RU-21, U-8, and other nonstandard aircraft lower forward wing attachment bolt (U-21-81-02, U-8-81-01, 040135Z Nov 81). Summary: A Beech aircraft had a lower forward wing bolt failure in flight. FAA preliminary evaluation has indicated failure was due to stress corrosion. This message grounds all U-21, RU-21, U-8, and other nonstandard aircraft. Contact: Edward Branhof, TSARCOM, AUTOVON 693-3325, commercial 314-263-3325.

• Change to safety-of-flight emergency message concerning inspection of U-21, RU-21, U-8, and other nonstandard aircraft lower forward wing attachment bolt (062110Z Nov 81).

• Safety-of-flight maintenance message concerning retorquing of main pressure regulator valve hold-down screws (UH-1-81-11, AH-1-81-34, OV/RV-1-81-4, 041800Z Nov 81).

• Safety-of-flight maintenance message concerning AH-1 main rotor blade (AH-1-81-35, 051445Z Nov 81).

• Safety-of-flight maintenance message notifying maintenance personnel to perform a recurring inspection on the T55-L-11ASA engine variable inlet guide vanes (CH-47-81-15, 061600Z Nov 81).

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

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Army aircraft mishap prevention data

Published by the United States Army Safety Center Fort Rucker, Alabama 36362

Volume 10 Number 9 25 November 1981

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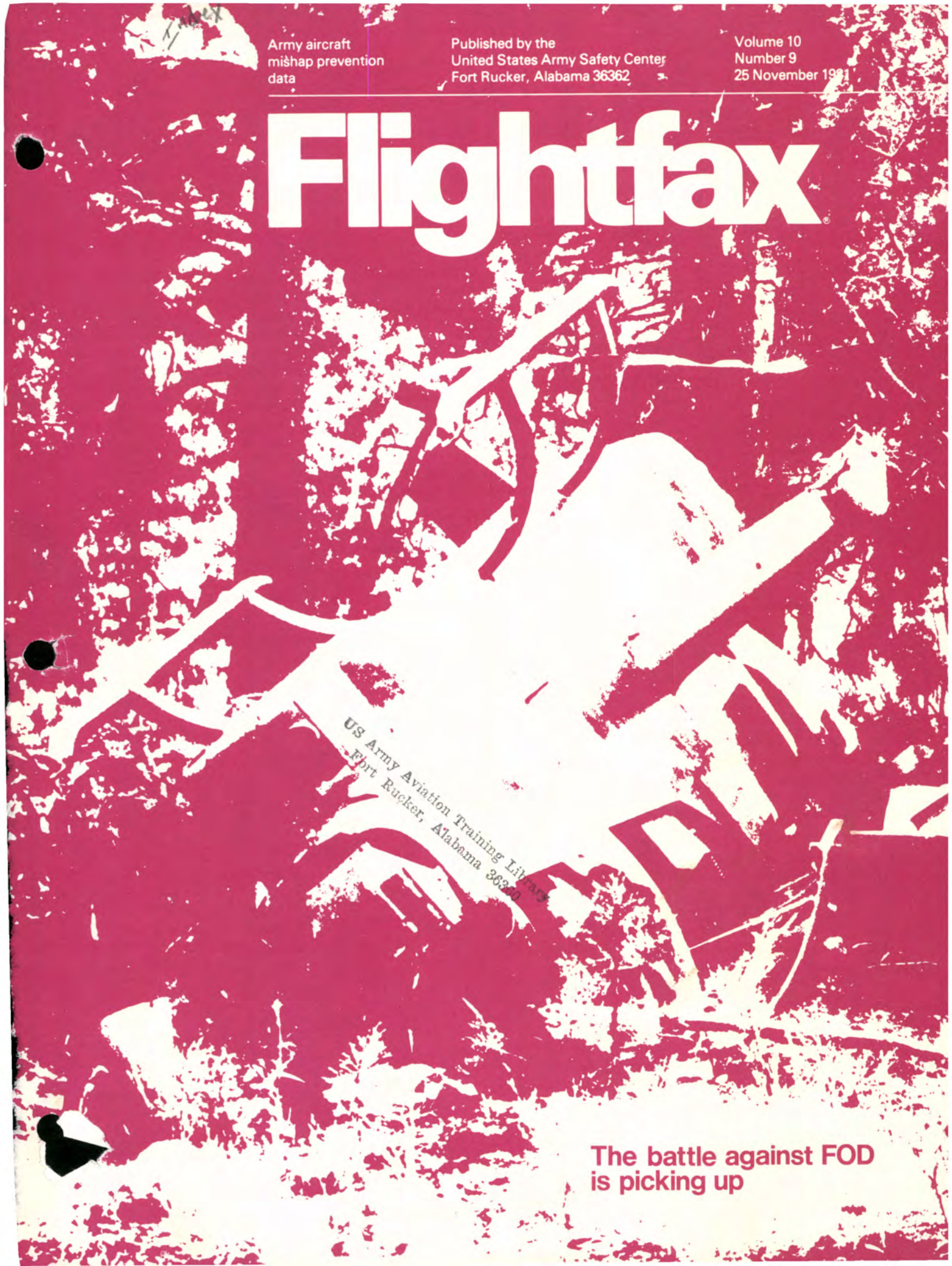

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The battle against FOD is picking up

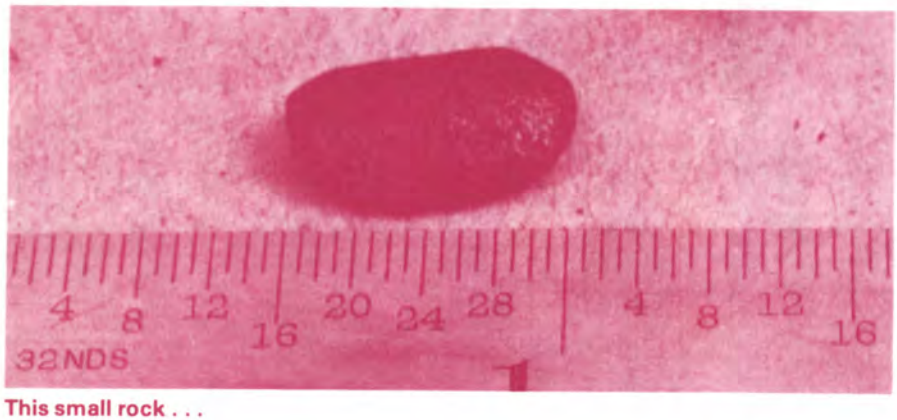
Small rock makes big hit

My name is Small Rock, and my highest ambition in life is to attack gas turbine engines. Don't underestimate me because of my size. I'm really quite good at my job. A look at the accompanying photographs will show you just how good. And remember, I'm not alone. I have literally millions of relatives scattered all over the globe.

Granted, our job isn't as easy as it used to be. In the old days—before particle separators and inlet screens—we had a pretty easy time of it. Flight line personnel wore shoes with wide-tread soles that made it easy for us to arrive at the engine inlet. Similarly, toolboxes of all sizes and shapes along with cans, buckets, and various test equipment served as vehicles on which we could hitch a ride. Those were the days! Why I have relatives that wiped out as many as three engines before being identified as the culprits.

Today, our job is not so easily accomplished. Most aviation units really try to give us a hard time. It's a rare treat to get a lift to the engine deck on a shoe anymore. However, at times, even technical inspectors forget to check their shoes and a stray bit of gum imbedded with sand and pebbles gets a free ride.

I remember when old Rough Rock once got such a lift and sneaked right by the screens to a cozy spot in front of the compressor while a TI was making his final check. Boy, did Rough Rock ever have people scratching their heads trying to figure that one out!



This small rock . . .

damaged 2nd stage and wiped out 3rd, 4th, and 5th stages . . .

As I said before, it just isn't easy nowadays. We have to dodge sweepers, high pressure water hoses, and hangar floor sweeps. Oh sure, inlet screens and such are sometimes removed outdoors, but then we rocks have to move fast if we are to do our act. Personally, I like the hangar area better. Somebody is always swinging a power cord, air hose, or rope close by an open engine. And once I get there, the rest is easy. Not everybody checks inside the engine before replacing the screen.

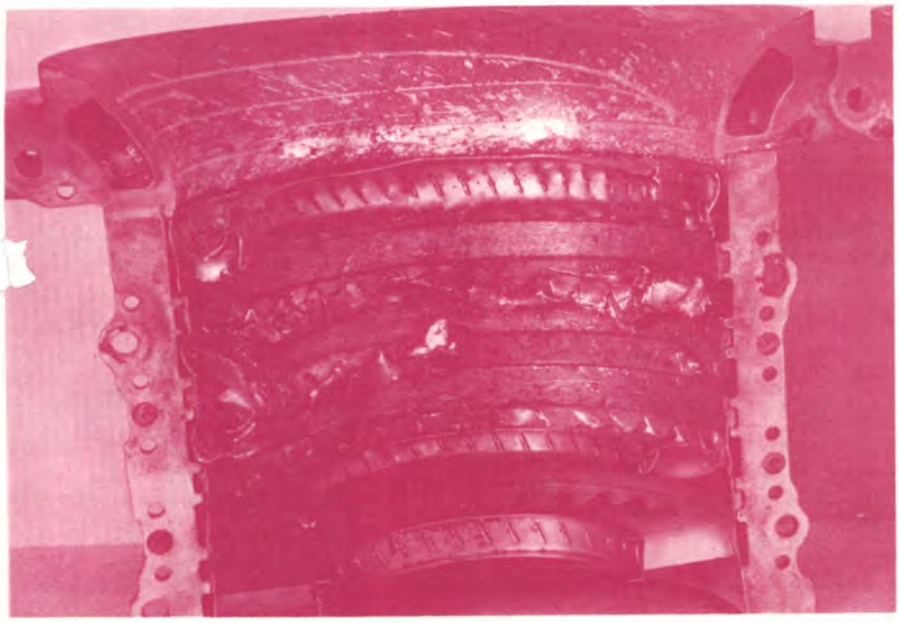
I have heard that some of my relatives as well as some of my close friends—nuts, bolt, washers, cotter pins, lock wire, and such—made it to engine inlets and as far back as the third set of compressor blades without being spotted. Of course, some got caught because sharp mechanics rotated the engine compressors and checked for FOD before installing the screens.

But we have other tricks. One of my fondest is to position myself in a hard-to-see spot and wait for the engine covers or screens to be removed. Then, I ease myself inside and wait. After the maintenance work is completed and the engine is started, I just hold tight. Then when the engine is operating at high speed, I turn loose and jump into the airstream. Wow! What a ride!

Well, I think I've run my mouth long enough. Maybe too much. After all, I don't want to give away all my secrets. So long for now, but watch for me—because I sure plan to be around. That's a promise.

Just a friendly reminder not to let down your guard against FOD. It plays havoc with engines and threatens the safety of personnel and equipment as well. So as you go about your work, take all precautions necessary to prevent FOD. If you drop a piece of hardware, locate it before you leave the aircraft.

And use your eyes—inspect your work area for tools as well as any other type of foreign objects before you "button it up." As the pictures show, a small rock can indeed make a big hit. ■



demolished stators in compressor housing . . .

and resulted in extensive thermal damage to N_1 nozzles and turbine blades.

Mishap review

Synopsis

The JCH-47C was flying at 95 knots and 3,000 feet agl when it pitched up. Forward cyclic had no effect. The aircraft rolled left and pitched down. Two aft rotor blades hit the forward tunnel cover. Control was recovered, and the aircraft was landed.

History of flight

The CH-47, with a crew of three, two technical observers, and four passengers, took off on a service mission. The weather was clear, with light to occasionally moderate turbulence at 3,000 feet agl. A few minutes into the flight, turbulence caused the crew to increase rotor rpm to 245 to make the flight smoother. Airspeed was increased to 100 knots.

The mountains to the west were obscured by low ceilings and clouds. The pilot filed a progress report with a flight service station and was advised of turbulence and headwinds. The flight route was then revised.

The pilot of a civilian airplane radioed that the air was "smooth as silk" at 4,000 feet agl. The CH-47 pilot decided to ease up 1,000 feet higher. Thrust was not increased from cruise position, but a slight amount of aft cyclic was added to start a slow climb. The nose pitched up and the pilot added forward cyclic, with no effect. With full forward cyclic, the nose continued pitching up to at least a 40-degree nose-high attitude. As the nose reached its highest point, the aircraft yawed slightly to the left. The pilot was satisfied with the aircraft's inclination to slide to the left instead of continuing to pitch up.

With the cyclic still forward, the pilot added left input, and the aircraft slid left and passed through a steep left bank. As the aircraft continued to swing left into a nose-down attitude, the pilot, fully aware of the potential for a rotor blade strike, applied slow and gentle aft cyclic to bring the aircraft back to a level attitude. Terminating at a 3,000-foot agl hover and not knowing if he had control of the aircraft or the extent of possible damage, the pilot slowly eased the aircraft into forward flight. The controls responded normally, and thrust was reduced slightly to begin an approach for landing.

After the aircraft was on the ground, inspection revealed an aft rotor blade strike to the forward tunnel cover. The strike had been heard by two people in the forward part of the cabin as the aircraft started down and to the left.

Crewmember experience

The 30-year-old pilot had almost 3,000 rotary wing hours, with more than 2,500 in CH-47s. The 34-year-old copilot had more than 1,400 rotary wing hours, with about 400 in CH-47s.

Commentary

Flight control system malfunction was eliminated as a cause factor. As supported by the weather analysis, it was determined that the helicopter entered unforecast severe clear air turbulence. There was not enough justification for the National Weather Service to forecast the possibility of severe turbulence until almost 5 hours after the mishap, when a significant meteorological information advisory for severe turbulence was issued.

Although not a mishap factor, the crew did not place the longitudinal cyclic speed trims in the manual mode during flight in turbulent air. This is a violation of TM 55-1520-227-10-2.

All aviators should be aware that turbulence can be encountered even at great distances from mountain ranges. When encountering unforecast meteorological conditions, aviators should frequently update their weather information via METRO, flight service stations, or other available facilities. ■

Recurring problems with CH-47 cockpit doors

Three cases of CH-47 jettisonable cockpit doors separating from the aircraft in flight were recently reported. In one of the mishaps, the door hit three rotor blades, extensively damaging one and resulting in severe vibrations. The crew of this aircraft was lucky.

In all three cases, the doors had been removed and reinstalled just before flight. However, the installation instructions in the maintenance manuals are incorrect. The changes generated by MWO 55-1500-210-30-54 to these manuals were not published and sent to the field. TSARCOM is publishing Urgent TB 55-1520-241-20-17 outlining the correct reinstallation procedures. The TB also points out a discrepancy in TM 55-1520-209-23P-1. Figure 21, page 125, shows item 110, P/N MS20392-1023, as being installed in the upper and lower latch assembly. The pin in the lower latch assembly was changed with MWO 55-1500-210-30-54. It is larger than the upper pin. It should be P/N RC 104, NSN 5315-00-984-7377. If pin, P/N MS20392-1023, is installed in the lower latch assembly, it could allow movement in the latch, resulting in door loss during flight.

The Safety Center recommends that you not remove and reinstall the doors until TB 55-1520-241-20-17, containing the proper reinstallation procedures, is received. It is emphasized that strict adherence to the installation procedures in the TB be followed. The old "cargo tiedown strap between the doors trick" does not always allow for correct installation. It can also damage the door by warping or bending it slightly. In any case, incorrectly installed doors almost always come off in flight.

MWO 55-1500-210-30-54 incorporated inspection holes in the upper and lower latches of the doors. It also required a red stripe to be painted on the latch to improve visibility of the latches through the inspection holes. These are to be checked as part of the daily inspection (reference sequence numbers 10.12.1 of TM 55-1520-209-PMS and 10.3.1 of TM 55-1520-227-PMD). If the latches are not properly centered in the latch plate detent, door loss could result.

Safety Center point of contact is SFC James Wheeler, AUTOVON 558-4202/4198. ■

Interest in ELTs growing

The pros and cons of emergency locator transmitters (ELTs) in Army aircraft have been argued for some time now. In fact, the first article on the subject was published in the PEARL section of the ARMY AVIATION DIGEST in October 1979. Sure, the Army has signal devices such as flares, signal mirrors, and survival radios, but how effective are these items if you are knocked unconscious or sustain broken bones in a crash and are unable to use them?

The current DA policy pertaining to ELTs is stated in DA message, DAMA-RQD, 241910Z Jul 81. "Hq DA continues to support ELTs for aircraft in remote or isolated areas and other areas where a bona fide need exists." The article entitled "Emergency Locator Transmitters . . . Why Wait?" in the August 1981 AVIATION DIGEST again identified the ELT as a viable means of locating and rescuing downed aircrew personnel and their passengers.

Interest in ELTs appears to be growing. The DARCOM Project Officer for Aviation Life Support Systems suggests that each aviation unit evaluate its need for ELTs. As appropriate, units should then forward their requests for use of ELTs, with justification, through the appropriate chain of command to HQ, TSARCOM, ATTN: DRCPO-ALSE. This information will be used to assess the extent of interest and need for ELTs within the aviation community. ■

Selected mishap briefs

uh1 **Class C mishaps** ☐ (H series) As aircraft landed for medevac pickup at field site, main rotor blade hit tree branch to left of aircraft. Pilot was trying to avoid wires on his right side. ☐ (H series) Postflight inspection revealed missing silent chain cover and hole in tail rotor blade. Rivets securing lower nut plate for silent chain cover failed and cover was torn off by airflow.

Class E mishaps ☐ (H series) Pilot noticed moisture and steam on left windshield during night flight. Caused by thermal runaway of battery. ☐(H series) Master caution light came on without segment light. Caused by internal failure of master caution panel. ☐ (H series) Maintenance officer was performing maintenance operational checks on several aircraft. When UH-1 was untied for MOC, engine inlet cover was not removed. During start, pilot noticed N_1 built slower than normal and hung at 58 percent for a few seconds before accelerating to engine idle. Egt rapidly accelerated to 600° C. Inlet air warning light came on and engine was shut down. Short shaft boot and inlet air baffles were damaged. Pilot and mechanics were rushing themselves to complete the job at a predetermined time. The normal sequence for preparing aircraft for MOC was not followed and pilot was distracted by other maintenance personnel requesting information not associated with the task being performed. ☐ (H series) Loadmeter increased on short final, mist was seen coming from upper battery vent, and crew smelled acid fumes. Caused by failure of battery.

ah1 **Class E mishaps** ☐ (G series) Master caution and d.c. generator lights came on. Flight was continued with battery power. Twenty minutes into battery power, low rpm audio activated and forward fuel boost pump light came on. Caused by failure of starter generator. ☐ (S series) Pilot removed left hand from collective to tune radio. Almost immediately, aircraft vibration increased dramatically. Overtorque light came on, and aircraft was landed. Caused by insufficient amount of friction being applied to collective controls. ☐ (JAH-1S) Master caution and aft fuel boost lights came on during hover. Caused by failure of aft fuel boost pump.

ch47 **Class C mishap** ☐ (C series) As aircraft was in 2-minute engine cooldown, crew chief saw that No. 1 engine was on fire. Fire was caused by oil coming from rear of compressor through combustion chamber. Melted bits of metal were found throughout combustion chamber and power turbine section. Seal on No. 2 bearing pack and bearing pack failed.

Class E mishaps ☐ (JCH-47C) No. 1 engine chip detector light came on, followed by indication of high side beep/governor failure. Engine then failed. Caused by failure of engine oil pump. ☐ (C series) Crew chief saw white smoke coming from No. 1 engine exhaust during

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Mishaps	Fatalities	Month	Class A Mishaps	Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	1-25Nov	**3**	**0**
	December	1	1	December		
2nd Qtr	January	8	4	January		
	February	4	3	February		
	March	4	1	March		
3rd Qtr	April	1	0	April		
	May	5	5	May		
	June	6	3	June		
4th Qtr	July	1	0	July		
	August	5	3	August		
	September	1	0	September		
	Total for Year	43	26	Total to Date	**9**	**3**

Professional performance
demands aviator discipline in the cockpit . . .
a total approach to mission accomplishment

hover. Caused by seeping engine snubber quill shaft seal. ☐ (C series) No. 2 engine chip detector light came on and aircraft was landed. Chip detector was pulled and only fuzz was found. On takeoff, light came on again. Crew rechecked chip detector and found two one-half-inch chips in debris detector screen. More slivers were found in filter assembly. No. 2 engine transmission was replaced. ☐ (A series) Aft transmission pressure gauge went to zero and oil pressure light came on. Caused by failure of aft transmission oil pressure transducer. ☐ (A series) When APU was shut down after engine start, both generators and No. 1 hydraulic lights came on. Aft transmission quill shaft clutch failed, shearing generator and No. 1 hydraulic flight boost pump shafts and causing failure of No. 2 generator control panel.

oh58 **Class E mishaps** ☐ (A series) N_2 bled to 95 percent during takeoff. Caused by malfunction of linear actuator. ☐ (A series) Aircraft yawed to left during flight, followed by loud bang in engine area and activation of low rpm audio. Aircraft was autorotated to landing. Caused by failure of compressor. ☐ (A series) N_1 climbed to about 35 percent during start and became sluggish. Pilot then confirmed that main rotor blades were not turning. Blades were still tied down. ☐ (A series) N_2 dropped to 95 percent, low rpm audio sounded, and light came on. Pilot reduced collective and rpm increased again. Power-on approach was made. Engine is being changed in accordance with TSARCOM message on maintenance procedures check for OH-58 aircraft.

ov1 **Class E mishap** ☐ (D series) Crew heard loud noise and aircraft shuddered during climb. Pilot returned to base and landed. Probably caused by hung landing gear.

t42 **Class E mishap** ☐ As aircraft was being taxied to parking area, tower personnel told pilot to shut down immediately because nose of aircraft was on fire. Fire was extinguished when aircraft was shut down. Investigation revealed that heater inlet air plenum had gotten hot and deformed, possibly during ground operation of heater. This restricted airflow into heater and resulted in incomplete combustion in heater. Heater exhaust ignited.

Maintenance

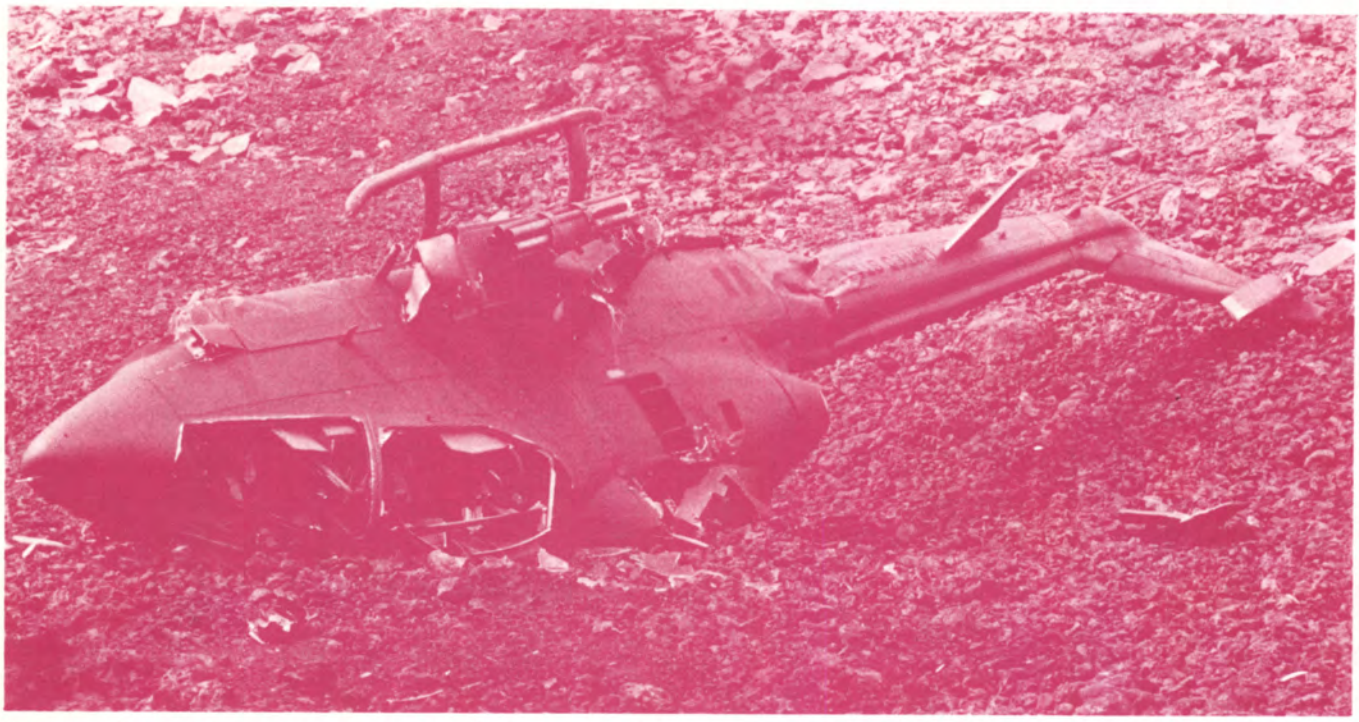
uh1 **Class E mishaps** ☐ (H series) Master caution and hydraulic lights came on, followed by feedback in controls. Crack was found in fitting. Caused by overtorque. ☐ (H series) Transmission oil pressure fluctuated during landing. Wire leading to transmission oil pressure gauge was chafed.

uh60 **Class E mishap** ☐ Transmission filter impending bypass button popped in flight. Transmission oil filter was contaminated with water. After inspection of main transmission bolts, during phase inspection, maintenance personnel had not replaced sealant around upper pressure plate.

oh58 **Class E mishaps** ☐ (A series) Pilot sitting in right seat noticed smoke rising between his feet. Source of smoke was magnetic compass light. Light bulb was painted red because pilots had been complaining about the effects of a white magnetic compass light on their night vision capabilities. Bulb produced enough heat to cause paint to burn and smoke. ☐ (A series) Thumping sound was heard and aircraft pitched nose up and then down. Friction on uniball was incorrectly set.

c7 **Class E mishap** ☐ Right throttle and right mixture control locked together during engine start. Incorrectly installed bolt caused binding in controls.

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



To reduce human error mishaps, there must be an effective blend of knowledge, skill, discipline and supervision at the operating level.

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Army aircraft mishap prevention information □ U.S. Army Safety Center, Ft. Rucker, AL 36362 □ Vol. 11, No. 1 □ 29 Sep 1982

The great American hero

This article, written by Major Gary Studdard of the Air Force Directorate of Aerospace Safety, was published in FLYING SAFETY. The pilot-error problem Major Studdard talks about certainly applies to Army aviation. The errors in the accident briefs in this article closely parallel those in the Army cases we continually report in FLIGHTFAX.

I've been directly involved (primary duty) as a flight safety officer for the past 5 years. And to me, a driver of F-4s for 11 years, the total experience has proven to be rewarding, challenging, demanding, and frustrating. I've counted and investigated more incidents, reviewed more accidents, looked at more trends rise and fall, and given more safety briefings than I care to remember.

I've worked my way through the squadron level, a wing position, and finally up to the Air Force level at AFISC where I've gone from seeing a corner of the "big picture" to occasionally having a blurred image of the total picture. I even promised myself that if I was ever in a position to influence the final findings and causes of mishaps to protect the pilot that I would do so. But, alas, I failed. Who can argue with the facts.

I would like to think somewhere along the line I've prevented some mishap from occurring, but who knows. That is part of the frustration factor. The unique thing about safety is that we can only measure our failures. But the largest part of the frustration equation is the repetitiveness of the factors involved in our aircraft mishaps. Almost all the mistakes that can be made in flying an air machine have been made and safety has duly recorded them. I suppose the smartest among us know the safety history and avoid these same mistakes, but there are still those who refuse to heed the lessons learned. Probably the most common words which appear over and over in our mishap reports are the lack of leadership, supervision, or discipline. We teach them, write about them, preach them, continually hear them, and evaluate them until we all become queasy at our stomachs. I suppose it's possible these have just become buzz words which have lost their meaning. But, in the end, whatever we call it, actions (inactions) by aircrews (who should know better), are still the leading causes of our mishaps.

I have often wondered if there is something about us pilots that make us a little foolhardy. I realize we belong to a unique fraternity and take a great deal of pride in what we do, but I wouldn't really consider us a breed apart or that different from "Joe Citizen." Maybe we are stereotyped and merely try to live up to the image. Imagining Pappy

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The great American hero

Boyington as an F-16 squadron commander might bring warm fuzzies to many of us. Or, how about those cliches you can read in any piece of aviation literature such as "cool, capable, granite-jawed, ruggedly handsome, crinkly-eyed towers of strength, instilling a confidence in their charges, born of uncounted ordeals by fire and long hours of lonely vigil"? See what I mean? Well, I think the run-of-the-mill aviators aren't so glamorous as the passages might describe. And most of us all-time-great pilots (oops!) don't really picture ourselves as such. So, in the final analysis, I guess I really can't say we fit any specific mold . . . another blank wall in explaining our pilot-factor mishaps.

Maybe you can shed some light on the reasons we do the things we do. Cases in point:

• The pilot performs a TACAN approach when the field is below TACAN minimums and eventually goes around when he sees the field too late for a safe landing. He has fuel for one "good" GCA. The supervisor of flying becomes concerned about the aircraft's low fuel, believes the pilot is having difficulty with the approach, and directs a divert. The copilot accepts the divert without question, even though he does not have enough gas remaining to make the divert field. The aircraft flames out on final approach and the two crewmembers successfully eject.

• The aircrew performs an intentional, nonstandard, or unauthorized maneuver in a nonaerobatic aircraft. The maneuver leads to a high-speed dive. Recovery is not accomplished. Two fatalities and one destroyed aircraft.

• A pilot allows his copilot to fly a popup attack, although the copilot was unqualified to perform the maneuver and had not been briefed on the attack. The copilot gets too close to the target as the popup is initiated. The pilot allows the popup to continue. An accelerated stall occurs as the aircraft is turned toward the target, and control is lost. One fatality, one major injury, and one destroyed machine.

History has proven it is better to do things "by the book."

• The two-ship flight completes their mission and on the way back to base, they overfly one of the crewmembers' homes. The mishap aircraft descends. The pilot applies maximum power and a wing rock starts. During a 90-degree bank pulloff, the aircraft impacts a tree. One fatality and one destroyed aircraft.

• The pilot had a history of fainting episodes and had undergone close medical examination. No abnormalities were found and a waiver for flying duty was granted. During the time between the waiver and the mishap, the medical problem resurfaced but the pilot did not report it. Following a routine mission, the aircraft struck the ground in a near vertical dive at high speed. The pilot was incapacitated at the time of the impact and he was fatally injured. The aircraft was destroyed.

Unfortunately, the list goes on and on. While the examples above are all a little different, they have the common "discipline" shortfall.

It's true accidents are an effective way usually to eliminate problems within the system because they get a lot of visibility and cause people to work the problem. In the logistics area, we eventually get it fixed. Admittedly, it may take awhile because of dollars, but it does get corrected. In the operations arena, no one has broken the code in solving discipline problems. In fact, if anyone has an iron-clad fix, give me a call—we'll patent it and retire rich.

In the interim, the best we have are established procedures, checklists, altitude limits, tested methods, and other rules which insure longer life, enhance safety and mission accomplishment, and are the "Air Force Way." History has proven it is better to do things "by the book." We cannot afford the unique and unusual way offered by those who think that to be a "hero" you can't follow tested ways, procedures, limits of any type, or what experience would dictate as a right method.

Successful missions are normally the direct results of team effort. This effort can only be achieved by following the established "game plan." Sustaining air discipline out in the system or around the flagpole requires a total commitment to the rules—no shortcuts, no haphazard, minimum acceptable performance, no "close enough for government work" attitude. No complacency. In a nutshell, professionalism.

How about you? Where do you fit into the mishap prevention equation? I think some of us (who need to) can still fit the walking model of a "curly blond hair, ice blue eyes, equiline nose, set mouth, cleft chin, cloud-busting pilot who gazes over far horizons, and cruises the skies as did the intrepid mariners of yore." I believe we can possess these attributes and not relinquish our "professional group" standards. If we can't, I'll opt for being in the latter. With it we can do most anything. Without it, we are reduced to luck, and I don't like the odds. ■

Selected mishap briefs

Information based on preliminary reports of aircraft mishaps

Utility helicopters

UH-1 Class A mishaps □ (H series) During takeoff from refueling point, aircraft climbed to about 10 feet and began a descending right turn. The turn continued for about 270 degrees before aircraft crashed in nose-low attitude. 8288 □ (H series) Aircraft began slow turn/spin during downwind portion of traffic pattern, crashed, and rolled onto side. 8289 □ (H series) Fireguard saw fire at forward end of engine around firewall about 3 seconds into engine start. Pilot shut down aircraft while fireguard tried to extinguish flames. Fire rapidly became uncontrollable and aircraft was destroyed. 8290

UH-1 Class E mishaps □ (H series) Master caution and engine low oil pressure lights came on and oil pressure gauge dropped to zero. Postflight inspection revealed oil filter retaining bolt had failed, allowing filter element to back out of housing, causing complete cavitation of engine lubrication system. □ (H series) Crew chief saw hydraulic fluid coming from transmission inspection panel. Master caution and hydraulic lights came on, and controls became sluggish. Running landing was made. Metal tube assembly broke just aft of tube end nut sleeve, causing loss of hydraulic oil. □ (H series) Lateral vibration was noted during flight. Caused by worn main rotor end bearing. □ (H series) After landing, crew was told that drive shaft cover extending from 42-degree gearbox to 90-degree gearbox was open. Preflight was done 1½ hours before takeoff. When crew returned for takeoff, walk-around inspection did not reveal that dzus fasteners were not secure. □ (H series) Master caution and hydraulic lights came on. Running landing was made. Caused by failure of irreversible valve in hydraulic system. □ (H series) Transmission fluid was seen seeping underneath aircraft after landing. O-ring in elbow fitting was cracked, allowing oil to leak from fitting.

UH-60 Class C mishap □ Stabilator hit treetop during approach to pickup zone. Stabilator skin was torn.

Attack helicopters

AH-1 Class A mishap □ (S series) Aircraft was approaching field site at night. Pilot decelerated about 10 to 12 feet agl and aircraft appeared to fall through, hitting the ground in tail-low attitude. Aircraft then rolled onto left side. 8291

AH-1 Class B mishap □ (S series) Main rotor blades hit tree during NOE flight. 8292

AH-1 Class C mishaps □ (S series) Postflight inspection revealed kite line wrapped around main rotor pitch change links. Links were replaced. □ (S series) Upper brace of F-style tracking flag broke and fell into rotor system during main rotor ground track. □ (S series) Main rotor blades hit tree during approach to LZ. □ (S series) Crew heard loud noise during runup. Small knick in drive shaft had been found during visual check before runup. Maintenance officer told crew chief to remove that section of drive shaft. After crew chief removed two screws of coupling clamp, technical inspector arrived and said knick was within tolerance. Crew proceeded with runup, not knowing screws had been removed. Drive shaft, hanger assembly, and clamp coupling were bent.

AH-1 Class E mishaps □ (S series) Several loud banging sounds were heard during takeoff. Caused by engine compressor stall. □ (S series) Loadmeter went to 30 amps and voltmeter began decreasing during flight. Caused by overheated battery.

Cargo helicopters

CH-47 Class A mishap □ (C series) Aircraft was transporting international parachute team to airshow. About 10,000 feet over the airfield, pilot told crew of another aircraft that he had a flickering caution light and was returning to airfield to land. As aircraft was on approach for landing, it began to break up in flight. Pylon disintegrated, aft transmission separated, and aircraft

FY 82 Class A Mishap Countdown

		FY 81			FY 82	
	Month	Class A Accidents	Army Fatalities	Month	Class A Accidents	Army Fatalities
1st Qtr	October	2	2	October	**6**	**3**
	November	5	4	November	**2**	**0**
	December	1	1	December	**4**	**6**
2nd Qtr	January	8	4	January	**4**	**1**
	February	4	6	February	**3**	**2**
	March	4	1	March	**5**	**3**
3rd Qtr	April	1	0	April	**7**	**6**
	May	5	5	May	**6**	**2**
	June	6	3	June	**2**	**3**
4th Qtr	July	1	0	July	**2**	**2**
	August	5	3	August	**8**	**5**
	September	1	0	1-29 Sep	**11**	**13**
	Total for Year	43	29	Total to Date	**60**	**46***

*Army personnel only. Total number of fatalities in Army aircraft accidents to date is 86.

crashed and burned. Cause of in-flight breakup has been determined to be failure of bearing assembly supporting forward transmission input bevel pinion gear. Eight Army fatalities and 38 civilian fatalities. 8293

CH-47 Class E mishaps □ (C series) Crew smelled burning odor. Flight engineer saw hydraulic fluid spraying inside rear of aircraft. Caused by failure of fitting on utility pressure safety valve. □ (C series) Flight engineer identified fire on No. 1 engine during flight. Fire control handle for No. 1 engine was pulled, and pilot asked flight engineer if fire was out. Engineer said sparks were coming from engine. When engine was shut down, sparking stopped. No. 1 engine chip detector light came on 15 seconds after engine was shut down. Running landing was made at airfield. Engine had ingested compressor blade from first stage compressor. □ (C series) When No. 2 engine condition lever was moved to ground during HIT check, engine remained at flight. Caused by failure of N_1 actuator.

Observation helicopters

OH-58 Class A mishaps □ (A series) Aircraft pitched down and spun three or four times to right during contour flight. Pilot neutralized antitorque pedals, applied forward cyclic, and reduced collective, slowing spin rate. Autorotation was begun and spin stopped. As aircraft settled, pilot tried to regain rpm by adding power but was unsuccessful. Aircraft hit tree and landed hard on rough terrain. 8294 □ (A series) Aircraft was No. 2 in flight of 3. Lead aircraft took off, followed by No. 2. Before No. 3 could take off, lead pilot radioed to the other two aircraft that they should remain on the ground because weather had deteriorated to a point that flight was unsafe. No. 2 had already taken off and entered IMC. Aircraft was seen coming out of low clouds in a steep right turn about three-fourths of a mile from takeoff point. Aircraft crashed in nose-up, near-level attitude, at or near cruise airspeed. Pilot was killed. 8295 □ (A series) Aircraft, participating in aerial gunnery training, was in out-of-ground-effect hover about 300 feet above 100-foot trees. Pilot began hovering turn to right but was unable to stop turn with left pedal. Turn accelerated into a spin, pilot lost control, and aircraft crashed. 8296

OH-58 Class C mishaps □ (A series) IP was demonstrating low-level night vision goggle autorotation. During application of initial pitch, rpm warning light came on, blinding IP. IP leveled aircraft and landed hard, bending front cross tube. IP failed to tape rpm warning light. Aircraft was not modified for NVG operation. □ (C series) Pilot could not take evasive action in time to avoid bird. Bird hit and broke copilot's windshield. Bird then hit copilot's visor. Visor was down, providing protection from bird and plexiglass.

OH-58 Class E mishaps □ (A series) D.C. generator light came on during takeoff. Caused by sheared starter drive shaft. □ (A series) Master caution and hydraulic lights came on. Caused by failure of hydraulic pressure switch. □ (A series) Tail rotor chip detector light came on. Caused by broken wire to magnetic plug. □ (A series) During termination of autorotation to sod, IP noticed aircraft was heels low and called for pilot to level. Pilot did not level aircraft. IP took control, but aircraft touched down heels low and rocked forward.

Fixed wing

C-12 Class E mishaps □ (A series) Temperature control circuit breaker popped during climb. Caused by failure of solenoid valve on pneumatic thermostat. □ (D series) No. 2 engine oil pressure rose during climb. Caused by inoperative oil pressure transmitter snubber.

OV-1 Class C mishap □ (D series) As aircraft turned final, no-hydraulics approach appeared normal, with slightly higher than normal approach speed. About 10 feet off the ground, pilot appeared to be pulling the power off, but instead he brought the power levers to reverse range. IP heard both engines go into reverse. Aircraft immediately went into high sink rate. IP hit power levers forward and took the controls just as aircraft hit the ground hard. Aircraft veered to left and went off runway.

U-21 Class E mishaps □ (A series) Fuel was seen siphoning from left wing fuel cap during takeoff. Fuel cap was not seated correctly. □ (A series) When landing gear was lowered during approach to landing stall, right main gear light would not illuminate. Gear was manually extended and aircraft landed. Caused by broken wire.

Maintenance

UH-1 Class C mishap □ (H series) When rpm reached 6500 during maintenance operational check, noise was heard from rear of aircraft. Engine inlet screens were removed and damage was found. Rear clamp on main drive shaft was not coupling engine to drive shaft and was to the rear of mating splines. Particle separator was destroyed and drive shaft damaged. Engine compressor blades showed evidence of FOD. Suspect failure to fully seat aft main drive shaft clamp.

UH-1 Class E mishaps □ (H series) Oil was seen coming from underside of aircraft during hot refueling operation. Oil cooler return line was chafed by wire bundle. Line or wire bundle was not clamped to prevent chafing. □ (H series) White flashes appeared under instrument panel as aircraft was picked up to hover. Right side instrument light failed. When aircraft received night

(continued on back page)

Accident review: inadvertent IMC

Synopsis

The lead aircraft of a flight of four AH-1s inadvertently flew into clouds. The crew became disoriented, and the aircraft hit the side of a hill and was destroyed.

History of flight

Four Cobras were en route to a field training exercise. Stopping for fuel, the crewmembers went to the flight service station to get a weather briefing. The pilots were told that the weather was VFR at their destination but that a pass they would be going through might not be open because of a low cloud cover. They were also told that if the pass was closed, they could try to go VFR on top or proceed south and cross the mountain range in the vicinity of another pass. The flight leader discussed the options with the other pilots and they decided to try the first pass.

The four aircraft took off in a loose, staggered trail formation and proceeded towards the pass. Ceilings and visibility started to decrease, and the mountaintops were obscured by low clouds. The flight leader was concerned about the weather but did not make any comment.

About 20 minutes after takeoff, the flight leader announced over his radio that the weather was deteriorating and he didn't think they were going to make it through the pass. The platoon leader, who was copilot of the trail aircraft, urged the flight leader to "go a little bit further." The flight leader continued on. About a minute later, the No. 2 aircraft broke out of the formation, followed by the No. 4 aircraft. The No. 3 aircraft continued as a part of the formation.

The flight leader (PIC) then told his copilot, who was on the controls in the rear seat, to break right. The copilot asked if the PIC meant left toward a highway. The PIC again told his copilot to break right. The copilot began a right turn with approximately 30 degrees of bank and entered instrument meteorological conditions (IMC).

As soon as the aircraft entered IMC, the PIC told the copilot that he had the controls and increased power to begin a climb. The PIC was not aware that the copilot had also increased power before relinquishing control. Airspeed had decreased to 60 knots. The PIC added more power and noticed he had about 60 pounds of torque and that the aircraft was out of trim. He immediately decreased power and applied antitorque pedal to trim the aircraft. The airspeed indicator went to zero and the aircraft entered an unusual attitude.

The PIC transmitted that they were in trouble and, at the same time, tried to lower the nose of the aircraft to regain airspeed. The pilot of the No. 3 aircraft answered the call and tried to calm the flight leader so he could regain control of the aircraft. During this time, the copilot got on the controls. When the aircraft came out of the clouds in a nose-down attitude about 50 feet above the ground, the PIC and copilot applied full aft cyclic. Just before the aircraft hit the ground, the PIC pulled full collective pitch. The high rate of descent could not be stopped and the aircraft crashed, coming to rest on its left side. Both crewmembers sustained major injuries.

Crewmember experience

The 24-year-old PIC had more than 400 rotary wing hours, with more than 200 in the AH-1G. The 24-year-old copilot had more than 200 rotary wing hours, with more than 50 in the AH-1G.

Commentary

This accident was the result of the cumulative effects of the platoon leader's decision to continue flight into IMC, the PIC's loss of composure, and lack of training to operate the AH-1 from the gunner station. When the weather deteriorated, the flight leader's good judgment (and AR 95-1) told him to alter his flight. But when the platoon leader urged him to go a little further, he did.

The copilot, who was in the pilot station, had the aircraft under control when it entered IMC. The PIC took control and placed the aircraft in an unusual attitude from which he and the copilot could not recover. The PIC was not trained to operate the AH-1 from the front seat. The AH-1 qualification course trains aviators to operate the aircraft from the pilot station and to operate weapons systems from the gunner station. There are no tasks listed in the Attack Helicopter Aircrew Training Manual which must be performed from the gunner station. And the ATM does not require aviator evaluation in the gunner station during the Annual Aviator Proficiency and Readiness Test. It seems to be a common practice for units to require or allow aviators to operate the AH-1 from the gunner station because of the superior view from that station. Therefore, aviators are operating the AH-1 from a station which has a set of controls entirely different from those with which they were trained to operate the aircraft. ■

Mishap briefs

vision goggle electronic MWO, old electrical line and converter for mag compass was left hanging. One wire came loose, causing arcing.

UH-60 Class E mishap ☐ During flight control hydraulics check, pilot noticed rubbing in controls, with slight rumble and vibrations. Loud knocking sound was heard as cyclic was moved to forward stop. Caused by corroded droop stop and loose retention nut.

AH-1 Class E mishaps ☐ (S series) Engine oil pressure increased to more than 100 psi during takeoff. Oil pressure relief valve was out of adjustment. ☐ (S series) Pilot was unable to increase rpm beyond 6000 during runup. Caused by binding governor increase/decrease switch.

CH-47 Class E mishap ☐ (C series) No. 2 engine transmission oil hot light came on. Spliced wire leading to temperature bulb had come loose and was grounding on aircraft cowling.

OH-58 Class E mishaps ☐ (C series) N_2 tachometer fell to zero during flight. Caused by loose wire. ☐ (A series) Aircraft was on test flight for installation of transmission input quill. Oil began spraying from beneath instrument panel and engine oil bypass light came on. Engine torque gauge pressure line was not correctly tightened at gauge, allowing nut to back off.

C-7 Class E mishap ☐ Crew smelled hydraulic fluid odor. Reservoir was 2 quarts low. Hydraulic leak on emergency brake valve was caused by loose jam nut fitting.

U-21 Class E mishap ☐ (RU-21H) No. 1 engine power lever would not move below max power position. Engine was shut down and aircraft landed. Caused by insufficient lubrication on power lever cam control and linkage.

Messages received

• Safety-of-flight operational message concerning grounding of CH-47A/B/C aircraft (CH-47-82-07, 131700Z Sep 82). Summary: Message grounds all CH-47A/B/C aircraft until cause of recent fatal accident is determined. Contact: Michael West, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight operational message concerning continued grounding of CH-47 aircraft (CH-47-82-08, 161445Z Sep 82). Summary: Investigation continues on CH-47 fatal accident. Message CH-47-82-07 remains in effect. Contact: Michael West, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

• Safety-of-flight operational message concerning continued grounding of CH-47 aircraft (CH-47-82-09, 162300Z Sep 82). Summary: Investigation of recent CH-47 accident has determined cause to be failure of forward transmission. All CH-47 aircraft are grounded until further notice from TSARCOM. Contact: Michael West, TSARCOM, AUTOVON 693-2470, commercial 314-263-2470.

Changes to TMs

The following changes to TMs have been released:

• Change 16, dated 10 Sep 82, to TM 55-1520-235-CL.

• Change 13, dated 11 Oct 82, to TM 55-1520-228-CL.

• Change 24, dated 1 Nov 82, to TM 55-1520-228-23-1.

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

Published by the U.S. Army Safety Center, Fort Rucker, AL 36362, AUTOVON 558-4479. Use of funds for printing of this publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 Feb 79, in accordance with the provisions of AR 310-1. Distribution to Army commands for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition. Data is subject to change and should not be used for statistical analysis. Direct communication is authorized by AR 10-29.

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