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ARMY AIRCRAFT MISHAP PREVENTION DATA

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Aviation safety awards

AR 385-10 provides for four types of aviation accident prevention awards for recognizing aviation units and individuals—the Award of Merit, the Award of Honor, the Award of Excellence, and the Broken Wing.

The Awards of Merit, Honor, and Excellence are applicable to all Active Army, National Guard, and Reserve organizations having either assigned Army-owned or Army-leased aircraft. All activities (detachment, company, battalion, group, etc.) are eligible for the Award of Merit and Award of Honor. However, only company size units and above are eligible for the Award of Excellence.

Activities that have maintained accident-free flying time during the preceding 12 or more consecutive months are eligible for the Award of Merit. Upon completion of 36 or more consecutive months of accident-free flying time, activities are eligible for the Award of Honor. The Award of Excellence is presented upon achieving 72 consecutive months of accident-free flying time. For the purpose of these awards, "accident" pertains to major and minor accidents as defined in AR 385-40.

Recently, many questions have been raised about activities receiving concurrent awards. A recommended change to AR 385-10 has been submitted and will clarify this portion of the regulation as follows:

Multiple awards cannot be obtained concurrently for the same calendar period. The Awards of Merit, Honor, and Excellence are given only for consecutive periods of accident-free flying time and the periods

(Continued on page 7)

Timely PRAMs are essential

AR 95-5, chapter 13, provides instructions for the completion of PRAMs and specifies submission timetables:

"(1) Accidents, incidents, missing or abandoned aircraft within 8 duty hours from time of occurrence.

"(2) Completed preliminary reports of forced landings, precautionary landings, human factor mishaps, cargo and personnel handling equipment (functional group 17) failure and malfunctions . . . within 24 duty hours from time of occurrence."

PRAMs are an essential element of the USAAAVS aircraft accident prevention program. Timely submission of PRAMs will assist in minimizing the loss of aviation assets, man and machine.

Also, if a supplemental message is required, remember to "reference the original message and provide the date and time of the occurrence and the aircraft mission, type, design, series and serial number." ■

Prepared by the U.S. Army Agency for Aviation Safety, Fort Rucker, AL, AUTOVON 558-4479. 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 analyses. Direct communication is authorized by AR 10-29.

USAAAVS

Accident analysis

ANALYSIS 77-2
Type aircraft: AH-1G
Time: 1145
Classification: Major
Injuries: None
Estimated Cost: $40,686 (aircraft)
Mission: Combat readiness training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	33	2,402	2,402
Copilot	W1	20	389	407

The accident

IP initiated a standard autorotation demonstration with an entry airspeed of 100 knots followed by a deceleration 70-knot attitude. After checking the trim, rpm, and percent N_1, IP applied initial and collective pitch. The helicopter touched down on the heels of the skids, slid approximately 100 feet, and veered to the right of the runway. Rotor rpm decayed and directional control was lost. The AH-1G then slid another 190 feet, turned 40 degrees, and slid off the runway into a muddy area. IP initiated a power recovery. The aircraft became airborne, spun to the right 180 degrees, and touched down. It then became airborne again, spun another 180 degrees, and hit the ground with the heel of the right skid. The right skid separated and the aircraft became airborne again and bounced to the right. The left skid then hit the ground and separated and the aircraft skidded right, coming to rest on the bottom of the fuselage and right rocket pod.

The causes

■ IP inaccurately estimated rate of closure and failed to reduce forward speed enough for a minimum ground run because of inadequate attention due to preoccupation with performing the maneuver.

■ Because of inadequate airfield facilities, he attempted a power recovery and go-around with low rotor rpm, an action in violation of common practice. Although the IP doubted his ability to successfully accomplish the power recovery, he decided that the alternative of sliding into a mud-filled hole bordering the runway was even more dangerous.

The cures

■ Discuss in safety meetings the inherent dangers of improper division of attention, particularly during emergency maneuvers.

■ Adhere to procedures as outlined in TC 1-36, "Qualification Training and Standardization (AH-1)."

■ Insure that adequate facilities are provided for emergency maneuver training. The criteria contained in chapters 4 and 5 of TM 5-803-4 should be used as a guide.

TOTAL MISHAPS FOR 16-22 SEP 1977

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	1	0	18	20
AH-1	1	0	1	9	11
TH-1	0	0	0	1	1
OH-6	1	0	0	0	1
OH-58	0	2	0	10	12
TH-55	0	0	1	1	2
CH-47	0	0	0	6	6
CH-54	0	0	0	2	2
U-21	0	1	0	0	1
RU-21	0	0	0	1	1
U-8	0	0	0	1	1
T-42	0	0	0	1	1
Total	3	4	2	50	59

0 Fatalities, 2 Injuries
Estimated Costs: $77,743

Selected mishap briefs

Rotary wing

UH-1

Accident □ Rpm light and audio came on during cruise flight 300-400 feet agl. Pilot confirmed decrease in rotor rpm and initiated autorotation, which terminated to plowed field. Preliminary reports indicate aircraft rolled over on left side. Pilot and copilot sustained minor injuries.

Incident □ During contour flight, crew suspected main rotor blade tree strike and landed. Rotor blades were damaged.

Precautionary landings □ Pilot smelled oil, master caution and transmission oil pressure lights came on, and oil pressure dropped. Caused by failure of gasket. EIR submitted. □ Master caution and No. 1 hydraulic lights came on. Cracked pressure switch allowed loss of hydraulic fluid. □ Right fuel boost pump caution light came on. Caused by failure of electric fuel pump. □ During practice low-level autorotation, needles failed to split when collective was lowered and throttle reduced to flight idle detent, dragging rotor rpm to below minimal operational limits. Power recovery was made and aircraft landed. Caused by failure of input quill. □ Transmission oil pressure fluctuated between 0 and 30 psi. Broken safety wire caused cannon plug to be loose. □ Engine quit during start. Caused by overspeed governor failure. □ Crew smelled electrical fire and landed. Windshield wiper motor was warm and wipers were turned off. Aircraft remained at 5500 rpm for several minutes while communication was established with the rest of the flight. Sparks were then seen coming from over pilot's head. Caused by materiel failure of ceramic insulator. □ Tail rotor pedals were stiff at neutral position. Running landing was made. Caused by failure of tail rotor magnetic brake assembly.

AH-1

Accident □ Aircraft was hovering for take-off when hydraulic failure of No. 1 system occurred. Postlanding investigation revealed SCAS actuator chafed an electrical wiring bundle and it shorted out. Resulting fire severed hydraulic line, which added hydraulic fluid to the fire. Fire was extinguished by crash rescue with foam.

Precautionary landings □ Engine oil bypass light came on, then went out. Light came on again and stayed on, with rise in engine oil temperature. Oil reservoir drain valve had no spring tension. □ Hydraulic caution light came on and hydraulic pressure was lost. Hydraulic pressure line fitting came loose. □ Fire detection light came on during landing. Caused by failure of connector.

TH-1

Precautionary landing □ Aircraft pitched left and up during landing. Suspect hardover in pitch mode of SCAS.

OH-6

Accident □ IP and pilot were on training flight. During straight-in autorotation, pilot pulled initial pitch too high, resulting in hard landing. Minor damage to tail boom and two main rotor blades.

OH-58

Incidents □ Pilot ran into cedar tree while parking aircraft. Blade was split. □ Aircraft

struck and severed four powerlines during NOE flight.

Precautionary landings □ Engine oil bypass light came on during takeoff. Caused by cracked oil line. □ Pilot noted rotor rpm at 102.5 during pretakeoff check. Rpm would not increase and aircraft was shut down. Caused by failure of power turbine governor assembly. □ Gas producer N1 went to zero, engine-out light came on, and engine-out audio was heard. Caused by N1 tachometer generator failure. □ Oil pressure dropped to 85 psi during landing, and rose to 135 psi when power was applied. Caused by oil pressure indicator failure.

TH-55

Forced landing □ Engine quit on downwind leg of traffic pattern. Failure of starter relay is suspected to have caused starter vibrator to overheat and short circuit, resulting in grounding of both magnetos.

Precautionary landing □ Engine ran rough during hover, with insufficient power to maintain hovering flight. Inspection revealed that starter was energized as soon as battery was reconnected to the system. However, it then released and functioned normally.

CH-47

Precautionary landings □ After completion of test flight, aircraft was flown to hot POL point for refueling. After APU was started and both engines brought to ground, crew heard unusual noise in ramp area. Inspection revealed impeller fan in utility hydraulic cooler had two blades broken off and hub was off the shaft. One blade of the fan landed underneath the last seat on the left side, which is where the crew chief normally sits. □ Passenger noted leak in flight control closet and flight engineer verified hydraulic leak. Rigid line connecting No. 2 roll and yaw lower stick boost actuator failed. □ Torque split and crew heard grinding noise and smelled burning odor during flight. Transmission oil pressure decreased to zero and No. 1 engine chip detector light came on. Post-landing inspection revealed failure of dual element pump in combining transmission.

CH-54

Precautionary landing □ Transmission oil pressure light came on and audio warned of oil pressure fault. Oil pressure gauge was indicating normal. Caused by inoperative oil pressure transmitter.

TSARCOM message

□ 212210Z Sep 77, subject: Inspection of Hydraulic Lines, Electrical Cables, and Control Tubes in the Tail Rotor Controls Installation (AH-1-77-20).

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

U-21

Incident □ (A series) Bird struck left wing of aircraft, denting leading edge of wing.

RU-21

Precautionary landing □ (D series) Landing gear was cranked down manually during test flight. More pressure than normal was required to get gear down. Circuit breaker

Selected mishap briefs

was reset and gear was raised. Gear was then lowered electronically but safe indication was not received. Tower flyby indicated gear was down. Landing gear indicator light had worked loose in the socket.

U-8

Precautionary landing □ (D series) Engine missed once during climb. About 15 minutes into flight, No. 2 engine carburetor heat went to maximum allowable. Engine was shut down. Caused by failure of cylinder assembly.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landing □ Master caution and transmission oil pressure lights came on and transmission oil pressure dropped to zero. Caused by improperly installed transmission oil filter gasket.

AH-1

Forced landing □ Pilot was preparing to take off from hover when aircraft yawed rapidly to the right. Pedal application had no effect, and hovering autorotation was made. Tail rotor pitch change cable turnbuckle was not safetied, allowing cable to back out.

Precautionary landings □ Pilot heard hydraulic pump howling and smelled hydraulic fluid. Antitorque pedals became stiff and running landing was made. Hydraulic pressure switch was installed without O-ring. □ Aircraft developed shuffle in fore and aft axis. Caused by loose fore and aft hydraulic servo uniball.

OH-58

Precautionary landing □ Crew smelled fuel and landed. Caused by loose fuel line at main fuel filter.

T-42

Precautionary landing □ Fuel was siphoning from right wing tank during test flight. Caused by deteriorated rubber fuel cap seal.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ Mechanic was jacking aircraft for transfer into hangar. Jack slipped off of attaching points and pinned mechanic's arm against jack and aircraft gun mount, causing laceration to arm. □ Aircraft was being moved onto wash rack for cleaning. Four aircraft were already on rack and it was decided the space was too limited to back aircraft in with tug. As aircraft was pushed onto rack, trailing edge of right synchronized elevator struck underside of leading edge of left synchronized elevator of another aircraft. Ground guide was not used. Wash rack is now limited to three aircraft.

AH-1

□ Personnel were storing main rotor blades in bins. Portable A-frame with hoist attached was being used. A-frame suddenly collapsed, causing it to flip over and fall on top of main rotor hub and blade assembly. Support bracket pin was not cotter keyed.

U-21

□ Tug operator was towing aircraft out of hangar when right horizontal stabilizer was caught on propeller blade of another aircraft. Wing walkers were used.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

Aviation safety awards

(Continued from front page)

cannot overlap. That is, once an Award of Honor or Excellence has been attained, eligibility for the Award of Merit will commence again until the plateau for the next higher award (Honor or Excellence) has been achieved. Awards of Honor and Excellence serve as the sole recognition for the last year of the required accident-free period. For example, a period of accident-free flying time from 1970 to 1977 would result in the following recognition:

Award of Merit 1970-1971
Award of Merit 1971-1972
Award of Honor 1970-1973 (only for the complete 36-month period)
Award of Merit 1973-1974
Award of Merit 1974-1975
Award of Excellence 1970-1976 (only for the complete 72-month period)
Award of Merit 1976-1977

The effective date of the Awards Program is 25 April 1970 and only the flying performed subsequent to this date will be considered for award eligibility. In addition, an award to a subordinate unit will not serve as the sole basis for an award to the higher headquarters of that unit.

Army activities meeting this criteria may be nominated for these awards by their next higher headquarters provided their headquarters certify that the activities are continuing to pursue active and effective accident prevention programs. Nominations must contain the unit identification code, the calendar period covered, and the hours flown during this period, and will be forwarded to Commander, U.S. Army Agency for Aviation Safety (USAAAVS), ATTN: Safety Awards Program Officer, Fort Rucker, AL 36362.

The Broken Wing is an individual-type award and is applicable to military and civilian personnel (including student pilots) who are authorized to pilot or serve as crewmembers of Army-owned or -leased aircraft. To qualify for this award, nominees must have demonstrated the highest degree of professional aviation skill while actually recovering an aircraft from an in-flight failure or malfunction which necessitated an emergency landing. The circumstances surrounding the occurrence must not have been aggravated by self-induced factors, violation of regulations, lack of discipline or judgment, etc. The emergency and the circumstances surrounding it must, in their entirety, demonstrate the individual's extraordinary skill, judgment, and technique in analyzing and recovering from the situation. Personnel subject to situations as a result of combat or related emergencies are also eligible for the award provided they meet this criteria. Normally, only one individual will be nominated to receive the award for a single in-flight emergency. However, in those cases where more than one crewmember clearly contributed to the actual recovery, all concerned, including enlisted personnel, may be considered for nomination.

Broken Wing Award nominations may be made by any person having knowledge of the event and should be forwarded without indorsements to the Commander, USAAAVS, ATTN: Chairman, Broken Wing Award Committee, Fort Rucker, AL 36362. Nominations should contain a concise description of the event which includes those elements contained in paragraph 7-3f(1) of AR 385-10. ■

REMEMBER THE FIVE "Cs"

- **CONTROL** - Keep aircraft straight and level.
- **COORDINATION** - Pilot concentrates on instruments; copilot looks outside.
- **CLEARANCE** - Clear highest obstacles with straight controlled climb.
- **COURSE** - Select and turn to appropriate heading.
- **CALL** - Make required radio call for assistance.

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ARMY AIRCRAFT MISHAP PREVENTION DATA
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Binder

—From USATSARCOM Materiel Readiness Bulletin

Weight and balance records for Army aircraft

Recent reports received from Army Aviation Field Activities have indicated that confusion exists relative to the requirements for preparation of weight and balance forms. Sample DD Forms 365F (Weight and Balance Computations) for each "normal" configuration of an aircraft are in accordance with Change 9 to TM 55-405-9 and AR 95-16. In some cases, the instructions have been interpreted to mean that it was necessary for each activity to prepare sample forms for every conceivable configuration of the aircraft whether they had all of the equipment necessary to establish a specific configuration or not (i.e., normal seating, alternate seating, litters, etc.).

In order to alleviate this problem, Aviation Field Activities are being notified that AR 95-16 is currently being revised to indicate that sample DD Forms 365F will be required for "typical loading arrangements utilized by the Operational Unit." TM 55-405-9 will also be revised to reflect similar information.

Additionally any problems experienced with weight and balance records on aircraft received from contractors or depots should be forwarded to the Plans and Depot Division, DRSTS-MP(1), Troop Support and Aviation Materiel Readiness Command, 4300 Goodfellow Blvd., St. Louis, MO 63120. Reports of these discrepancies should include aircraft serial number and contractor/depots identity. (USAAAVS note: You need not wait for the publication change. Go ahead and compute your 365F using typical loading arrangements.) ■

Three-level maintenance for aircraft

Have you converted to three-level maintenance? The maintenance manuals are being revised to the three-level maintenance concept. They are easily identifiable as the last two digits of the publication number, dash 23 in lieu of the old dash 20 and dash 34. Three-level maintenance allocation charts were added to the existing manuals to assist in early implementation pending fielding of the manuals. Also the new manuals (dash 23s) will carry the old MAC for activities which have not converted. ■

(Continued on page 3)

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Accident analysis

ANALYSIS 77-12
Type aircraft: AH-1Q
Time: 1335
Classification: Major (substantial)
Injuries: None
Estimated cost: $296,157 (aircraft)
Mission: Unit tactical training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW3	30	2,841	2,841
Copilot	CW2	27	953	953

The accident

Following a weather briefing, four AH-1Qs took off in loose trail formation into forecast weather below VFR minimums. About 10 minutes after takeoff, the pilot of the lead aircraft directed the flight to make a 180° turn because the weather did not look good and he thought the flight should return to the takeoff point. However, the leader of the formation flight, flying in the No. 2 aircraft, stated he thought the flight could continue and that they could always land if the weather worsened. Other members of the flight made similar comments and it was decided to continue the mission. Approximately 20 minutes later, deteriorating weather in the form of snowshowers prompted the pilot of the lead aircraft to land, followed by the other aircraft. As the pilot of the No. 4 aircraft began to terminate his approach, rotorwash caused a whiteout condition and both pilots lost outside visual contact. The toe of the right skid of the aircraft hit the ground and the aircraft then bounced forward and started rolling to the right. The right skid hit the ground again and the aircraft continued to roll right until the main rotor blades struck the ground. The aircraft came to rest inverted.

The causes

■ Pilot of No. 4 aircraft failed to execute a go-around as required by par. 10-15c(2), TM 55-1520-221-10-1, when whiteout conditions were encountered. His unit, recently deployed to the area, had not received adequate training to prepare for winter environmental operations. Flight operations in snow, to include blowing snow hazards during takeoff and landing, were not adequately discussed, and assigned aviators had minimal experience with this type of condition and its unique problems.

■ Leader of formation flight inadequately planned the flight before the mission in violation of par. 3-6b(2), AR 95-1. Because of inadequate unit training, he delegated responsibility for obtaining weather data to another aviator, but did not review the information to determine if en route weather was adequate for this mission. The unit did not conduct a formal training program to develop pilots-in-command or flight leaders.

■ Because of get-home-itis, leader of formation flight directed the flight to continue after pilot of lead aircraft initiated a 180° turn away from the deteriorating weather. The unit had been on a tactical field exercise for 7 days and had permission to return to home base before returning to the field.

The cures

■ Upgrade unit training of units deploying to cold weather environments to include specific training on operations in snow. Provide units with written training guides which detail different operational characteristics that must be considered for a cold weather environment.

■ Upgrade unit training to provide prospective flight leaders with training and knowledge in how to properly command and control. To implement this remedial measure, guidelines should be established for units to use in developing this training in conjunction with unit pilot-in-command training programs.

■ Take positive command action to discourage improper performance attributable to adverse psychophysiological states such as get-home-itis. To implement this measure, insure that courses of instruction pertaining to aviation resources management, such as COI 2G-F15, "Aviation Commander's Readiness Course," properly emphasize this command responsibility.

(Continued from front page)

–From USATSARCOM Materiel Readiness Bulletin

Rotor and propeller assembly dynamic balancing and tracking system

A dynamic balancing and tracking kit (Vibrex) is currently available as an off-the-shelf nondevelopment type item. The Vibrex provides substantial improvements over current balancing and tracking methods.

The Vibrex is fully portable and enables accurate measurement and location of main and tail rotor imbalances, determines the track of main and tail rotors on the ground or in the air, performs track and balance of propeller systems, and performs vibration troubleshooting functions.

The Vibrex will be authorized as a TOE item in Aviation Unit Maintenance Shop Set No. 2 (AVUM #2) and Aviation Intermediate Maintenance, Divisional (AVIM-Div) Shop Sets.

Procurement action has been initiated, type classification is anticipated during the 1Q FY 78, and fielding of the Vibrex will begin 1-2Q FY 78. ■

Selected mishap briefs

Rotary wing

UH-1

Accident □ (Test activity) Aircraft landed hard during engineering test flight. Tail boom separated on impact, transmission was torn loose, and skids flattened.

Incidents □ UH-1 was hovered too close to parked helicopter and main rotor blades struck main rotor blade of parked aircraft. Incident damage to blades. □ While on night practice assault, touchdown was made with forward airspeed, causing damage to forward cross tube. □ Main rotor blade struck small tree during landing to LZ, damaging blade. □ During training flight, aircraft was flying down riverbed at 80 knots and 300 feet agl. Pilots allowed aircraft to descend to 75 feet agl where aircraft struck wire, damaging skid tunnel and cap assembly. □ Aircraft struck tree during approach to LZ, damaging main rotor blades. □ Seagull struck pilot's windshield, knocking out small piece of glass. □ Aircraft struck tree during go-around from approach to confined area, breaking left chin bubble. □ Aircraft struck top of dead tree during low-level training mission, breaking both chin bubbles. □ Aircraft was hovering through NOE confidence course. Main rotor blade hit bamboo pole serving as obstacle, damaging blade.

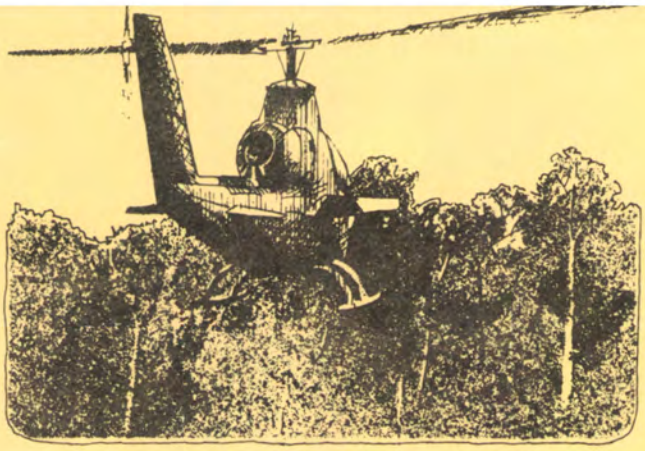
Forced landing □ After preflight, runup, and HIT check, aircraft was being picked up to 3-foot hover. At approximately 2-foot hover, crew heard muffled sound similar to small explosion. Aircraft immediately lost power and hovering autorotation was made. Locking pin on fourth stage compressor blade failed, causing blade to come out and shear blades off fifth stage compressor.

Precautionary landings □ Fire detector light came on. Caused by faulty resistor in fire detection system. □ Battery overheated during hover/taxi. □ Severe vertical vibration occurred during cruise flight. Power-on landing was made to large field. Inspection of red main rotor blade revealed that blade skin and bonding material on underside of blade had peeled rearward. □ Engine oil pressure began fluctuating from 80 to 105 psi. Male end of electrical plug of engine oil pressure gauge broke loose. □ Internal failure of inlet guide vane actuator caused engine power fluctuations. □ During engine runup, transmission pressure light came on, accompanied by rapid drop of pressure on transmission oil pressure gauge. Caused by failure of transmission oil filter gasket. □ During low-level tactical trail formation flight, pilot pulled approximately 62 pounds to avoid wires, overtorquing aircraft. □ During hot refueling operation, oil leak was seen in vicinity of engine compartment. Caused by failure of No. 3 and 4 bearing retainer seal. □ Master caution and engine oil pressure lights illuminated, followed by decrease in engine oil pressure. Inspection revealed quick disconnect on engine oil return line was leaking excessively. □ Cyclic displaced to right rear during low-level flight. Caused by failure of irreversible valve.

AH-1

Incidents □ Both main rotor blades struck tree while pilot was maneuvering into NOE firing position. Incident damage to both blades. □ Aircraft hit wire while flying NOE at 70-90 knots. Poles were hidden in treeline. Forward pylon fairing was damaged and FM antenna was broken off at mount.

Forced landing □ Noise was heard from transmission area during cruise flight.



During approach, master caution and No. 1 hydraulic segment lights came on. Pilot executed emergency procedure and continued to land. At 15 to 20 feet the pedals became stiff and at 5 to 10 feet pedals locked, forcing pilot to continue to the ground with minimal tail rotor control. Caused by internal failure of lateral cyclic servo.

Precautionary landings □ Torque, N_1, and N_2 started fluctuating. Caused by governor failure. □ Controls became stiff and then stuck twice. Caused by lateral servo failure. □ Crew heard loud squealing noise from area of hydraulic compartment. Before landing, master caution and No. 2 hydraulic pressure lights came on, accompanied by feedback in cyclic and collective pitch controls. Caused by failure of preformed packing on No. 2 hydraulic system module. □ Failure of engine oil pressure switch caused illumination of oil pressure light.

CH-47

Precautionary landings □ No. 2 engine failed to accelerate above 62% N_1 after power recovery autorotation during maintenance test flight. N_1 advanced to 67% by use of emergency d.c. beep, No. 2 engine condition lever was moved to ground, and running landing was made. Caused by failure of engine transmission. □ Transmission oil hot light came on and temperature went to 140° C. Caused by failure of transmission oil temperature gauge and transmission oil temperature selector switch. □ Aircraft was in level flight with slingload when rotor rpm fluctuated. Torque split, followed by low rotor rpm, with noise in aft transmission. Postlanding inspection revealed failure of fuel control. Noise in aft transmission could not be duplicated.

OH-6

Accidents □ Aircraft struck high tension powerlines between two ridgelines. All four blades separated from aircraft, tail boom was severed, and rear fuselage separated from main cabin section. Apparently an unauthorized passenger was being carried and there was no safety observer on board. Pilot and passenger were killed. Pilot was flying below 500 feet agl at night, but was not on a mission requiring flight below 500 feet. □ At approximately 1,000 feet agl in cruise flight, TOT rose to about 1,000°. Pilot shut off cabin heat and reduced collective. TOT momentarily went down to 650°, then rose rapidly again and engine failed. Pilot autorotated to pasture and landed hard. Main rotor blades severed tail boom.

OH-58

Accidents □ Aircraft struck wires that crossed river, then crashed into river. Pilot, crew chief, and passenger were killed. Low-level flight was not required by mission. □ Aircraft was making minimum light night landing to a single light. Pilot flew aircraft into ground. Minor damage. □ Lead aircraft struck powerline that crossed a river during cross-country navigation training. Pilot was not aware of a published warning that numerous unmarked wires crossed the river.

Precautionary landings □ Master warning light and hydraulic pressure light on caution panel came on. Caused by failure of hydraulic pressure switch. □ Twenty-minute low fuel light came on and aircraft was landed. Flight had to vector around weather to maintain VFR which caused unplanned delays en route. Weather was forecast to be VFR entire route. □ As throttle was advanced during runup, transmission oil light came on. Bearing ►

Selected mishap briefs

in free-wheeling shaft of transmission failed, causing shaft to shift during rotation. This rotation caused failure of free-wheeling seal. □ During practice GCA, engine N2 bled off to 99%. Pilot reduced collective control and N2 was restored to 1038. However, each time collective control was increased, N2 diminished. Caused by internal failure of engine fuel control governor.

TH-55

Incident □ SP applied excessive forward cyclic control at entry to practice hovering autorotation. IP was late with corrective action, resulting in hard landing. Incident damage to landing gear assembly.

Precautionary landings □ Main rotor tachometer needle fluctuated 150 rpm above engine rpm needle. Caused by internal failure of dual tachometer. □ Battery overheated during hover. Caused by internal failure of battery.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

TSARCOM message

□ 061345Z Dec 77, subject: Technical Advisory Message—CH-47A, B, and C Engine Engagement (CH-47-1977-9).

Fixed wing

C-12

Precautionary landings □ (A series) Aircraft entered traffic pattern and, when gear extension was attempted, gear would not electrically extend. Manual extension was completed and aircraft landed. Caused by electrical malfunction in landing gear control switch assembly. □ Power levers were retarded to establish a power change. No. 2 lever had no control of No. 2 engine. Engine was shut down and aircraft landed. Caused by failure of fuel control unit arm. □ Pilot's windshield outer layer cracked after descent from 25,000 feet. Aircraft was passing 3,000 feet msl and airspeed was 140 knots.

U-21

Incident □ Flock of seagulls flew over runway when aircraft was on short final. Aircraft struck bird, breaking right landing light cover.

Precautionary landings □ (A series) After-takeoff check revealed fuel siphoning from left wing tank. Aircraft returned to airfield, fuel cap was reseated, and mission continued. □ (H series) During climbout, all engine-related instruments except oil pressure and temperature began fluctuating. Suspect fuel control was starting to fail. Fuel line was also cracked and separated.

U-8

Precautionary landings □ (D series) Right engine began surging 50 to 100 rpm during climbout. Caused by failure of altitude compensator. □ (F series) Power was lost, accompanied by engine vibration and sound of metal to metal contact. Suspect valve was ingested into engine cylinder. □ (G series) No. 1 engine chip detector light came on, accompanied by increase in oil pressure. Chip detector plug was cracked internally. □ Right passenger window popped open during takeoff. Piece of curtain was entangled in window latch. □ No. 2 engine began to run rough and vibrated. Two spark plugs were replaced.

OV-1

Precautionary landing □ (C series) Crew smelled smoke in flight and then saw smoke coming from upper quadrant and lower

instrument panel. Postlanding inspection revealed gear down-lock switch solenoid was burned out.

U-3

Precautionary landings □ No. 2 engine oil temperature exceeded limits and engine was secured. Caused by malfunction in thermostat in engine oil cooler. □ Oil pressure dropped to 20 psi and oil temperature rose to 250°. Postlanding inspection revealed vernatherm valve was stuck in closed position.

T-42

Precautionary landing □ Landing gear failed to lower during landing approach. Both alternators went off line. Emergency extension procedure was executed and aircraft was landed. Caused by failure of landing gear motor.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

UH-1

Incident □ Immediately after takeoff, ground observer noticed tail rotor drive shaft cowling was open. Aircraft was landed. Crew chief and pilot detected no damage that precluded further flight so medevac mission was completed. After aircraft returned to home station, tail rotor drive shaft was inspected by TI who determined that No. 5 section of tail rotor drive shaft needed to be replaced. Cowling was not secured because crew chief had been distracted by need to refuel aircraft and forgot that cowling was open.

Forced landing □ Pilot smelled strong fuel fumes in cockpit and landed. Fuel was draining out in bottom left fuel cell area. Fuel line connection inside left side inspection panel was only finger tight.

Precautionary landing □ Master caution light came on and fumes and smoke were detected in right side of aircraft above pilot's head. During previous maintenance operation, maintenance drilled into wiring harness for pilot's windshield wiper motor while installing new greenhouse. Moisture entered through hole and caused short circuit.

AH-1

Precautionary landings □ Engine oil temperature climbed and aircraft was landed. Caused by frozen engine oil cooling fan. Aircraft had been washed the previous day, causing ice to form. Ice prevented fan from turning. □ Master caution and transmission oil hot lights came on. Transmission oil temperature went to 115° C. Quick disconnect on transmission oil return line from oil cooler was not fully seated, restricting oil flow through oil cooler.

CH-47

Precautionary landings □ No. 2 engine oil low light flickered and oil was seen coming from engine. Caused by improperly secured engine oil cap. □ Aircraft took off with No. 1 engine fuel disconnect loose. Vibration caused fuel line to separate and engine failed. □ After takeoff, crew chief noticed high frequency vibration around No. 8 and No. 9 hanger bearing area. Caused by improper installation of bolts on flex pax.

OH-58

Precautionary landing □ Sparks and smoke came from under instrument panel on approach. Caused by short circuit of airspeed indicator light rheostat wire to ground wire due to exposed wire on rheostat.

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U-21

Precautionary landings □ (H series) During autofeather check, pilot noticed No. 2 torque fluctuating 200 pounds. Aircraft was returned to ramp and shut down. Inspection revealed oil leak on No. 2 engine at oil line leading to fuel/oil heater. Oil line was cross-threaded. □ (D series) After takeoff, gear handle was raised, gear did not move, and circuit breaker popped. Landing gear down-limit switch was dirty. □ (A series) Aircraft was on tactical training flight. After reaching mission area, pilot called for cruise check. During battery check, loadmeter needle fluctuated and battery was turned off after loadmeter needles reached point seven. Postflight inspection revealed voltage regulator was out of adjustment.

OV-1

Precautionary landing □ (D series) When landing gear locked into place, right main gear would not indicate safe. Aircraft was landed without incident. Caused by improper adjustment of microswitch.

For more information on maintenance mishaps, call AUTOVON 558-3913/3901.

Followups

In the 23 Nov 1977 issue, we reported a U-8 accident with 5 fatalities. The suspected cause was left engine failure at takeoff. Supplemental information indicates engine failure did occur. Violent engine backfire caused internal damage to engine crankshaft counterweights resulting in failure of supercharger/accessory spur gear shaft and subsequent power failure of No. 1 engine.

TOTAL MISHAPS FOR 2-29 DEC 1977

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1*	10	3	42	56
AH-1	0	2	1	14	17
CH-47	0	0	0	9	9
OH-6	2	0	0	2	4
OH-58	3	0	0	13	16
TH-55	0	1	0	2	3
C-12	0	0	0	6	6
U-21	0	0	1	7	8
U-8	0	0	0	9	9
OV-1	0	0	0	2	2
U-3	0	0	0	2	2
T-42	0	0	0	2	2
Total	6	13	5	110	134

5 Fatalities, 0 Injuries
Estimated costs: $636,592
*Test Activity

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In-flight fires in U-8s

Investigations of in-flight fires involving military and civilian versions of the U-8 aircraft revealed two common problem areas.

□ Engines disintegrating in flight, causing hot oil to spill on the exhaust stacks and creating a fire in the engine area forward of the firewall.

□ Deposits of fuel, oil, and grime aft of the firewall ignited by fire burning through the lower engine cowling area in one case and by heat transfer through the firewall in two cases.

Corrective actions:

□ TSARCOM will improve engine overhaul procedures and quality control.

□ Commanders and maintenance officers should insure engines are properly maintained and operated.

□ All pilots should be made aware of engine detuning and its effects.

□ Local maintenance procedures should be improved to require more frequent inspections of all fluid lines in the engine and aft nacelle area. Insure there are no leaks in lines or connections. Clean the aft nacelle area to eliminate deposits of fuel, oil, and grime.

□ Refer to TSARCOM message 092120Z Jan 78, subject: Maintenance Advisory Message (U-8-78-1). (See page 3 of this FLIGHTFAX for copy of this message.)

Increase your margin of safety. ■

Programed Texts may be limited

Due to the increase in requests from units worldwide for the Programed Texts listed as references in the Aircrew Training Manual, TC 1-135 (DRAFT), some requests will probably be only partially filled. With the requirement to furnish the instructional departments at the Aviation School as well as field units with these Programed Texts, stockage level must be maintained. Requests that are partially filled can be resubmitted in 30 to 60 days and they will be completed.

Contact for these Programed Texts is U.S. Army Aviation Center, Department of Academic Training, Extension Training Management Branch, ATTN: ATZQ-T-AT-E, Fort Rucker, Alabama 36362. ■

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Accident analysis

ANALYSIS 77-13
Type aircraft: UH-1H
Time: 1130
Classification: Major (total)
Injuries: 3 (minimal)
Estimated cost: $618,055 (aircraft)
Mission: NOE training

	Grade	Age	RW Hrs	Tot Flt Hrs
IP	DAC	32	2,211	2,807
Pilot	CW3	32	1,693	1,693

The accident

IP told pilot to perform an NOE quick stop maneuver from north to south on an airstrip. From base to final, airspeed was about 20 to 30 knots and altitude was between 5 and 20 feet. Pilot initiated the maneuver by first applying aft cyclic instead of collective, which allowed the aircraft to pivot about the mast. The aircraft assumed a tail-low attitude and both tail skid and tail rotor hit the ground. Tail rotor separated from aircraft, aircraft yawed right, and main rotor struck the ground, destroying both main rotor blades. Aircraft came to rest on its left side about 180 degrees from point of initial contact.

The cause

■ Pilot violated par. 3(d), Appendix B, TC 1-35; and Appendix C, FM 1-1. He incorrectly initiated the quick stop maneuver by applying aft cyclic first instead of collective, or collective and cyclic simultaneously, because of inadequate unit training and inadequate IP supervision. Following the accident, this pilot, as well as other pilots in the unit, exhibited a lack of knowledge of the control techniques necessary to accomplish a quick stop maneuver and keep the tail rotor from pivoting downward. The IP requested the pilot to perform this maneuver for the first time without demonstrating or reviewing the fundamentals of the maneuver, to include emphasizing the need to maintain altitude of tail rotor. When the pilot incorrectly applied aft cyclic without first using collective, IP was unable to intervene in time to prevent the tail rotor strike.

The cures

■ Unit commanders improve monitoring of unit training activities to recognize areas of inadequate standardization/training. The commander's responsibility to monitor standardization/training, plus the methods for accomplishing this, should be included in the Aviation Commander's Readiness Course 2G-F15.

■ Unit commanders improve monitoring of IPs and unit training activities to insure IPs understand and practice fundamentals of instruction detailed in the Instructor Pilot's Handbook. Insure that training in how to properly monitor unit instructor personnel is included in the Aviation Commander's Readiness Course 2G-F15.

U-8 engine nacelle inspection

TSARCOM message 092120Z January 78, subject: Maintenance Advisory Message, U8-78-1, U-8 Series Aircraft Engine Nacelle Inspection.

1. Purpose of Message—The FAA has issued an airworthiness directive 77-25-01 requiring more extensive inspection criteria in the engine nacelle area. This message will add those requirements not already contained in TM 55-1510-201-PMS which will emphasize keeping the engine nacelle free from fuel, oil, and dirt accumulations. These inspections may prevent or reduce the possibility of in-flight fires in the engine compartment and main wheel wells.

2. TM 55-1510-201-PMS

a. The following changes will be made to the above manual. They will all be 100-hour inspections (P column).

Sequence

4.11 and 11.10 Add an inspection of main and auxiliary fuel tanks for cracks, brittleness, leakage, and general condition.

5.12 and 10.12 Add an inspection for fuel selector valve for leaks, damage, security, and operation.

6.1 and 8.1 Add/visually inspect engine cowling for oil, fuel, or dirt accumulation and source of same.

6.5A and 9.5A Add a new inspection item after 6.5 and 9.5 as follows:

Visually inspect front and back side of firewall for oil, fuel or dirt accumulation.

Check for missing, cracked, or deteriorated grommets in firewall.

Plug open or unused firewall holes.

6.15 and 9.15 Add the word "security."

6.22 and 9.22 Add the word "deterioration."

6.6 and 9.6 Change the removal of augmentor tubes and fire shield inspection from a 300-hour to 100-hour inspection.

b. The following power-on test will replace the first item on page 27. Start engines and operate at 1500 rpm, cycle propellers in and out of feather position several times. Test for clean engine shutdown by moving mixture control (U-8D/G/RU-8D) or switching (U-8F) to "idle cutoff." Open cowling and visually inspect engine compartment area aft of firewall and main gear wheel well for fuel or oil leaks. Restart engines and test for clean engine shutdown by moving fuel selectors to "off" position.

3. The information contained in this message may be used pending receipt of the formal change. Hugh Collison, AUTOVON 698-2391, commercial (314) 268-2391, is the point of contact for this message. ■

TOTAL MISHAPS FOR 30 Dec 77-5 Jan 78

Type Aircraft	Accidents	Incidents	Forced Lndgs	Prec. Lndgs	Total
UH-1	0	0	0	4	4
AH-1	0	0	1	0	1
OH-58	0	0	0	2	2
CH-47	0	0	0	2	2
O-2	0	0	0	1	1
U-8	0	0	0	1	1
Total	0	0	1	10	11

0 Fatalities, 0 Injuries
Estimated costs: $19,547*
*Ground mishap

Selected mishap briefs

Rotary wing

UH-1

Precautionary landings □ Master caution/hydraulics caution lights came on and hydraulics circuit breaker popped out during hydraulics-off maneuver. Caused by failure of safety relief valve. □ Pilot heard loud bang from aft portion of aircraft and airframe shuddered during cruise flight. Aircraft was test flown but situation could not be duplicated.

AH-1

Forced landing □ Engine failed during maintenance flight. Cause unknown at this time.

CH-47

Precautionary landings □ Loud bang was heard and airframe shuddered. Caused by defective vibration dampener. Broken spring assembly and guide bottomed out on weight assembly. □ No. 2 engine nose box lost oil pressure during climbout. Caused by failure of oil pressure transmitter.

OH-58

Precautionary landings □ Transmission oil pressure light came on. Caused by malfunction of oil pressure switch. □ Engine chip detector caution light came on. Caused by metallic fuzz on lower chip detector.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

O-2

Precautionary landing □ During maintenance test flight, pilot lowered gear on downwind before descending for landing. Main gear indicated down but visual check showed it did not extend. Pilot recycled gear lever four times, with gear extending on the fourth try. Landing gear solenoid had frozen due to moisture and freezing temperatures.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Ground □ Crew chief placed tracking flag too far into rotor system before maintenance supervisor could stop him. Two rotor blades and rotor hub were damaged.

Precautionary landing □ IP noticed loss of torque from 28 to 20 psi. He increased rpm from 6000 to 6600 and, approximately 3 minutes later, noticed rapid loss of rpm down to 6100. After determining there was no engine failure, IP increased collective to maintain altitude, increased N_2 to 6250 rpm, returned to airport, and landed. Caused by loose wire on linear actuator.

U-8

Precautionary landing □ Gear handle was raised on takeoff and intransit indication was received. Gear handle was recycled three times with unsafe indication on right main gear. Gear was recycled a fourth time and safe indication was received. Caused by excess wire to landing gear up stop switch slider.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ Three UH-1s with blades tied down were parked on sod. CH-47 passed UH-1s on the south side and did not directly overfly UH-1s. Southerly surface wind of about 10 knots caused CH-47 rotorwash to flex UH-1 main rotor blades. Blades hit tail rotor drive shaft covers on all three UH-1s and was severe enough on one UH-1 to make indentation on tail rotor drive shaft.

□ Aircraft was mounted on 10-ton jacks. One jack failed, allowing aircraft to shift and strike cross tube assembly which had been removed. □ Aircraft had been hoisted off of landing gear for saddle repair. As aircraft was being lowered onto jacks with overhead hoist, excessive mechanical speed of hoist caused right rear jack point to slip from top of jack. Jack punctured hole in aircraft skin at station 211. □ Fuel tanker was backed into right side of helicopter. Ground guide was not used.

AH-1

□ Technical observer, preparing to go on orientation flight, was reading the before-starting-the-engine portion of the checklist to the pilot. When he arrived at the item about canopy removal mechanism, he proceeded to arm the removal system and jettisoned the canopies. Observer said he misunderstood his preflight briefing. □ As aircraft was being towed from paint booth, antenna became entangled in lower part of overhead paint booth door. Aircraft honeycomb paneling and paint booth door were damaged.

CH-47

□ Aircraft was towed after shutdown with APU on line to prevent damage to gyros. Crew chief in cockpit failed to release swivel lock switch and swivel lock actuator on right strut failed when mounting bolts sheared and actuator housing was broken. □ Mechanic, installing new seals on vertical hinge pins on forward head of CH-47, lost his balance and fell from work platform approximately 15 feet to concrete floor.

OH-58

□ Maintenance personnel were working on main rotor and hub assembly. As they finished repositioning outer blade stands, "T" bar pins, which were holding blade grips in place, broke and one blade twisted off blade stand and hit floor. Blade was cracked. □ Light fixture was lowered from top of hangar by use of cables. Chain was used to extend cables to floor level. As fixture was being returned to ceiling, chain broke and fixture fell on aircraft, breaking greenhouse and causing minor sheet metal damage. □ UH-1 was hovered too close to parked OH-58. Downwash caused left door of OH-58 to spring open, damaging hinges and leading portion of door.

C-12

□ Unauthorized driver, attempting to reposition tug in hangar, lost control of tug, and ran into nose landing gear of C-12. C-12 moved aft 12 feet, hitting left wall of hangar and ground equipment behind left wing.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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STACOM 24 ■ 18 JANUARY 1977 COL CHARLES S. WINGATE ■ 558-2603/3514

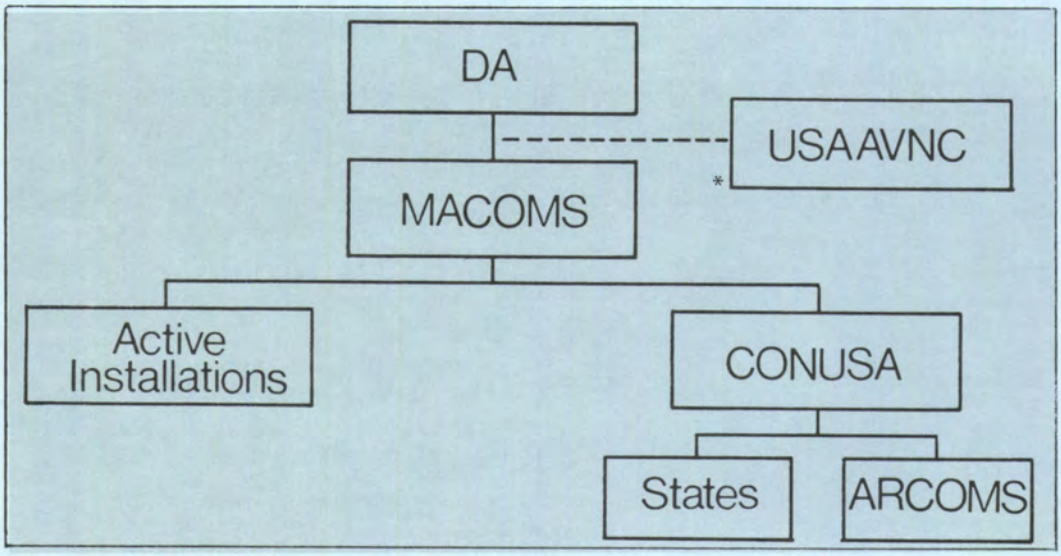
Standardization hierarchy

The effectiveness of the U.S. Army Aviation Standardization Program is directly proportional to those efforts made to establish good communications throughout the aviation standardization hierarchy. This means keeping everybody informed—up and down the line, even to the smallest aviation unit and even further, to each crewmember.

Granted, the Directorate of Evaluation and Standardization (DES), USAAVNC, has an open-door communication policy and a worldwide aviation standardization evaluation and assistance mission. But all too often requests from the field for aviation standardization assistance are received and/or responded to without the knowledge of intermediate commands and aviation standardization boards. Potentially, this can allow the effectiveness of the Army's standardization hierarchy to be undermined.

Here is the message: "You bet we want to provide aviation standardization support requested by units in the field," but this effort must complement the established aviation standardization hierarchy emanating from the lowest level to the highest. This doesn't have to slow down your request for standardization assistance. Just funnel your requests through your normal aviation standardization channels with an information copy to DES. DES will start the required action and informal coordination while awaiting MACOM comments/concurrence. It is just good military business to keep your "next higher" informed about your local standardization activities.

We are all in the aviation standardization business together. To function properly and successfully, all elements in the hierarchy must, therefore, be kept informed. For your information, this diagram broadly outlines the standardization hierarchy; keep all the levels informed.



*CG USAAVNC is designated HQDA's proponent for aviation standardization

More on hydraulics failure

STACOM 22 has generated additional questions with its position on AH-1 hydraulics failure procedures. We have been asked for an explanation of the difference between AH-1 and UH-1 hydraulics failure procedures, both actual and simulated. Specifically, why is a touch-and-go landing recommended for the AH-1 and not for the UH-1? Okay, here's why.

AH-1: The dash 10 and TC 1-36 prescribe a minimum touchdown speed of 50 knots for landings during actual or simulated hydraulics failure. As stated in STACOM 22, the Aviation Center recommends touch-and-go landings when practicing this procedure in order to preclude excessive wear on the skid shoes. The touch-and-go procedure will also be incorporated in the revised TC 1-36.

The UH-1 dash 10 and TC 1-35, on the other hand, prescribe touchdown at or slightly above effective translational lift during actual or simulated hydraulics failure. Interim change 3 to TC 1-35, 16 March 1977, further cautions against attempting a go-around after the aircraft has touched down or after airspeed is reduced below ETL. Any decision to go around must be made prior to the aircraft's deceleration below ETL. A go-around will be initiated any time the aviator perceives that the airspeed has decayed to the point when touchdown will be made below ETL.

The minimum touchdown speeds for the AH-1 and the UH-1 are predicated on maintaining an airspeed which will enable control forces to be manageable. Under simulated hydraulics failure conditions in the AH-1, loss of hydraulics does not occur, and simulated control feedback is negligible. Under actual conditions, both systems may be inoperable and the situation is more critical. If the airspeed is allowed to deteriorate below 50 knots, there is a rapid degradation of performance until cyclic feedback forces become uncontrollable; thus, the need for a minimum touchdown speed of 50 knots for simulated or actual hydraulics failures in the AH-1 and the recommendation for touch-and-go landings during training to preclude excessive wear of the skid shoes. Under both simulated and actual hydraulics failure in the UH-1, the hydraulic system is totally inoperative. After decelerating below effective translational lift, feedback forces become extremely difficult to control and could become unmanageable; thus, the caution against go-around after airspeed is reduced below ETL.

A final word to all aviators, IPs, and SIPs: Hydraulics failure procedures in the AH-1 and UH-1 (actual or simulated) are very demanding and require the utmost in planning, judgment, and performance on the part of the aviator and the IP.

"The Height of Decision"– "Decision Height"

Some confusion has occurred as a result of the article in the August 1977 AVIATION DIGEST entitled "The Height of Decision!"

The confusion is apparently generated by the article's discussion of missed approach procedures, required obstacle clearance, missed approach obstacle clearance surface, and recommendation that the pilot consider raising his decision height during precision approaches under certain operating conditions. The article.

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"The Height of Decision," is an excellent technical analysis of selected segments of any precision approach, and as such it is not intended to be a modification of applicable ARs or FARs.

"Opinions on what actions are to be taken or completed by decision height vary to the point that some clarification is needed. What actions (flight procedures) are correct at decision height?"

Remember that military aircraft classified as Approach Category "E" (approach speed 166 knots or more; any weight) routinely and safely make PAR approaches to minima of 100-¼, and aircraft classified up to Approach Category "D" (approach speed 141 knots or more but less than 166 knots, weight 150,001 pounds or more) normally utilize weather minima of 200-½ for ILS approaches. Standard Army aircraft are classified up to Approach Category "B" (approach speed 91 knots or more, but less than 121 knots), while all military helicopters may be classified as Approach Category "A" (approach speed less than 91 knots).

If the "Lead Sleds" in categories "D" and "E" are capable of conducting precision approaches under minimum weather conditions, Army aviators should be able to handle the situation equally as well; inasmuch as equipment operated by the Army meets all operational requirements in complying with criteria demanded of every segment of a safe precision approach.

The article, "The Height of Decision" did not redefine or alter the meaning of the term, "Decision Height." So, it remains just that–the height (in feet above msl) at which a decision must be made during an ILS or PAR instrument approach, to either continue the approach or to execute a missed approach.

So, continue to follow the dicta of AR 95-1 and applicable FARs and drive on to a safe landing.

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VOL. 6, NO. 14 □ 25 JAN 1978

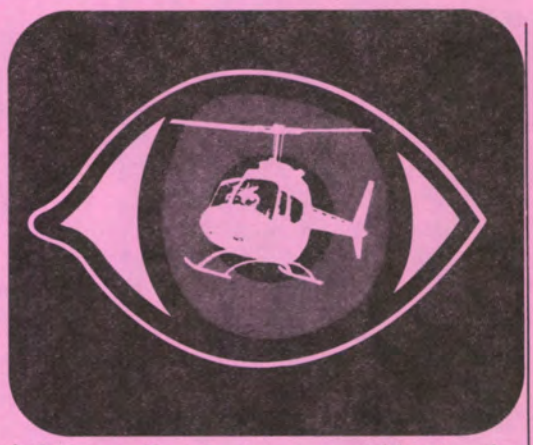
Minimal light operations

Recently, while practicing tactical night landings to a single light, an OH-58 pilot made his first two approaches with his landing light on. However, on his third approach, he turned it off—and flew his aircraft into the ground. The cost for aircraft repairs was estimated at $12,000.

The factor that probably played the most significant role in causing this accident was the pilot's temporary loss of night vision from having used the landing light during his first two approaches. Experts tell us the time required for the human eye to adapt itself to the dark after being subjected to light usually varies from 5 to 45 minutes, depending on the intensity of the light source and duration of exposure. In addition, other variables such as smoking and drinking habits as well as the general health of an individual will influence this time element.

Autokinesis—an illusion of motion of the single light source used to guide the pilot to his landing zone—was probably a contributing cause factor in this accident. This phenomenon can be easily demonstrated by gazing steadily at a single star on a clear moonless night. After a few seconds, the star will appear to move, changing directions and sometimes darting back and forth.

A third factor—fascination—may also have had some bearing on this accident. This fixation has been emphatically demonstrated in the past by pilots who became so intent on hitting their target that they developed "target hypnosis" and



failed to pull up in time to avoid hitting the target with their aircraft. One thing is certain: The OH-58 pilot in question never intended his landing to terminate in a crash.

To prevent mishaps from similar causes, we should employ the following safeguards:

1. Make sure our eyes are fully adapted to darkness before we attempt any tactical night operations.

2. Follow procedures outlined in TC 1-28, Rotary Wing Night Flight, by using a lighted "T" or "Y" for tactical operations, and a **minimum** of two ground lights 15 or more feet apart to prevent autokinesis during nontactical night operations.
Note: A lighted "T" or "Y" offers additional benefits by providing us with a means for judging proper approach angle, directional alignment, and rate of closure.

3. Use the glideslope indicator if available.

4. Employ pathfinders during training when possible. They can provide expertise as well as necessary equipment. ►

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USAAAVS

Medical clearances for aviators

Comments from the field indicate that disagreement exists concerning expiration of flight physicals and medical clearances. Based on guidance in Army regulations, the following criteria upon which to base local policy are presented.

Flight physicals and DA Form 4186 (Medical Recommendation for Flying Duty) expire at 2359 hours on the last day of the month, 12 months after completion of the last flight physical (par. 10-17a(2), AR 40-501).

Ideally, flight physicals should be accomplished in the birthday month (par. 10-23c(1), (2), and (3)). Current flight physicals, however, can be extended for not more than 60 days. Thus, the goal of birthday month flight physicals does not take precedence over the 60-day extension rule.

Active duty aviators are required to have a current DA Form 4186 (or its equivalent, but not the actual flight physical form) posted in their official flight records folder. If the DA Form 4186 is not present in the flight records folder, the aviator is considered "grounded" (MILPERCEN msg 201700Z Jan 77). ■

MINIMAL LIGHT OPERATIONS *(continued from front)*

5. Always keep in mind the effect light has on night vision, and if we feel any apprehension at any point of our approach, we should not hesitate to turn on the landing light. But remember: **Once we switch it on, we should keep it on.**

Note: This assumes no fog, haze or other meteorological conditions exist that could cause glare and affect vision. If such conditions are present, the landing light should not be turned on; but if it is and glare is induced, the light should be switched off immediately.

The fact remains that even with our eyes wide open, we can't always see everything before us. Nor do we necessarily see what we think we see. A good look at TC 1-28, particularly chapters 2 and 5; and at FM 57-38, Pathfinder Operations, chapter 4, can enlighten us on this matter and provide information we may have forgotten—information that can be highly instrumental in keeping both us and our aircraft healthy. ■

TOTAL MISHAPS FOR 6-12 JAN 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	0	2	12	15
AH-1	0	1	0	1	2
CH-47	0	0	0	4	4
OH-6	0	0	0	1	1
OH-58	0	0	1	6	7
C-12	0	0	0	1	1
U-8	0	1	0	1	2
OV-1	0	0	0	2	2
T-42	0	0	0	1	1
U-1	0	0	0	1	1
C-7	0	0	0	1	1
Total	1	2	3	31	37

4 Fatalities, 4 Injuries

Estimated costs: $625,105

Conversion to fire resistant hydraulic fluid

TSARCOM message 191830Z Dec 77, subject: Maintenance Advisory Message, Conversion of Army Aircraft to Fire Resistant Hydraulic Fluid, MIL-H-83282A (GEN 77-18)

A. TB 55-1500-334-25, Conversion of Aircraft to Fire Resistant Hydraulic Fluid, 2 May 75, with Ch 1 and 2.

B. Msg, 022010Z Jun 75, AMSAV-FEG, subject: Conversion of Army Aircraft From MIL-H-5606 Hydraulic Fluid to MIL-H-83282A, Fire Resistant Hydraulic Fluid (GEN 75-20)

C. Msg, 121300Z May 76, DRSAV-FEG, subject: Clarification of Requisitioning Procedures for MIL-H-83282A Fire Resistant Hydraulic Fluid (GEN 76-13)

1. Ref A, B, and C have no time compliance date. Conversion of aircraft to fire resistant hydraulic fluid is currently at the discretion of each unit.

2. Use of fire resistant hydraulic fluid (MIL-H-83282A) is based on safety considerations. Recent fires in AH-1 and CH-47 aircraft have reemphasized the importance of using fire resistant hydraulic fluid. In addition, MIL-H-83282A fluid will contribute to improved combat readiness and decreased maintenance downtime based on superior lubricity and sealing efficiency. Current stocks of MIL-H-83282A are sufficient to support an increased rate of conversion of Army aircraft to the subject fluid. The Defense General Supply Center has sufficient stock on hand or due in to allow conversion during the next 8 months of those Army aircraft not yet converted. Local commanders are encouraged to establish priority of conversion to those aircraft whose operations or mission are most susceptible to fire.

3. DA funding of the conversion program is still not available and cost of conversion must be borne by the unit stock fund. Because ref A was distributed in June 1975 and ref C was distributed in May 1976, units should have had time to budget for conversion costs. Activities that are not now converting are encouraged to include the cost of conversion in their budget as soon as practicable.

4. Action will be taken to have new production aircraft and new production hydraulic components manufactured and tested with MIL-H-83282A.

5. Action has been taken to have aircraft converted to MIL-H-83282A at overhaul. Commanders should insure that converted hydraulic systems are not diluted with MIL-H-5606. Action will also be taken to change DMWRS, and overhaul manuals of those hydraulic components listed in par. 2-2 of ref A to use MIL-H-83282A. This message is authority to use MIL-H-83282A on such components pending revision to those DMWRS and overhaul manuals. Prior to installation of a nonconverted component on a converted aircraft, the component will be drained, flushed and refilled with MIL-H-83282.

6. International logistic customers are encouraged to consider utilization of MIL-H-83282A fire resistant hydraulic fluid and compliance with this message.

7. Point of contact is Melvyn J. Shichtman, AUTOVON 698-5846, or commercial 314-268-5846, DRSTS-MEG(2).

Accident analysis

Damage to left windscreen caused by two strands of telephone wire. One wire was cut by the rotor blades and the other caught on the left skid.

ANALYSIS 77-14
Type aircraft: OH-58A
Time: 1505
Classification: Minor
Injuries: None
Estimated cost: $2,891 (aircraft)
Mission: Tactical (FTX) reconnaissance

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	31	2,628	2,634

The accident

Pilot picked up the squadron commander, who was to act as observer, at the downrange command post. They were to fly a mission in support of a field training exercise. The commander told the pilot that it would be a tactical mission requiring NOE flying. After takeoff, they flew to a particular grid line and began flying NOE. During this phase of flight, the squadron commander was using the pilot's map. Although the map indicated wire hazard markings, the commander was unaware of their meaning. About midway through the flight, the commander spotted his S-3 and told the pilot to land. After talking with the S-3 for several minutes and obtaining another map, which did not indicate wire hazards, the squadron commander again boarded the aircraft. The pilot continued NOE flight and encountered an opposing forces armor column. To avoid detection, the commander told the pilot to leave the area. The pilot made a right turn and increased airspeed to mask his position behind a ridge line. While traveling at about 25 feet agl and 80 knots, the pilot flew between two large trees and the aircraft struck two strands of telephone wire. One wire was cut by the rotor blades and the other caught on the left skid. The aircraft violently yawed left and right until the left wire snapped. The pilot regained control and, thinking he had lost antitorque control, made a low shallow approach and landed without further damage.

The cause

■ Pilot inadequately planned the flight in that he accepted an unqualified observer (a violation of par. 1-5, FM 1-1; and par. 3-26, FORSCOM Reg. 350-3) and failed to conduct a comprehensive preflight briefing concerning pilot and observer duties (par. 1-5, FM 1-1) and known flight hazards marked on the map (par. 1-6, FM 1-1; and par. 3-31B(2), FORSCOM Reg. 350-3). Although the wires were clearly marked on the pilot's map, the squadron commander was using a map without wire hazard markings. But had they been marked, he would not have been aware of their meaning. Pilot performed this inadequate flight planning because of inadequate unit training. He received his initial NOE qualification and subsequent renewal during an annual standardization checkride without being required to know the qualification requirements for NOE pilots and observers, the minimum crew required for NOE flight, or the required content of NOE preflight briefings.

The cures

■ Improve monitoring of unit and personnel activities by higher command to insure unit aviators required to fly NOE are aware of: (1) qualification requirements for NOE pilots and observers, (2) regulatory provisions stipulating the minimum crew required for NOE flight, and (3) the required content of NOE preflight briefings. To implement this, questions should be included in the U.S. Army Annual Written Examination concerning these elements.

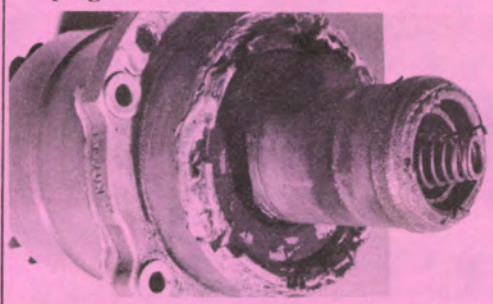
■ Revise par. 5-1, FM 1-1; and par. 3-25, FORSCOM Reg. 350-3, to require that in addition to demonstrating flight proficiency during annual/semiannual standardization flights to maintain NOE qualification, aviators must demonstrate knowledge of the three elements listed in the first cure.

Materiel failure/malfunction mishap analysis

77-9
Type aircraft: UH-1H
Classification: Minor
Injuries: None
Estimated cost: $18,844 (aircraft)
Mission: Service

The mishap

Aircraft was at 1,000 feet and 90 knots when pilot heard a rumbling noise, followed by a vibration. Pilot confirmed his suspicion of tail rotor failure when he was unable to get antitorque response. Vibrations increased and two violent oscillations were felt as a power-on approach was being made. At 10 feet agl, aircraft started an accelerated right spin, continued a tight right turn and touched down hard, left skid first, on slightly sloping terrain.



Spherical male coupling

The causes

■ Main transmission tail rotor output quill assembly stripped due to fatigue failure of the splines on the spherical coupling drive shaft. The fatigue failure was the result of a lack of lubrication caused by inadequate written maintenance procedures. The quill assembly had been installed 2 years before, but had accumulated only 285 hours of flight time. This component either had no grease or very little grease when installed. Page 2-2 of TM 55-1520-210-20 requires lubrication at 600 hours flight time, but does not require a calendar lubrication.

■ Coupling assembly stripped because spherical coupling drive shaft lubrication system seal failed, allowing the lubrication to leak or be thrown out. This caused the ultimate failure.

Female coupling

The cures

■ Revise TM 55-1520-210-20 to include a requirement to disassemble and inspect couplings before installation, plus an inspection at 600 hours flight time and/or 1 year of operation.

■ Redesign output quill assemblies to insure retention of lubrication. A possible solution would be a permanently sealed coupling with a set TBO life.

Selected mishap briefs

Rotary wing

UH-1

Accident □ Aircraft crashed during search and rescue mission. Four fatalities and four injuries. Investigation in progress.

Ground accident □ Main rotor tiedown struck tail rotor blade during start, damaging blades.

Forced landing □ Aircraft yawed left and rpm deteriorated rapidly. N_1 rpm stabilized at 67% and aircraft was autorotated to field. Caused by fuel control malfunction.

Precautionary landings □ Master caution and transmission chip detector lights came on during climb. Caused by failure of tail rotor 90° gearbox. □ Smoke filled cockpit. Suspect failure of overheat relay on newly installed muff heater, causing overheat condition. □ Strong odor was detected in cockpit. Postlanding inspection revealed no hydraulic fluid in reservoir. Caused by failure of irreversible valve in collective servo. □ Compressor stall occurred during takeoff. Suspect malfunctioning A6 series fuel control unit (did not have P1 multiplier modification). □ Transmission oil pressure light came on, followed by rapid loss of oil pressure. Caused by blown transmission primary oil filter gasket. □ Shortly after practice instrument takeoff, IP took control of aircraft and noticed stiffness/binding as forward cyclic was applied. Postlanding inspection revealed faulty fore and aft force trim magnetic brake was causing stiffness/binding. In addition, inspection of the swashplate and support assembly revealed two rubber hoses were wedged in the two gimbal ring pivot bearings. Swashplate and support assembly had recently been overhauled and installed in aircraft. Maintenance personnel failed to remove the two rubber hoses prior to installation.

AH-1

Incident □ Tail rotor struck tree limb while aircraft was tracking "enemy" vehicle from concealed attack position over trees. Damage to tail rotor blades was discovered on postflight inspection.

Precautionary landing □ Pilot, flying straight and level at 1,000 feet agl, decided to descend to lower altitude and began shallow descent. He then changed his mind, bringing the nose up and increasing collective. Both pilots noticed torque gauges reading 65 pounds and copilot in back seat took control and landed.

CH-47

Precautionary landings □ No. 1 engine chip detector light came on during takeoff. Pilot made 180° turn and No. 1 engine torque increased and rotor rpm climbed to 250. Engine could not be controlled with normal

or emergency trim. Single-engine running landing was made. Large metal particles were found on chip detector. Failure of N2 governor drive shaft resulted in high side governor failure. □ Crew smelled burning odor in cockpit and noticed transmission oil pressure going to 100 psi. Caused by failure of transmission oil pressure rotary switch. □ No. 2 engine transmission chip detector light came on. Caused by failure of engine transmission assembly. □ Severe lateral vibration occurred in aft rotor system during cruise flight. Caused by internal failure of SAS amplifier box.

OH-6

Precautionary landing □ Collective was increased during test flight and TOT increased to 800° C. for 10 seconds. Hot-end inspection revealed cracks around spot welds greater than 50% on first stage of gas producer nozzle fireshield, and burn hole in inner combustion chamber liner, possibly due to overtemperature. Abnormal amount of corrosion on turbine support assembly, turbine nozzle, and turbine rotor assembly was also found.

OH-58

Forced landing □ Engine lost power during approach and failed completely after touchdown.

Precautionary landings □ Aircraft yawed left after takeoff, with loud pop and continuous loud roar. Extreme high frequency vibration was present in airframe and pedals. Caused by malfunctioning bleed valve. □ IP noticed rapid rise of N2 and torque, reduced throttle, and entered autorotation. Pressure sensing line from N2 governor to fuel control cracked and failed. □ Pilot felt vibration in antitorque pedals and landed. Inspection revealed no preload on tail rotor trunnion. □ Fireguard saw oil being slung out of freewheeling unit and engine was shut down 20 seconds after start. Seal was found to be seeping. □ Postflight inspection revealed torn seal on main shaft flex coupling.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

C-12

Precautionary landing □ (A series) Aircraft was leveling to cruise flight. As airspeed increased, copilot saw right engine upper cowling raise up and away from normal position. Suspect continued use of cowling locks caused deterioration of locking mechanism.

U-8

Incident □ (F series) No. 1 engine momentarily lost power during cruise flight and fuel pressure indicator fluctuated. Engine then failed and about 3-5 minutes later No. 2 engine stopped. Gear selector was placed in down position for landing and there was no response. Emergency gear pump was activated. After a few strokes on ►

Selected mishap briefs

the pump, system appeared to fail. Nose gear came down about 6 inches, but main gear did not extend. Aircraft was landed on partial gear, damaging No. 1 propeller, ADF antenna, and inboard side of flaps on both wings. Both main fuel tanks were dry.

OV-1

Precautionary landing □ (C series) Left main gear indicated not fully up during takeoff. Recycling gave "up" indication, but no "down" indication on left main with gear handle down. Emergency gear extension procedure was used and aircraft was landed. Caused by failure of left main gear up micro-switch.

C-7

Precautionary landing □ Pilot reduced power for approach and No. 1 engine started to backfire. Fluctuation in rpm was noticed and No. 1 engine was secured. Postlanding inspection revealed failure of No. 1 cylinder assembly.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

UH-1

Precautionary landing □ Rapid series of loud compressor stalls occurred and power-on landing was made. Inlet guide vane allowed IGV to fluctuate in full open position.

OH-58

Precautionary landing □ Hydraulic caution light came on. Caused by improper installation of preformed packing.

OV-1

Precautionary landing □ (D series) Right main gear would not fully retract on takeoff. Gear handle light stayed on and gear indicated in-transit. Gear was recycled several times, but with same indications. Postlanding check revealed strut was overinflated. Strut had been serviced in cold weather and air expanded in warmer weather, causing strut to function improperly.

For more information on maintenance mishaps, call AUTOVON 558-3913/3901.

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Planning realistic field training

If your unit were to be deployed to a combat zone tomorrow, would you be ready? Are your aviation personnel trained to perform and survive in a hostile environment?

One answer to combat readiness is realistic field training. But the transition from a garrison aviation environment to a field setting emphasizing realism creates problems common to all units. The key to eliminating or reducing these aviation hazards is the insurance of full consideration for safety during the planning as well as the execution of field exercises. Emphasis should be placed on the following safety hazards found most often during field training.

■ Airspace management around tactical helipads and forward area rapid refueling points (FARRP) is frequently neglected. For tactical reasons, FARRPs and helipads must be located to afford maximum concealment of aircraft and equipment. This is a conceded necessity, but it also increases the possibility of a midair collision. One possible solution to this problem would be to establish one-way routes and checkpoints into and away from FARRPs and helipads. If several units are to use these areas, ensure that routes are widely disseminated and strictly enforced. Landing areas can be marked with lights for night operations and radios can be used for traffic control.

■ Another area where additional planning is needed is operation of FARRPs. This can be a hazardous area ►

FLIGHTFAX index

An index of the significant articles published in FLIGHTFAX during CY 1977 is included in this issue on pages 8-11. ■

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USAAAVS

Planning realistic field training

without sufficient NCO supervision at all times. Ensure that adequate protective clothing and equipment is available and used by POL handlers, and that adequate grounding is available and used every time an aircraft is refueled. Fire extinguishers should be checked before the field problem begins. They should be fully charged and the proper type to extinguish a POL fire. Fuel sampling and testing procedures should be established to detect contaminated fuel before it is put in the aircraft.

■ Training missions often require that aircraft be loaded to near maximum gross weight with troops and supplies. Weight and balance records should be checked for accuracy. Ensure that aviators brush up on go-no-go procedures, density altitude and emergency procedures. Emphasize the importance of thorough preflights and passenger briefings.

■ Inventory survival kits for missing items and order shortage items. Ensure there is no shortage of Nomex flight suits and that helmets are properly fitted.

■ Aviator fatigue can be a problem during field training. Aviators often exceed their physical capabilities because of the long hours of flying and other duties or lack of adequate sleeping accommodations. This fatigue is usually induced by commanders requiring mission accomplishment beyond the capability of a tired aviator. Therefore, it is important that crew rest requirements be established and strictly enforced.

■ Plan to use available personnel and equipment for flight following or air traffic control during field training. It is difficult to maintain communications with aviators flying NOE, but a sincere effort must be made and this requires advance planning. In some areas, requests for additional radio frequencies to be used in field training must be made as much as 6 months in advance. This makes early planning a necessity.

■ Availability of timely weather information for flight planning also requires advance planning. Weather personnel in the field without adequate means of communication are not going to do your aviators any good. Observations must be readily available to both aviators and weather forecasters who may not be co-located. Additionally, the forecaster will need information from outside the maneuver area if valid forecasts are to be provided. Extensive communications planning must be accomplished early in the field training planning cycle before that forecaster can make a valid forecast and get it to you in the field.

■ Pilots should be cautioned about approaching tactical helipads and refueling points at a high rate of speed. Planning for an approach will allow the aviator to arrive at the intended touchdown point at zero airspeed as opposed to the 80 knots sometimes presently observed. Rapid acceleration/deceleration of the aircraft should be avoided unless

absolutely necessary. Pilots should plan what they are going to do in flight, particularly on approaches, to preclude the necessity for exaggerated decelerations during approaches. Downwind landings and takeoffs should be avoided in field training just as they are avoided in garrisons, and for the same reason. Hovering at 50 feet and using pedal turns at that altitude is fine when required for tree clearance but these maneuvers can lead to unnecessary problems when performed in the POL area.

■ When pilots are flying in the rear area, and altitude is available that can safely be used without a possibility of enemy air defense detection, that altitude should be used. The principle that altitude above you and runway behind you are not much use still applies today as much as it did 10 years ago.

Garrison preaccident plans normally include requirements that ensure everyone concerned will be notified when an accident occurs. But in the field, mishap reporting is not always done in accordance with AR 385-40. Everyone usually gets the word when an accident occurs, but the same cannot always be said about a precautionary or forced landing. Aviator

proficiency usually means the difference between a forced landing and a major accident, so forced and precautionary landings also need to be reported. The data obtained from these reports frequently means the prevention of a future accident.

The problems we have talked about here are by no means the only ones you can expect to encounter during field training, but they do occur most often. These problems and the lessons learned can be beneficial to you in planning your field training. When your field training is completed, share your experience and help establish the fact that realistic training can be conducted without sacrificing safety. ■

Accident analysis

ANALYSIS 77-15
Type aircraft: UH-1H
Time: 0955
Classification: Major (total)
Injuries: None
Estimated cost: $619,155 (acft, property)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	36	1,586	1,586
Copilot	WO1	21	476	476

The accident

Pilot, on cross-country training flight at an altitude of about 500 feet agl, decided to fly low level over a river and gradually descended to approximately 75 feet. The pilot and copilot were aware that wires crossed the river. The pilot spotted wires and a bridge crossing the river and climbed to cross the obstacles. Immediately after crossing the bridge and wires, he descended to about 40 feet. He did not see the next set of wires until he was about 10 feet from them, and immediately attempted a cyclic climb. The aircraft struck the wires at approximately 80 knots. The tail rotor and 90-degree gearbox separated from the aircraft, which traveled one-third of a mile before it landed in the river. Upon impact with the partially dry streambed, the main rotor blade dipped and struck the tail boom, and the transmission separated.

The cause

■ Pilot performed a prohibited course of action (flew aircraft at too low an altitude) because of poor judgment. He elected to fly at this altitude knowing full well that such flight was prohibited by FAR 91.79, paragraph d.

The cure

■ Revise procedures for normal operation contained in AR 95-1 to address the conduct of terrain flight and restrictions thereto, i.e., minimum altitudes, authorized areas, etc.

UH-1/AH-1 Safety of Flight

□ TSARCOM message 171500Z Jan 1978, subject: Safety-of-Flight One-Time Inspection of all T53-L-13B Engines for Unmodified Fuel Controls (TB 55-1500-200-20-19) (UH-1-78-1) and (AH-1-78-1). **Summary:** The purpose of this message is to purge all unmodified T53-L-13B fuel controls from UH-1/AH-1 aircraft. This message further amends and clarifies message from HQDA WASH, DC, DAMO-RQ, DTG 170035Z Jan 78, subject: Aircraft Grounding. **Contact:** Mr. Frank Stevens, TSARCOM, AUTOVON 698-6868, commercial 314-268-6868. ■

Wear those glasses

Eyeglasses are prescribed because they are needed. Consequently, they are to be used.

Recently, one pilot failed to wear his glasses during an NOE mission. As he nursed his aircraft along the course, he spotted some powerlines and climbed over them, then reestablished his original altitude. Shortly afterwards, he was confronted with a second set of wires which he failed to see. The resulting wire strike caused one death and three serious injuries.

The point is clear: If you need glasses, wear them. This is more than just good common sense on your part—AR 40-8 requires you to wear your prescription lenses during all flights. And remember, this regulation was designed to help insure YOUR safety as well as that of your passengers. Obey it! ■

Recap of TSARCOM messages

TSARCOM message 042007Z Jan 1978, subject: Safety-of-Flight and Worldwide Technical Messages. Following is a list of all AIG 8881 addressed messages transmitted by TSARCOM (DRSTS-M) from 1 July to 31 December 1977 for the AH-1:

AH-1-77-15 Incorrect Installation of Four Hi-Lok Fasteners in the Transmission Mount Support Structure of the AH-1G (MOD) Aircraft

AH-1-77-16 New Drive Shaft Lubricant

AH-1-77-17 Defective Tail Rotor Servo Cylinder Assy

AH-1-77-18 Maintenance Instructions for Infrared Suppressors

AH-1-77-19 Main Rotor Retention Strap Assemblies

AH-1-77-20 Inspection of Hydraulic Lines, Electrical Cables and Control Tubes in the Tail Rotor Controls Installation

AH-1-77-21 Pilot Miscellaneous Panel in AH-1S

AH-1-77-22 Extending the Retirement Schedule of the Canopy Removal System on the AH-1G/Q/S (MOD)

AH-1-77-23 One-Time Inspection of Oil Cooler Blower Assemblies

AH-1-77-24 Return of Unserviceable T53-L-13B, 15 and 701A Engines

AH-1-77-25 AH-1S (MOD) and AH-1S (PROD) Tail Rotor Gearbox Installation

AH-1-77-26 Overspeed Limits for T53-L-13B and T53-L-703 Engines ■

Selected mishap briefs

Rotary wing

UH-1

Incidents □ Aircraft, on final approach to field site, struck bird. Six-inch hole was torn in right chin bubble. □ While turning crosswind after takeoff, aircraft struck seagull, damaging lower window assembly.

Precautionary landings □ Master caution and tail rotor chip detector lights came on. Metal chips were found in 42° gearbox. □ Transmission oil pressure gauge fluctuated between 58 and 100 pounds. Postflight inspection revealed gauge was cracked at cannon plug. □ During runup, engine rpm climbed to 7100, causing engine and transmission overspeed. The pilot was wearing heavy clothing and his sleeve caught on the governor switch, putting it in the emergency position. When the pilot advanced the throttle, the engine rpm surged to 7100. □ Right fuel boost pump failed in flight. □ During hydraulics failure emergency procedure demonstration, left antitorque pedal became jammed with hydraulics off. Hydraulics were turned on, pedal movement was restored, and running landing was made. Caused by failure of tail rotor servo. □ Pilot felt stiffness in cyclic movement to right front quadrant. Ice on servo power shaft passed by hydraulic O-ring, melted, flowed into hydraulic filter, and refroze, clogging filter and bypass system. □ Grinding noise was heard from transmission and master caution and hydraulic segment lights came on. Loss of hydraulic assist was also noted. Running landing was made. Caused by failure of irreversible valve.

AH-1

Incidents □ Aircraft hit telephone wire during NOE flight at about 30 feet agl, damaging sheet metal panels at left forward cross tube. □ During termination of standard autorotation, excessive initial pitch was applied by pilot at approximately 10 feet agl, causing rapid decay of rotor rpm. IP took control of aircraft and used remaining pitch control in an attempt to cushion landing. Aircraft bounced once and skidded 75 feet. Main rotor flexed down, causing trailing edge of one blade to hit tail rotor drive shaft cover just forward of 42° gearbox, denting cover and damaging blade. Hard landing resulted from insufficient pitch control remaining after initial application.

Precautionary landing □ Aircraft on training flight was masked for NOE target attack. Pilot's attention was diverted to simulated aerial attack and aircraft drifted left and struck tree. Rotor blade damage was within safe limits.

OH-58

Incident □ Aircraft was performing NOE screening mission on field training exercise. Pilot flew over trees into open field, saw tanks, and moved to right near tree line. Tree limb flexed into main rotor system, damaging tip caps of blade.

Precautionary landings □ N_2 dropped to 101% and fluctuated between 100% and 103% during climb. Pilot began approach and N_2 dropped to 91% and low rpm audio sounded. Caused by failure of double-check valve. □ Severe high frequency vibration occurred after takeoff. Suspect ice in tail rotor. □ Engine chip detector light came on. Lower cannon plug had shorted out.

TH-55

Precautionary landings □ During landing, tachometer needles separated with rotor needle dropping below engine needle. Caused by internal failure of dual tachometer. □ Engine ran rough during hover. Caused by clogged fuel injector nozzle on No. 1 cylinder.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

C-12

Precautionary landings □ (A series) Landing gear would not retract after takeoff. All attempts to retract gear failed. Caused by failure of gear retract motor. □ Flap lever was set to approach position at 160 knots. Flaps went to full down and could not be raised. Flap limit switches were covered with ice. Aircraft had been flying in freezing precipitation and snow. □ As cruise power was being reset after climb, aircraft shuddered and smoke came from under bench seat. Aircraft shuddered again and popping sound came from No. 2 engine. Oil began to stream out from inboard No. 2 engine access cowling. Duct overtemp light came on as cabin and cockpit filled with thick smoke. Postlanding inspection revealed engine had ingested oil from ruptured tube assembly.

U-8

Precautionary landing □ (D series) Left main gear position light indicated gear was not down and locked. Gear was recycled and manually lowered. Tower fly-by confirmed gear was down. Caused by failure of sensitive switch.

OV-1

Ground mishap □ (D series) Pilot attempted to start No. 2 engine using GPU. Engine would not start. Fire guard saw smoke coming out of exhaust and had pilot motor No. 2 engine. Smoke was then seen on left side of aircraft where GPU was connected. Battery cable was on fire. Fire guard discharged fire extinguisher and pilot turned off battery and inverter switches. Connector plug was destroyed. Cable check revealed several cable wires had been broken and caused electrical short through repeated bending on cable connector while connecting and disconnecting GPU to aircraft.

Precautionary landing □ (D series) When gear was lowered for landing, unsafe condition was indicated for left main gear. Blow-down bottle was activated and landing was made. Caused by failure of microswitch.

U-21

Precautionary landing □ (H series) No. 2 engine chip detector light came on during climbout. Inspection of chip detector and oil filter revealed numerous metal particles.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

UH-1

Precautionary landing □ As aircraft was on downwind after completing several approaches and one hydraulics-off running landing, pilot was told there was a puddle of oil on the runway where running landing had been terminated. Wrong size clamp was installed on line from transmission to

(Continued on back page)

CY 77 FLIGHTFAX index

- □ A Look at P1 Multiplier Failures (discusses P1 multipliers and associated problems)–2 March
- □ Accident Analyses to be Featured (accident analysis replaces synopsis in FLIGHTFAX)–28 September
- □ After Four Inspections, FOD (flashlight left in engine area)–13 July
- □ Aircrew Survival Sleeping Bag (NSN changed)–30 November
- □ ALSE Authority (basis of issue and requisition authority)–15 June
- □ ALSE Bulletin (how to get)–18 May
- □ ALSE Pamphlet (how to get)–30 March
- □ Another Fix for Leaking Survival Firestarters (Zeus butane refill kit)–30 Nov
- □ AN/PRC-90 Survival Radio (how to requisition)–6 July
- □ Are Your CH-47 Fire Extinguisher Bottles Serviceable? (fire bottle cartridge service life)–23 February
- □ Army Logistic Assistance Program (explains technical logistic assistance provided by AVSCOM Field Services Activity)–26 January
- □ ASOs on Their Toes (errors in TMs regarding personal protective and survival equipment, reported by ASOs)–9 February
- □ Aural Sound Protector (NSN and cost)–15 June
- □ Aviation Safety Awards (discusses four types of awards)–5 October
- □ Aviation Safety Reporting Program (Army participation in NASA's reporting program)–9 March
- □ Aviator Mishap Experience Can't Be Provided (USAAAVS can't supply information)–17 August
- □ AVSCOM Advisory (how to get "Army Aircraft Delivery Procedures")–15 June
- □ AVSCOM and TROSCOM Merge (new TSARCOM)–27 July
- □ AVSCOM T-42A Newsletter No. 18 (how to get)–15 June
- □ Attention ASO Students (new closing dates for ASO Courses)–12 October
- □ Attention ASO Students (paragraph needed on orders)–27 July
- □ Backplate for AN/PRC-90 Survival Radios (how to get new backplates)–2 November
- □ Battery Water (maintenance advisory message)–16 February
- □ Battery Water (clarification of maintenance advisory message)–2 March
- □ Birds Pose Health Hazard (disease caused by bird droppings)–7 September
- □ C-12A Cracked or Delaminated Windshields (plea for information on cracked or delaminated windshields)–23 March
- □ C-12 Users (request for landing gear info)–14 September
- □ CCAD Teardown and Analysis–All Classes of Mishaps (components from any mishap classification can be submitted)–30 March
- □ Change to Aviation Resources Management Guide (nickel-cadmium battery supplement)–17 August
- □ Check Those Chinstraps (how to check for deterioration)–20 April
- □ Check Those Seats (what to do if nonstandard seats are in aircraft)–6 April
- □ CH-47 Cockpit Doors (discusses problems with doors coming off and gives instructions for adjustment gauge)–7 December
- □ CH-47 Mishaps Caused by Fuel Tank Overpressure (causes and symptoms)–3 August
- □ Clarification of Silent Chain Inspection (clarifies article in previous issue)–29 June
- □ Cold Weather Operations and Your Nicad Battery (correction of battery problems in cold weather)–2 February

- □ Combination of Errors (discusses accident and its causes)–8 June
- □ Complacency and the Aviator (accepting aircraft with known discrepancies)–6 Jul
- □ Cooling Care (consequences of not properly cooling engine before shutdown)–14 September
- □ DA Form 2397-1 (how block 10 should be filled out)–13 April
- □ DA Form 2397 Series (revised series available for issue)–9 March
- □ Damage to Torquemeter Roller Assembly During Hot-End Inspection (cites necessity for using power output shaft holding device)–28 September
- □ Distress Marker Lights (may be safety hazard)–23 February
- □ Does Your Cobra Have a Light Nose? (info on nose counterweight)–23 Nov
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- □ Double-Check Valve Malfunction Fix (installation of new diaphragm-operated double-check valve)–6 July
- □ Fitting and Care of the SPH-4 Helmet (video tape available)–27 April
- □ Fuel Starvation in the OH-58 (clamps are losing torque)–24 August
- □ FY 78 Schedule of Aviation Safety Courses (AAPMC, ASOC, AAPC)–7 Sep
- □ Grounding Cable Configuration (diagram and description)–8 June
- □ Hats Off (recognition of rescue assistance following helicopter crash)–20 July
- □ Heat Illness (categories of heat injury and preventive measures)–29 June
- □ Hydrostatic Testing of Hose (how to test hose)–20 July
- □ Improper Use of Fire Extinguisher (fire extinguisher being charged with power-driven compressor exploded)–2 February
- □ Improved OH-58 Tail Rotor Drive Shaft Bearing (recognizable by eight lubrication points)–19 October
- □ Inadvertent IMC (5C procedure)–5 Oct
- □ Inspection Criteria for Helmet Shell (crack renders helmet unfit)–26 October
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- □ Life Preservers for Aircrewmen (substitution of B-7 life preserver for LPU-10/P)–16 March
- □ Low Reflective Paint Defective (paint failing specification requirements)–20 July
- □ Lube Oil to be Placed in Hold Status (USAGMPA message)–22 June
- □ Maintenance Inspections Clarified (inspections for nuclear cargo missions)–13 July
- □ Maintenance Test Flight Course Graduates (how to get change to CH-47 Test Flight Handbook)–21 September
- □ MBU-5/P Oxygen Mask (NSNs, nomenclature, etc., on masks and components)–11 May
- □ More on Bird Cleanup (assistance in determining if problem exists)–23 Nov
- □ Murphy Strikes Again (AH-1S tail rotor couplings and shafts)–25 May
- □ Murphy Strikes Again (OH-58 copilot collective stick misaligned)–12 January
- □ Nicad Battery First Aid Procedures (alkali chemical burn treatment)–30 Nov
- □ Notice to T53 Operators (emergency governor save after fuel-control-related engine failure)–19 January
- □ October Lessons Learned (recaps October accidents)–16 November

- □ OH-58A Lapbelt Murphy (incorrectly installed lapbelt)–13 April
- □ OH-58A Operations Reminder (some things to do when operating without passenger doors)–21 September
- □ Overheating of Nicad Batteries (questions and answers on handling overheated Nicad batteries)–19 January
- □ Oxygen Mask Problems (breathing valves freezing)–28 September
- □ Parachute Automatic Opening Device (accident caused by activation of parachute automatic opening device)–14 Dec
- □ PMPs Needed Now (need for supplemental information on PRAMs)–27 April
- □ PRC-90 Survival Radio Test Equipment (radio test set and battery test set not on TOE)–30 November
- □ Preparation for Night Flight Series (removal of material placed on aircraft for night flight)–19 January
- □ Preparing Aircraft for Night Operations (low-level night training precautions)–23 March
- □ Recap of AVSCOM Messages (UH-1 messages from 1 July to 31 December 1976)–2 February
- □ Recap of AVSCOM Messages (OH-6, OH-58, CH-47, and OV-1 messages from 1 July to 31 Dec 1976)–9 February
- □ Recap of AVSCOM Messages (general messages from 1 Jul to 31 Dec 76)–16 Feb
- □ Recap of AVSCOM Messages (AH-1 messages from 1 Jan to 30 Jun 77)–13 July
- □ Recap of AVSCOM Messages (UH-1 messages from 1 Jan to 30 Jun 1977)–20 July
- □ Recap of AVSCOM Messages (OH-6, OH-58, and CH-47 messages from 1 Jan to 30 Jun 1977)–27 July
- □ Recap of AVSCOM Messages (OV-1, U-21, and U-8 messages from 1 Jan to 30 Jun 1977)–14 September
- □ Recap of AVSCOM Messages (general messages from 1 Jan to 30 Jun 1977)–28 September
- □ REDEYE Missile Flight Safety Hazard (missiles should be in container when transported by air)–27 July
- □ Restraint Systems Service Life Extended (cites extension to 6 years and lists inspection procedures)–4 May

Safety-of-Flight Messages

- □ AH-1G/Q/S firing of weapons under icing conditions–20 April
- □ AH-1Q and AH-1S M28 turret weapons–12 January
- □ AH-1Q M158A1 launcher–23 February
- □ CH-47A/B/C extended range fuel tankage–12 January
- □ CH-47C engine mechanical transmission–11 May
- □ CH-47C crash resistant fuel system overpressure–29 June
- □ CH-47A/B/C rotor system phasing–14 September
- □ CH-47A/B heater fuel line–14 December
- □ OH-58 oil cooler blowers–15 June
- □ OV-1 defective connector assemblies–6 July
- □ OV-1 spacer installation–20 July
- □ U-8 storing and transporting oil–25 May
- □ UH-1D/H defective control cables–23 February
- □ UH-1B/C/D/H/M, AH-1G/Q/S/S (mod) and TH-1G defective tail rotor servo cylinder assembly–17 August
- □ UH-1/AH-1 oil cooler blower assemblies–26 October
- □ USAF ALSAFECOM 001-77–4 May

- □ Seeping Seals? (how to cure)–19 Oct
- □ Sex and the EIR (importance of EIRs)–

12 October

- □ Shortage of Modified T53-L-13B Fuel Controls (return unserviceable fuel controls to CCAD)–1 June
- □ Silent Chain Inspection (inspection requirements extended)–1 June
- □ Sinking Spells (factors contributing to sinking spells)–9 November
- □ SRU-21/P Survival Vest Distress Signal Flares (service life of flares)–16 March
- □ SRU-21/P Survival Vests Misrouted (inadvertent storage in ammo storage areas)–10 August
- □ STACOM–19 January, 2 March, 30 March, 20 April, 4 May, 18 May, 1 June, 15 June, 20 July, 24 August, 14 September, 26 October, 30 November
- □ Submission of EIRs on Aeronautical Equipment (EIR procedures)–30 March
- □ T-42, U-21, and U-8 Schools (maintenance courses at Beech)–28 September
- □ Tail Rotor Tip (lubrication needed after operations in rain, ice, or snow)–6 July
- □ The Common Cold . . . No Minor Problem (see flight surgeon before flying with cold)–2 November
- □ The Copilot (proper use of copilots)–23 November
- □ There is a Difference (CH-47A and B cowling used on C model aircraft)–26 October
- □ Timely PRAMs Are Essential (submission timetables)–5 October
- □ Timely Submission of PRAMs (addresses to use)–6 July
- □ Tower Signal Placards Available (how to get)–27 July
- □ Training of Aviation Life Support Specialists (training spaces available at Chanute AFB)–27 July
- □ Training of Aviation Life Support Specialists (quotas filled through FY 78)–21 September
- □ Tree Strikes on the Rise (conditions causing tree strikes)–29 June
- □ Turbine Engine Facts (care and procedures)–22 June
- □ Twelve Receive Broken Wing Award (recipients for June, July, and August 1977)–21 September
- □ Twenty-One Receive Broken Wing Award (recipients for first 5 months of 77)–8 Jun
- □ 212 Tail Rotor Myth (misconceptions about tail rotor pitch control loss)–25 May
- □ UH-1/AH-1 Unmodified Fuel Controls (return unserviceable and unmodified fuel controls)–27 July
- □ Use of JP-5 Fuel in T55-L-7C Engines (operating limitations increased between hot end inspections)–24 August
- □ Vest-Type Survival Kit (discusses some components of kit)–27 July
- □ Want to See the Light? (NSNs for flashlight and penlight bulbs)–23 November
- □ Was Weather a Cause Factor? (stipulation for inclusion as cause factor)–10 August
- □ Well Done (alertness of crew prevented accident)–18 May
- □ What is Partial Blockage? (definition of partial inlet blockage)–27 July
- □ What You Can't Hear Can Hurt You (replace hardened and wrinkled earcups)–15 June
- □ What's Your Answer? (OH-58 problem–can you complete the mission)–9 Feb
- □ What's Your Answer? (answer to OH-58 problem in previous issue)–16 February
- □ What's Your Answer? (CH-54 problem–can you complete the mission)–9 March
- □ What's Your Answer? (answer to CH-54 problem in previous issue)–16 March
- □ Why Plan? Why Brief? (wire strike caused by improper mission planning)–14 Dec
- □ Winter Blues (reminder about winter hazards)–9 February

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Selected mishap briefs

external transmission oil filter. When clamp is on metal line, there is a 0.187-inch gap on all sides. Clamp had teflon liner.

AH-1

Ground accident □ During runup for blade tracking, main rotor blade hit 12-inch crescent wrench. Wrench was left on head assembly by crew chief. Pilot, technical inspector, and crew chief did not inspect area after maintenance was performed.

OH-58

Precautionary landing □ Crew was practicing landings to snow-covered field. On second approach, crew noticed oil on snow. Caused by loose transmission oil line.

For more information on maintenance mishaps, call AUTOVON 558-3913/3901.

Aviation-related

UH-1

□ POL handler did not notice that hose being removed from truck to refuel aircraft was twisted. As nozzle was being carried to side of aircraft, hose began to untwist. POL handler was unable to control hose and nozzle struck and broke aircraft chin bubble.

AH-1

□ Aircraft was found with unsecured front main rotor blade and damage to tail rotor drive shaft cover and last horizontal section of drive shaft. Aircraft was facing 270° and winds were 290° at 20 knots, gusting to 30 knots. Front main rotor tiedown hook failed due to fatigue stresses probably brought about by high winds.

OH-58

□ Aircraft landed and parked adjacent to hangar. While aircraft was running down, mechanic exited aircraft while pilot remained in aircraft. Pilot was observing instruments and noted rotor rpm to be 20 when main rotor blades came to a sudden stop. Pilot immediately exited aircraft and found mechanic standing next to right side of tail boom with his right arm hanging limp. Mechanic had placed his hand on rotating tail rotor drive shaft. Two bones in mechanic's lower arm were fractured.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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First quarter FY 78 recap

Unauthorized low-level flights kill five

Unauthorized low-level flight down a river led to wire strike and three fatalities.

During the first 3 months of this fiscal year, 22 accidents and 10 fatalities were recorded. This is an alarming increase over the same period in FY 77 . . . 12 accidents and 1 fatality. Yet flying hours were virtually the same . . . about 338,000 in first quarter FY 77 and 340,000 this fiscal year.

Of the 22 accidents, 16 were major, including 7 total losses, and 6 were minor. Three accidents accounted for all 10 fatalities. Two fatal accidents involved wire strikes as a result of **unauthorized low-level flight** and **accounted for half of the fatalities.**

■ An OH-6 pilot was conducting a night flight in the local area. The aircraft struck and severed two powerlines which were about 200 feet agl. **Pilot was flying below 500 feet agl at night on a mission that did not require low-level flight.** There was an unauthorized civilian passenger on board. Both were killed.

■ An OH-58 was flown low level down a river for approximately 10 miles before it struck and severed two cables about 140 feet above the river. **Low-level flight was not required by the mission.** All three crewmembers who were killed were avid outdoorsmen and had expressed a desire to take a float trip on the river.

■ An OH-58 on another **unauthorized low-level flight down a river** struck and severed three wires. The pilot was able to set the aircraft down, but there was substantial damage to the windshield, ►

Prepared by the U.S. Army Agency for Aviation Safety, Fort Rucker, AL, AUTOVON 558-4479. 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 analyses. Direct communication is authorized by AR 10-29.

USAAAVS

Result of tail rotor blade stall. Pilot was hovering his OH-6 300-400 feet agl near a relative's house.

mast, rotor, and plexiglass. The pilot violated FAA directives, ARs, unit SOP, and flight discipline by attempting low-level flight outside the training environment.

■ Five fatalities occurred when a U-8 crashed shortly after takeoff because of engine failure.

Other accidents were the result of a variety of causes . . .

■ An OH-6 pilot was hovering his aircraft out of ground effect (300-400 feet agl) **near a relative's house** when the tail rotor blade stalled. The aircraft spun rapidly to the right and crashed. The pilot violated flight discipline by putting the aircraft in the avoid zone. He misinterpreted the emergency and initiated corrective actions which aggravated the blade stall.

■ A T-42 landing gear failed to fully retract after takeoff. The gear would not lower by manual extension and a gear-up landing was made. **A cotter pin which secures the worm gear adjusting nut had not been installed.**

■ Seatbelt left hanging outside aircraft caused major damage to an OH-58. **Pilot did not insure seatbelts were secured** and crew chief was not knowledgeable of his duties.

■ An OH-6 on final to landing began to yaw right as power was applied. **Abrupt and uncoordinated control inputs** caused the right yaw, and the pilot lost visual reference and crashed. The pilot exceeded his level of proficiency by attempting a night formation landing to tactical LZ.

THE SITUATION IS NOT IMPROVING. The Army had a total of 26 fatalities and 81 accidents during fiscal year 77. So far this fiscal year, as of 3 February, 19 fatalities and 29 accidents have been recorded. If we are to stop this upward trend in fatalities and accidents, a major effort is required in the months ahead.

There's nothing new about the causes of these accidents. They happened because "old" lessons learned have been allowed to creep back—unrecognized—into the aviation system. **Commanders, supervisors, SIPs/IPs, PICs . . . it's up to you!** There's nothing new about what's needed as a cure. We have the tools necessary to prevent accidents from "repeat" causes. It's simply a matter of everyone applying the lessons learned to every phase of operation . . . and the time to begin is now.

ACCIDENTS BY TYPE AIRCRAFT
1st Quarter FY 78

Type Aircraft	CLASSIFICATION			
	Major Accident Total Loss	Major Accident Substantial Damage	Minor Accident	Total
OH-58	1	4	3	8
UH-1	2	2	0	4
OH-6	3	1	0	4
U-8	1	0	1	2
U-21	0	1	0	1
TH-55	0	1	0	1
T-42	0	0	1	1
AH-1	0	0	1	1
Total	7	9	6	22

Visors down!

Aircraft, flying 35 feet agl, was in a left turn when main rotor blades hit three wires. Canopy shattered and pieces of plexiglass struck pilot's face, causing lacerations. Aircraft hit the ground nose low and came to rest in a level attitude.

Ask 10 aviators which type of helmet visor they prefer, and chances are that 5 will prefer the clear while the other 5 will opt for the tinted visor. Although the SPH-4 is issued with both visors, few pilots interchange them regularly to meet mission conditions. If you normally use the tinted visor, do you replace it with the clear visor for night flights? NOE flights? When the weather is marginal? Many aviators do not. They place their tinted visors in the up position.

A lesson can be learned from a recent OH-58 accident. Because of reduced visibility and ceiling, the pilot was flying low and slow yet he failed to see the powerlines that shattered his right windshield. Fragments of plexiglass hit the pilot in the face, causing injuries that could have been reduced—even prevented—if the visor had been down. However, both the pilot's and copilot's helmets had tinted visors which were not suitable in the marginal weather.

The visor should be used for the eye protection it provides. A relatively minor mishap like this one could turn into a catastrophe if the pilot were blinded, even if only temporarily. Bird strikes are another threat to eye safety during all phases of flight. An aviator should not have to be concerned with lowering his visor in an emergency; it should be down at all times. The visor also offers some protection against flying objects and fire during a crash sequence.

Changing environmental conditions, i.e., bright sun to night, during a flight dictate a change in the type of visor required. With the clear visor installed, the pilot may wear his Army-issue sunglasses under his visor during day operations and still have the clear visor for night or reduced visibility situations.

AR 95-1 requires that a helmet be worn, but does not address the use of the visor. FM 1-1, Terrain Flying, states that under most conditions visors should be down. Local commanders should establish a positive visor down policy in their unit SOPs.

It is recognized by many that a helmet with dual visors (clear and tinted) would be ideal. Until such a helmet is available USAAAVS recommends clear visor down at all times. What does your SOP say?

USAAAVS point of contact is MAJ G. G. Reese, Jr., AUTOVON 558-4202/4198. ■

Bird strikes clearly demonstrate the need to fly with visor down at all times. This duck hit and entered lower left chin bubble of OH-58 but could have come through pilot's windshield.

Selected mishap briefs

Rotary wing

UH-1

Precautionary landings □ During cruise flight 1,000 feet agl with OAT −6° C., crew heard loud thump and suspected bird strike. Cracked copilot's greenhouse was discovered after shutdown. Large temperature differential on either side of greenhouse caused it to crack. □ Aircraft encountered unforecast moderate icing conditions, causing some vibration. Light rime ice had been forecast. Aircraft landed at airfield. □ Master caution and engine chip detector lights came on. Excessive metal particles were found on magnetic plug and engine oil screen. □ Pilot noticed fluctuation of N_1 gas producer and yaw of aircraft during power changes. Suspect materiel deficiency of fuel control. □ Weather deteriorated and pilot landed in open area to wait for improved conditions. □ During completion of simulated right antitorque failure, pilot reduced rpm, trying to straighten and align aircraft with runway. Rpm decreased to 5800 and aircraft began to spin to right. IP took control, increasing rpm. Loud bang was heard before 6600 rpm was reached, indicating compressor stall. Caused by failure of interstage bleed actuator.

AH-1

Precautionary landing □ After takeoff, oil pressure fluctuated from 55 to 70 psi with engine torque at 33 psi and N_1 at 94.1%. Oil pressure light came on and aircraft landed. Caused by failure of engine relief valve.

OH-58

Precautionary landing □ Fuel filter caution light came on. Filter was clogged.

CH-47

Precautionary landings □ Flight engineer detected fuel leak on No. 2 engine during takeoff. Main fuel filter packing split, causing leak. □ Weather went below VFR minimums and aircraft was landed. Weather was forecast as good. □ No. 1 engine chip detector light came on. Engine was secured and running landing made. Chip detector had come apart and shorted out.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-21

Accident □ Aircraft on IFR flight crashed into mountains. Five fatalities. Accident is under investigation.

U-8

Precautionary landing □ (G series) Pilot saw oil streaming back along No. 2 engine cowling during cruise flight. Caused by prop seal failure.

T-42

Precautionary landings □ During extension of gear for landing, light and down flag failed to show safe gear-down indication. Gear was manually extended and light, flag, and horn indicated gear was down. Postlanding inspection revealed

landing gear motor relay was inoperative. □ When gear was retracted on takeoff, unusual noise was heard from vicinity of wheel wells. Nose gear shimmy damper seal ruptured, resulting in loss of hydraulic fluid.

U-3

Precautionary landing □ Voltage regulator failed and overvoltage relay did not stop overvoltage condition. Resulting electrical surge burned out turn and slip indicator, damaged several radios, and destroyed batteries.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

AH-1

Precautionary landing □ Torque, N1, N2, and egt fluctuated. Postflight inspection revealed engine bleed band was out of adjustment.

OH-58

Precautionary landings □ High frequency vibration was felt 1 minute after takeoff and pilot landed. Ice had formed in tail rotor blade at blade root. After takeoff, it slid to the blade tip, causing out-of-balance condition and vibration. □ After HIT check, as aircraft was hovering to active runway N2 rpm fluctuated between 100 and 105%. Caused by loose air line on engine.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Recap of TSARCOM messages

TSARCOM message 042007Z Jan 1978, subject: Safety-of-Flight and Worldwide Technical Messages. Following is a list of all AIG 8881 addressed messages transmitted by TSARCOM (DRSTS-M) from 1 July 1977 to 31 December 1977 for the UH-1, OH-58, and CH-47.

UH-1-77-14 Main Rotor Grip Assemblies
UH-1-77-15 Defective Tail Rotor Servo Cylinder Assy
UH-1-77-16 Maintenance Instructions for Infrared Suppressors
UH-1-77-17 Main Rotor Retention Strap Assemblies
UH-1-77-18 One-Time Inspection of Oil Cooler Blower Assemblies
UH-1-77-19 Use of Chadwick-Helmuth Vibrex Equipment on UH-1 Series Helicopter Tail Rotor Systems
UH-1-77-20 Return of Unserviceable T53-L-13B, 15 and 701A Engines
UH-1-77-21 Swashplate Trunnion Bearing KSP8001-1/-3/-5
UH-1-77-22 Overspeed Limits for T53-L-13B and T53-L-703 Engines
OH-58-77-6 Engine Fuel Pump Filter Bypass Switch
OH-58-77-7 Upper Clamp on Fuel Hose
OH-58-77-8 Inspection of Tail Rotor Hub and Blade Assembly
CH-47-77-7 One-Time Inspection of CH-47A, B, C Aircraft
CH-47-77-8 One-Time Inspection of Heater Fuel Line in CH-47A & B Aircraft With Crashworthy Fuel Systems
CH-47-77-9 CH-47A, B & C Engine Engagement ■

C-12 tires—CAUTION

Several instances of C-12 aircraft becoming mired in sand, gravel, snow, and mud have been reported in recent months. On one occasion, the aircraft had to be jacked up before it could be extracted from the sod. On another, the propeller blades were damaged when the wheels sank into gravel. Further, directional control may be lost if the wheels should become mired in snow.

The problem is attributed to the extremely narrow and heavy "footprint" of the high pressure tires. Consequently, C-12 users are urged to use extreme caution when operating aircraft on unimproved surfaces, and to report any similar occurrences of this problem to: Commander, USAAAVS, ATTN: IGAR-AS, Fort Rucker, AL 36362, AUTOVON 558-4202/4198. ■

Tape recorder available

Tool Kit, Army Aircraft, Crash Investigating, NSN 5180-00-903-1049, has been issued minus the tape recorder, NSN 5835-00-130-3261. As of 1 December 1977, this recorder is listed on the Army Master Data File (AMDF) and can be ordered using the code S9E (Defense Electronic Agency). No cost figures are available at this time. ■

Get rid of those ammonia ampules

Check your panel-mounted general purpose first aid kits (NSN 6545-00-919-6650) used in Army aircraft and any liferaft first aid kits (NSN 6545-00-168-6893) you may have lying around.

Message 171300Z Nov 77 from Commander, USAMMA, Fort Detrick, MD, SGMMA-LDT, subject: Disposition Instruction for Medical Materiel, says that the Ammonia Inhalant Solution, Aromatic Ampules, NSN 6505-00-106-0875, is unsuitable for issue and use. The lot numbers affected are 1120, 1124, 1125, and 1129. These were manufactured by the Jewish Employment and Vocational Service and were supplied by Jersey Analytical Services.

If you find any of these ampules in your first aid kits, you are to destroy them as directed by paragraph 3-48a, AR 40-61, under provisions of paragraph 2-18, AR 735-11. ■

Check your copy

The current issue of Low Altitude Instrument Approach Procedures, Volume 5, may have pages 238 through 268 missing. These pages include approaches to:

Mt Vernon, IL	Chicago, IL
Neosho, MO	Topeka, KS
Nevada, MO	Phillipsburg, KS
Newton, KS	Pratt, KS
Offutt AFB, NE	Pueblo, CO
Ottumwa, IA	Moline, IL

Check your copy of this publication for missing pages, and report any discrepancy to USAASO, AUTOVON 284-7773. ■

OOPS! Our mistake

The article concerning the backplate for the AN/PRC-90 survival radios published in Vol. 6, No. 5, 2 Nov 1977 issue of FLIGHTFAX, contains an error in one of the contract numbers. The correct contract numbers are F41608-72C-7887, Oklahoma Electronics, and F41608-74C-6720, MICROPAK. Thanks to WO1 Misner, avionics officer for reconnaissance helicopters, Fort Sill, OK, for bringing this to our attention. ■

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STACOM 25 ■ 8 FEBRUARY 1977 COL CHARLES S. WINGATE ■ 558-2603/3514

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. This update is current as of 1 February 1978. Please check your weekly AG Publication Center Bulletin for subsequent changes.

TM No.	Aircraft	Basic Manual	Last Change	Basic Checklist	Last Change
Rotary wing					
TM 55-1520-					
209-10	CH-47A	30 Mar 73	22, 23 Sep 77	Jan 73	7, 16 Mar 77
210-10	UH-1D/H	25 Aug 71	17, 7 Apr 77	Aug 71	9, 16 Mar 77
214-10	OH-6A	17 Dec 76	2, 2 May 77	Dec 76	1, 16 Mar 77
217-10-1	CH-54A	8 Apr 77		Mar 77	
217-10-2	CH-54B	15 Apr 77		Mar 77	
219-10	UH-1B	16 Jan 69	12, 19 Aug 77	Dec 68	7, 16 Mar 77
220-10	UH-1C/M	20 Nov 68	15, 2 Nov 77	Jul 71	6, 16 Mar 77
221-10	AH-1G	12 Dec 75	5, 10 Aug 77	Dec 75	3, 10 Aug 77
221-10-1	AH-1Q	31 Dec 75	5, 25 Aug 77	Dec 75	1, 16 Mar 77
227-10-1	CH-47B/C	3 Aug 73	27, 23 Sep 77	Jun 73	10, 18 Mar 77
228-10	OH-58A	7 Sep 72	16, 27 Jun 77	Oct 72	10, 16 Mar 77
233-10	TH-55A	30 Sep 76		Sep 76	2, 18 Mar 77
234-10	AH-1S (MOD)	17 Nov 76	6, 25 Apr 77	Nov 76	1, 16 Mar 77
236-10	AH-1S (PROD)	29 Apr 77		Apr 77	
Fixed wing					
TM 55-1510-					
201-10/4	U-8D/G				
	RU-8D	12 Feb 69	9, 30 Mar 77	Feb 69	4, 30 Mar 77
201-10/5	U-8F	12 Feb 69	11, 30 Mar 77	Feb 69	5, 30 Mar 77
204-10/3	OV-1B	11 Feb 70	12, 21 Mar 77	Jan 70	6, 21 Mar 77
204-10/4	OV-1C	11 Feb 70	14, 21 Mar 77	May 71	5, 21 Mar 77
204-10/5	OV-1D	29 Aug 75	5, 21 Mar 77	Sep 75	2, 21 Mar 77
208-10	T-42A	19 Dec 75		Dec 75	2, 12 Aug 77
209-10	U-21A	25 Mar 77	1, 25 May 77	Feb 77	2, 25 May 77
209-10-1	RU-21A/D	28 Feb 77	1, 20 Jun 77	Mar 77	1, 18 Mar 77
212-10	T-41B	31 Oct 74	2, 18 Mar 77	Oct 74	2, 18 Mar 77
214-10	RU-21B/C	15 Mar 77	1, 17 Jun 77	Apr 77	1, 23 Jun 77
215-10	U-21G	11 Mar 77	1, 23 May 77	Apr 77	1, 25 May 77
215-10-1	RU-21E/H	31 Mar 77	2, 24 Aug 77	Apr 77	2, 19 Aug 77
216-10	U-3	May 77		May 77	
	C-12A	30 May 77	A2, 18 Nov 77	May 77	A2, 18 Nov 77

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THE 10 COMMANDMENTS OF GOOD CREW COORDINATION

I Aircraft Commanders
THINK PEOPLE!
Remember you are working with people who have feelings of worth, need and dignity.

II Aircraft Commanders
SET THE TONE!
If you're the director of a one-man band, you won't foster much crew coordination. You, the pilot, set the tone of the crew. If you encourage and are receptive to an exchange of information, you'll probably get it. Also, let each crew member know what you expect of him.

III Aircraft Commanders
SOLICIT INFORMATION!
Ask for opinions or suggestions. It's not a sign of command weakness to ask what the other crew members think.

IV Aircraft Commanders
USE OTHER CREW MEMBER'S EXPERIENCE!
That old engineer probably has a lot of experience which can help you. Use it.

V Crew Members
DON'T BE SHY!
If you've got something bothering you, speak up. You may know something that someone else doesn't know.

VI Crew Members
BE PERSISTENT!
Keep the pilot and other crew members informed. Don't let one crew member snuff you out.

VII Crew Members
REMEMBER WHO'S IN COMMAND!
Make your input to the boss but remember he makes the final decision.

VIII Aircraft Commanders and Crew Members
BE TACTFUL!
Don't close the channels of communication in crew coordination through immature or unprofessional behavior.

IX Aircraft Commanders and Crew Members
REINFORCE GOOD COORDINATION!
When your crew flies a successful mission, it involves a lot of successful efforts by your crew and other support people. Reward people for special efforts with a thank you or a letter to their commander. Remember, a small "thank you" goes a long way with the other crew members and team players.

X Aircraft Commanders
DON'T SHIRK YOUR RESPONSIBILITY!
Think people; set the tone for crew coordination; solicit information; use experienced people; reinforce good coordination; BUT, remember you must make the final decision and be responsible for it.

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Wire strikes on the rise

Wire strikes claimed an average of two Army aircraft every month during FY 1977, and this average has since increased to about 2.7 aircraft per month for the first quarter of FY 1978.

Aircraft, flying about 35 feet agl, struck set of three wires. Visibility was reduced because of raindrops on the outside of the canopy and fog on the inside.

THE OH-58 WAS ready for flight back to its home station. It had been serviced and thoroughly preflighted. All cockpit and operational checks had been performed by the book; and the pilot, an experienced SIP, had accomplished every phase of planning with equal thoroughness. The route he selected was chosen because it provided more suitable landing areas in the event of an emergency and the flight would be made during daylight hours in VFR weather. What more could anyone ask?

With two passengers on board, the pilot lifted the OH-58 off the ground and nosed it toward home. Scarcely 20 minutes later, the broken aircraft, its occupants dead, lay inverted in a river—victim of a wire strike.

How did an ideal flight situation turn into a catastrophe? This is how accident investigators pieced together the events:

At some point after departure, the pilot elected to veer from his established course to follow a river. Then, in violation of his unit SOP, he chose to descend below the minimum authorized altitude of 500 feet agl. As the aircraft rounded a bend, wires seemingly appeared from nowhere. Whether or not the pilot saw them is not known; but if he did, he had no time to react. The aircraft crashed into the wires which severed the mast, then nosed inverted as it fell 140 feet into the river.

This accident is "typical" in that most wire strikes do NOT occur during authorized NOE flight, despite its inherent dangers, but during the conduct of other types of missions.

During the 5-year period FY 1973-1977, wire strikes resulted in destruction of 30 aircraft, major damage to 13, minor damage to 4, and incident damage to 54. In addition, they caused 23 precautionary landings. Collectively, they claimed 37 lives and more than $10½ million in damaged and destroyed equipment. Almost 90 percent of these mishaps happened outside the authorized NOE environment. This fact coincides with the concern voiced by Army aviation safety personnel ➤

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early in FY 1973 when NOE training began to expand. The fear expressed was that as NOE and other forms of low-level flight became more commonplace, pilots might tend to become less cautious and more prone to fly low level outside the authorized training area. They pointed out that in a formal NOE training program, the risk of wire strikes is known to be a real and constant threat. Consequently, positive prevention measures have been taken.

Since we do not provide the same degree of supervision and control outside the NOE training environment, where do we look for a solution?

As the matter now stands, we must look to ourselves for the best means of avoiding wire strikes. And there is much we can do. The first step is to review what we already know.

Facts to consider

■ Human error is almost always involved when wire strikes occur. Those rare mishaps that happen after some in-flight materiel-related emergency are generally the only exception.

■ Most wire strikes occur below 50 feet agl, with few occurring above 150 feet and none at altitudes above 300 feet.

■ Most wire strikes happen during cruise flight.

■ An aerial reconnaissance over unfamiliar terrain is only partly effective in locating wires strung in the area. For all practical purposes, it is virtually impossible to insure all wires are noted during such a reconnaissance.

■ Wire strikes seldom occur at takeoff and landing points when surrounding wires are marked.

■ Pilots in units with strong command supervision to enforce SOPs dealing with flight discipline are less likely to become involved in wire strike mishaps.

■ Even though wires may not be seen, their presence should be expected along roads and railroad tracks; between hills, poles, structures; and between any pole and a structure. Even when only a single pole in open country is spotted, the possibility of wires exists.

■ The position of the sun, types of wires, time of day, and existing atmospheric conditions can drastically affect the pilot's ability to detect wires. A change in one or more of these variables can be a deciding factor as to whether wires can be readily spotted, seen with difficulty or not seen at all. Even large powerlines suspended by towers can sometimes be impossible to see even on a perfectly clear day. On one occasion, accident investigators being flown to the site of a wire strike accident could not see the powerlines from the air even though they knew exactly where the wires were located.

■ Some types of wires such as those associated with missiles are impossible to see during flight. The danger posed by these is greatest during low-level flight over firing ranges and over trees and other foliage adjacent to such ranges.

■ The more crewmembers actively engaged in spotting wire hazards on any given flight, the less the risk of wire strikes. Conversely, the possibility of a wire strike is greatest when the pilot is the sole aircraft occupant.

Actions to take

With what we know, we can take positive steps to prevent wire strikes. The

After recon of abandoned airfield, copilot aligned aircraft with runway. As aircraft descended to within 40 feet of the ground, copilot saw wire stretched across runway. His attempt to fly under the wire was unsuccessful.

following are recommended:

1. Review unit SOPs and directives relative to low-level flying to make certain they reflect the safest procedures possible for the types of missions being flown.

2. Provide adequate supervision to insure pilots adhere to established policies.

Recently, a pilot decided, on his own, to perform NOE flight at night. Not only did he embark on an unauthorized flight but, in addition, took with him an unauthorized passenger. The aircraft struck wires and crashed, killing both occupants and destroying the aircraft.

3. When low-level flights are required, provide aviators with current maps that show wire obstacles, and make certain crews receive thorough briefings.

4. Where possible, mark all wires around potential takeoff and landing sites on and off military reservations. In the absence of some device to help the pilot locate and identify wire obstructions, one of the best solutions lies in making wires more conspicuous. This means the use of wire markers—something we have been doing to a limited degree for years. Time and again such markers have proved their value. A pilot arriving at an airfield—even one new to him—knows to expect wires in the vicinity. In looking for them, his job is simplified by the markers.

5. Unless required by missions, avoid low-level flight over areas known to contain wires and over firing ranges where fine missile wire can pose a potential threat.

6. Use all crewmembers in searching for wire obstructions during all low-level flights, and insure maximum coordination between them.

7. Keep in mind, the closer to the ground that low-level flight must be conducted, the slower the airspeed should be.

If two helicopters are approaching wires or some other obstruction and one is traveling at 80 knots while the other is flying at 40 knots, the pilot of the faster moving aircraft must spot the obstruction from a distance of more than 1,650 feet to have sufficient time to react and avoid striking it. On the other hand, the pilot of the slower moving aircraft could get slightly closer than 600 feet to the obstacle before detecting it and still have ample time to maneuver his aircraft to safety. (These figures have been approximated, allowing for a time delay that includes the period required for human perception, decision, control manipulation, and reaction of the aircraft to control input.) Since more obstacles of different types are likely to be encountered close to the ground and since the types of evasive maneuvers that can be safely made at extremely low level are limited, depending on terrain vegetation, etc., it is more than just good common sense to slow down when flying near the ground.

The number of wire strike mishaps involving Army aircraft decreased from 38 in FY 1971 to a low of 17 in FY 1975. The trend then began to reverse itself and in FY 1976 the number of wire strikes rose to 22. In FY 1977 this figure reached 25. If the frequency of wire strike occurrences remains unchanged for the remainder of FY 1978, we can expect their number to reach 32. To stop this upward trend, positive action is a must; and the brunt of this responsibility rests on commanders and aviators alike. ■

Accident analysis

ANALYSIS 77-16
Type aircraft: OH-58A
Time: 0655
Classification: Major (total)
Injuries: 1 minor
Estimated cost: $159,282 (aircraft, injury)
Mission: Tactical reconnaissance

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CPT	27	1,036	1,036

The accident

The mission was a low recon of a proposed landing site during a field training exercise. The pilot took off and climbed to about 200 feet, then began a descending left turn. The proposed landing site was directly out the left side of the aircraft. The pilot kept the degree of turn so that the landing area remained off the left side until reaching a heading of about 110°. He then completed the turn in the direction of the area and was on a 40° heading. Altitude had decreased and stabilized at approximately 30 feet. Airspeed was between 15 to 20 knots with a tailwind at 220° between 15 and 25 knots. The aircraft was now headed into the sun and there was a slight ground haze. The pilot hovered forward and the left skid hit the top guide line of three electrical wires. The aircraft rotated perpendicular to the ground in a nose-low attitude. Full aft cyclic was applied and the aircraft rotated forward into a 360° flip. The main rotor chopped off the tail boom, then the main rotor and mast assembly separated below the static stops. The aircraft crashed in a slight nose-low attitude.

The cause

■ The pilot inadequately planned the flight in violation of paragraphs 6-2 and 6-3a(1), FM 1-51; and paragraph 1-6, FM 1-1. He knowingly conducted inadequate high and low recons of a tactical landing zone. Being familiar with the landing zone, the pilot, in the right seat, hurriedly conducted the high recon from 200 feet agl in a descending left turn with no observer in the left seat. On the low recon, the pilot selected an approach into the sun which reduced visibility due to glare. As a result of these inadequate recons, wires in the landing zone were not detected. Had the pilot reversed his pattern, the landing area would have been out his right door and the sun out his left rear, giving him an unobstructed view of the landing area. Even though the tailwind did not cause the wire strike, it aggravated the situation.

The cure

■ Inform personnel, through safety meetings, of the hazards associated with failure to perform a good reconnaissance before every landing.

Materiel failure/malfunction mishap analysis

77-10
Type aircraft: CH-47C
Classification: Incident
Injuries: None
Estimated cost: $140,273 (aircraft)
Mission: Service (ferry flight)

The mishap

During cruise flight at 2,500 feet agl and 120 knots, copilot's emergency exit (jettisonable) door separated from aircraft and struck forward and aft rotor systems. Emergency landing was made.

The causes

■ Door separated because present design allows door to shift and disengage one of the latches.

■ Door separated because maintenance was not performed. Modification instructions (TB 43-0001-2-4, dated Jan 76) were published as advisory instead of compulsory compliance information. The owning unit had not implemented the maintenance advice.

The cures

■ Modify the jettisonable door retention system to insure retention during all flight modes. A possible modification would increase the surface contact area between the locking lugs and the airframe hard points. (Proposed ECP 713 is being staffed to modify design.)

■ Provide maintenance modification procedures that require time compliance by owning unit maintenance. (Urgent TB 55-1500-210-20-34 has been published requiring inspection and reporting on the status of this modification.)

Programed Texts may be limited

Due to the increase in requests from units worldwide for the Programed Texts listed as references in the Aircrew Training Manual, TC 1-135 (DRAFT), some requests will probably be only partially filled. With the requirement to furnish the instructional departments at the Aviation School as well as field units with these Programed Texts, stockage level must be maintained. Requests that are partially filled can be resubmitted in 30 to 60 days and they will be completed.

Contact for these Programed Texts is U.S. Army Aviation Center, Department of Academic Training, Extension Training Management Branch, ATTN: ATZQ-T-AT-E, Fort Rucker, Alabama 36362. ■

TOTAL MISHAPS FOR 27 JAN-2 FEB 78

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	2	1	21	25
AH-1	1	0	0	4	5
CH-47	0	0	1	3	4
OH-58	1	1	0	12	14
TH-55	0	0	0	1	1
C-7	0	0	0	3	3
U-3	0	0	0	1	1
U-8	0	0	0	2	2
U-21	0	0	0	3	3
OV-1	0	0	0	4	4
Total	3	3	2	54	62

0 Fatalities, 3 Injuries
Estimated costs: $134,358

Selected mishap briefs

Rotary wing

UH-1

Accident □ Pilot, on approach to unimproved LZ, lost all visual reference due to blowing snow and aircraft crashed. Transmission and main rotor system separated and fuselage was damaged. Three occupants sustained minor injuries.

Incidents □ Left engine cowling separated from aircraft, damaging left lower tailpipe fairing. □ Lead aircraft in formation of five was making assault into LZ during tactical field exercise. Main rotor blade struck tree as pilot was trying to pick a spot to land. Blade was replaced.

Forced landing □ Unusual noise was heard from engine area and pilot initiated landing. Engine failed during reduction of power.

Precautionary landings □ N_2 decayed to 6000 rpm and stabilized during liftoff to hover. Rivet on torque tube on droop compensator control sheared. □ Faulty irreversible valve caused cyclic to jam in left forward position during power cylinder check. Crew chief cycled hydraulic control switch, which restored hydraulic assist to servo. □ Smoke filled cockpit from bleed air ducts. Caused by failure of No. 1 engine bearing seal. □ Fire warning light came on. Caused by moisture in cannon plug. □ Rotor rpm indicator on dual tachometer went to zero. Caused by failure of rotor tachometer generator.

AH-1

Accident □ Student pilot, terminating night low-level autorotation, pulled initial pitch too high, causing rotor rpm to decay and resulting in hard landing. Minor damage.

Precautionary landing □ Flight of three aircraft performing tactical training landed when weather rapidly deteriorated.

CH-47

Forced landing □ Aircraft was at hover with external load when No. 2 engine failed. Suspect variable inlet guide vanes were ingested, causing extensive internal damage to engine.

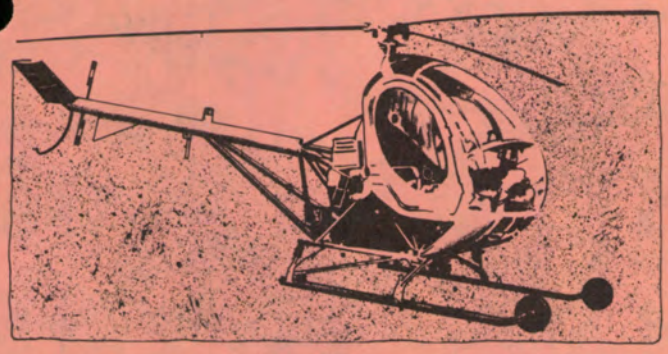
Precautionary landing □ Airspeed went below 60 knots during landing. Speed trim would not retract in manual or automatic position. Caused by failure of speed trim actuator.

OH-58

Accident □ Engine failed during takeoff at 35 feet and 30 knots forward airspeed and aircraft landed hard in deep snow, damaging fuselage, transmission, cowling, pitch change link, and swashplate.

Incident □ Main rotor blades hit yucca plant during termination of landing in confined area. Incident damage to blades.

Precautionary landings □ Tail rotor chip detector light came on. Wire to chip detector grounded out against aircraft. □ Engine quit during runup. Fuel nozzle was clogged by contamination. □ Pilot encountered deteriorating visibility due to fog and low ceiling, and landed in open field until ceiling improved. □ Crack approximately 3 inches from tip of main rotor blade was found across entire cord



of the blade during preflight inspection.

TH-55

Precautionary landing □ Engine oil pressure dropped below minimum limit for flight. Caused by failure of oil pressure sending unit.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

TSARCOM message

■ 302125Z Jan 78, subject: Inspection Requirements for Nonstandard/Locally Manufactured Heavy Duty Skid Shoes on UH-1 Series Aircraft (UH-1-78-2)

Fixed wing

C-7

Precautionary landings □ Gear retracted normally and about 2 minutes later main gear fell out of wheel well and locked down. Gear was recycled, with no results. Visual inspection of nose gear in nose wheel well revealed gear was retracted. Nose gear was hand pumped to down position and aircraft was landed. Inspection revealed ruptured hydraulic line to left main landing gear. □ No. 1 engine started to backfire during cruise flight. Engine was secured and aircraft landed. Exhaust rocker box area split on No. 10 cylinder.

U-21

Precautionary landing □ (H series) No. 2 engine N1 dropped from 100% to 95% and fluctuated for 10 minutes, then settled at 93%. When power was reduced for descent, there was a torque differential of 400 to 600 pounds and torque on No. 2 engine was fluctuating. Single-engine landing was made. Caused by failure of fuel control.

OV-1

Precautionary landings □ (C series) No. 2 engine was shut down for single-engine training maneuvers. Engine could not be restarted due to high egt. High egt was caused by broken air check valve on No. 2 engine which allowed bleed air from No. 1 engine to cross over to No. 2 engine. □ (D series) No. 2 engine chip detector light came on and oil pressure and torque pressure were lost. No. 2 engine then seized. Caused by failure of spur gear shaft assembly. □ (C series) Hydraulic pressure dropped to zero after speed brakes were extended. Caused by failure of hose assembly.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Postflight inspection revealed heavy loss of hydraulic fluid. Flat washer was not installed on input side of "T" tube to boss. Output side was found cracked, probably due to overtorque during installation, but was not the source of the leak. □ Four loud bangs were heard from engine area while aircraft was hovering out of ground effect on ridgeline. N2 rpm began fluctuating and aircraft was landed on crest of ridge. Customer bleed air line was loose, bleed air line to particle separator ruptured, N1 was out of rig, and fuel control power shaft stop arm did not touch lower stop.

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Selected mishap briefs

AH-1

Precautionary landing □ Roll channel SCAS motored severely during hover. Sensor amplifier for SCAS was incorrectly installed and prong was busted off.

CH-47

Precautionary landing □ Rotor tachometers dropped to zero. Caused by improper installation of cannon plug to rotor tach generator.

U-8

Precautionary landing □ (F series) Copilot saw fuel siphoning from left auxiliary tank during climbout. Adjusting screw on fuel cap was not tightened enough to seal cap.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Recap of TSARCOM messages

TSARCOM message 042007Z Jan 78, subject: Safety-of-Flight and Worldwide Technical Messages. Following is a list of all AIG 8881 addressed messages transmitted by TSARCOM (DRSTS-M) from 1 Jul to 31 Dec 1977 for the OV-1, U-21, and U-8 aircraft, and GEN messages.

OV-1-77-4 Propeller Reversal
OV-1-77-5 One-Time Inspection/Spacer Installation for FY 67 and FY 68 OV-1C, All OV-1D and all OV-1D (Conversion) Series Aircraft
OV-1-77-6 OV-1D and RV-1D Series Aircraft
OV-1-77-7 Return of Unserviceable T53-L-13B, 15 and 701A Engines
U-21-77-3 U-21 and RU-21 Series Aircraft
U-21-77-4 U-21 and RU-21 Series Aircraft Propellers
U-21-77-5 U-21 and RU-21 Series Aircraft Propeller Inspection
U-21-77-6 U-21/RU-21 Series Aircraft, Horizontal Stabilizer Spar Attachment
U-8-77-2 U-8/RU-8 Aircraft 0-480 Engine Oil Pump Screen Assy
U-8-77-3 U-8 Aircraft, Air Duct Hose
GEN-77-15 Lacquer, Low Reflective
GEN-77-16 Hand Portable Fire Extinguishers Used on Cobra Series Aircraft
GEN-77-17 Army Aircraft Maintenance Publications
GEN-77-18 Conversion of Army Aircraft to Fire Resistant Hydraulic Fluid
GEN-77-19 Lacquer, Low Reflective ■

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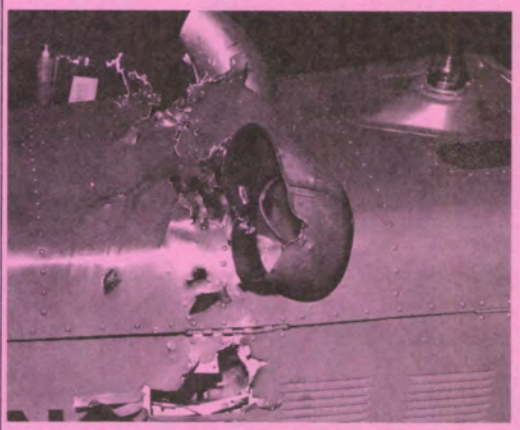
Safety-of-flight messages

■ 092145Z Feb 78, subject: Safety-of-Flight One-Time Inspection of all **RV-1D** and **OV-1D Aircraft,** TB 55-1510-204-20-29, Message Number OV-1-78-3. **Summary:** The purpose of this message is to identify T53-L-701A engines which are suspected to contain faulty ring gears. During a teardown analysis of a T53-L-701A engine that had been returned to CCAD as a result of metal contamination reported by chip detector and oil analysis, the ring gear, NSN 3020-00-220-5297, in the reduction gear section was found to be cracked. Seven other ring gears were then inspected and three of the seven were found cracked. The only engines affected by this problem are the T53-L-701A engines that were converted from the T53-L-15. **Contact:** William Hearst, TSARCOM, AUTOVON 698-6868, commercial 314-268-6868.

■ 102315Z Feb 78, subject: Safety-of-Flight Message No. OH-6A-78-1-OH-58A-78-1 ("Technical" "Urgent" With Limitations) for **OH-6A/58A Helicopters:** Inspection of the T63-A-700-5A Power Turbine Outer Coupling Nut. **Summary:** Severe corrosion has attacked the power turbine coupling nut, NSN 5310-00-943-1677. This condition usually occurs in extremely humid areas which have abnormal amounts of sulphur in the atmosphere. Failure of this unit would result in disengagement of the power turbine curvic coupling, resulting in possible N2 overspeed and turbine wheel failure. Outer coupling nut inspection procedures and criteria are detailed in the message. It is essential that this nut be inspected. Failure to comply with this message may result in a catastrophic mishap. **Contact:** Will Fisk, TSARCOM, AUTOVON 698-6868, commercial 314-268-6868.



Result of corrosion and separation of outer coupling nut. Luckily, the pilot of this OH-58 was at a 5-foot hover and able to make a successful autorotation when the power turbine shaft disengaged from the power turbine rotor assembly. The engine was destroyed and flying engine fragments caused minor damage to the main rotor, short shaft, and engine compartment area.

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Correct addressees on PRAMs

Some units are not complying with AR 385-40 when submitting Preliminary Reports of Aircraft Mishap (PRAMs). Paragraph 5-8(d) of AR 385-40 (draft), undated, lists the following mandatory addressees which should be on all PRAMs submitted for major and minor accidents, missing and abandoned aircraft, incidents, aircraft ground accidents, and misappropriated aircraft accidents:

a. Commander directly responsible for the pilot-in-command of the aircraft (if applicable).

b. DA WASH DC //DACS-ZA//DAMO-ODA//DAMA-WSA//DAIG-SD//

c. CDR, USAAAVS FT RUCKER AL// IGAR-D//

d. Appropriate MACOM CDR or head of Army Staff Agency

e. CDR DARCOM ALEX VA//DRCSF-A//

f. BMDSC-RS (for Ballistic Missile Defense System Command)

g. NGB-AVN-S Aberdeen Proving Ground, MD (for U.S. Army National Guard) (When ARNG aircraft are involved, info copies will be sent to CDR TRADOC, CDR FORSCOM, and appropriate commanders of CONUSA numbered armies.)

h. DA WASH DC //DAAR-OT// (for U.S. Army Reserve, if U.S. Army Reserve aircraft involved)

i. CDR USATSARCOM STL MO //DRSTS-X(2)//

j. CDR USAAVRADCOM STL MO //

k. FAA (nearest facility when required by AR 95-30)

l. DIR ARMED FORCES INST OF PATHOLOGY WASH DC //AFIP-DFP-A// CPR-S// (in cases of fatal aircraft mishap)

In the event of forced landings, precautionary landings, and human factor, cargo and personnel handling equipment mishaps, notify, within 24 duty hours, all of the above addressees except DACS-ZA, the FAA, and DIR Armed Forces Institute of Pathology.

Paragraph 5-8(g) lists aircraft common to the Army, Navy, and/or Air Force. When an aircraft common to another service is involved in a mishap, an additional addressee on the PRAM should be: CDR, NAVAL SAFETY CENTER, ATTN: CODE II, NORFOLK, VA and/or DIR AEROSPACE SAFETY, AFISC/SEP, NORTON AFB, SAN BERNADINO, CA.

Paragraph 5-8(a) states, "A PRAM will be dispatched by an electrically transmitted message through available military communications and accorded precedence as defined in AR 105-31." Although AR 105-31 does not give a clear example of PRAM precedence, the intent is for commanders to dispatch a PRAM on all total, major or minor accidents, those involving loss of life or misappropriation of government aircraft, or high visibility mishaps, with a "PRIORITY" precedence.

Paragraph 8, chapter 5, AR 385-40, lists complete requirements for the PRAM and should be followed in addressing the PRAM. ■

CH-54A main rotor blades

The CH-54A main rotor blade, NSN 1615-00-178-8345, is a NORS only AIMI with a replacement cost of approximately $30,000 each. When these blades are removed from the aircraft as unserviceable, please insure that DA Forms 2410 are properly completed and forwarded with the properly tagged blade to the depot. In the past 9 months over 30 blades have been received at the depot with the following conditions:

a. No DA Form 2410 data.

b. Serial number of the blade does not match the serial number on the DA Form 2410.

c. Missing Materiel Condition Tags (DD Form 1577-2).

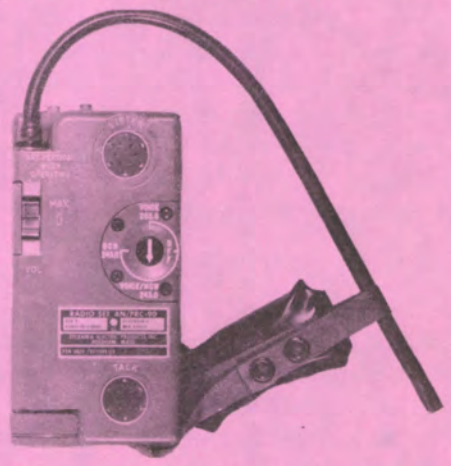
d. Incorrect copies of DA Form 2410.

When these conditions exist, depot personnel are forced to place the blade in an unclassified condition until the problems are corrected. This means no supply actions can be taken until the blade is reclassified even to moving the assets to a contractor for overhaul. Further, when information is not available within this Command for completion of the DA Form 2410 as to the hours since new and hours since overhaul, depot personnel must assume the spar life has been met and the blade is condemned as scrap. Due to the lack of proper documentation accompanying the unserviceable blades, two CH-54A main rotor blades have been scrapped in the past 30 days.

Point of contact: Mr. Lawyer or Mr. Wilsey, AUTOVON 698-3869. ■

From TSARCOM Materiel Readiness Information Bulletin

AN/PRC-90 survival radios



Message 071458Z Feb 78 from DRCPO-ALSE, St. Louis, MO, subject: Reliability and Maintainability (RAM) Performance of AN/PRC-90 Survival Radio System (Emergency Radio), GEN 78-2, advises that serious problems with survival radios may exist that would jeopardize survival of downed aircrewmembers.

The message tells how to test the radios, where to send the results of the failed radios, and how to obtain the radio test set if the unit does not have one.

A recent report from the field indicates a high failure rate of radios, even new ones not previously issued. ■

Radio tip

The antenna must be installed and extended before the transmitter switch is depressed or a burnout of the output stage of the transmitter will occur. ■

Selected mishap briefs

Rotary wing

UH-1

Accident □ Lead aircraft in flight of five took off and leveled at 200 feet agl and 90 knots. Pilot decelerated to 70 knots to form flight and aircraft descended and crashed in near level attitude, coming to rest on left side. Pilot, copilot, crew chief, and passenger sustained minor injuries.

Precautionary landings □ Fire warning indicator light came on. Caused by failure of resistor assembly. □ Pilot noticed excessive feedback in cyclic control at 50 feet agl on tactical mission. Inspection revealed ice buildup on cyclic servos. □ Unforecast weather developed over airport and pilot landed 15 miles north of airport in VMC. □ Aircraft yawed and gas producer, torque, and exhaust gas temperature fluctuated. Caused by malfunction of overspeed governor. □ At termination of low-level autorotation, throttle increased to 6000 N2 and main rotor turned very slow with no acceleration. Transmission oil pressure and d.c. generator lights came on. Preliminary inspection revealed complete failure of sprag and one broken and one chipped tooth in 90° gearbox. □ Egt probe leads at cannon plug on aft firewall failed, causing egt gauge to fluctuate. □ Engine oil pressure increased excessively. Caused by failure of torque regulator O-ring. □ Master caution and left fuel boost pump caution lights came on and aircraft was landed. Maintenance officer recycled main fuel switch, which dislodged foreign particle in injector pump of fuel boost pump.

CH-47

Precautionary landings □ Transmission pressure light came on. Caused by failure of forward transmission pressure transducer. □ Balance weight attached to flange on forward half of drive shaft came off in flight. Suspect materiel defect. □ Mission was aborted after takeoff due to change in forecast weather at destination. □ No. 2 engine torque dropped to zero and muffled noise was heard. Egt rose to 720° and aircraft was landed. Inspection revealed No. 2 engine last stage stator vanes and power turbine second row vanes were sheared. □ Pilot tried to start No. 1 engine to leave POL site but had to abort start because of excessive tailwind condition created by a passing aircraft. After engine stopped draining fuel, another start was initiated. Crew chief noticed internal fire and pilot cut off fuel and ignition switches and continued to motor starter but had no N1 indication. Copilot brought condition lever to stop and pulled fire handle. No. 1 fire bottle was expended and because fire remained around engine, No. 2 fire bottle was expended. Fire was finally extinguished by crew chief using two hand-held extinguishers.

OH-6

Precautionary landing □ Transmission oil pressure light came on. Filter was found to be nearly plugged with unknown substance. Aircraft had been in storage for more than a year.

OH-58

Accident □ Pilot picked aircraft up to hover, executed right pedal turn, and began hovering across snow. Visibility deterio-

rated in blowing snow and pilot executed another right pedal turn to return to takeoff point. At this time, partial whiteout occurred. Pilot still had visual reference with the trees but did not realize how high he was and left skid hit ground. Pilot applied right cyclic and aircraft rolled on right side. Pilot sustained minor injury.

Incidents □ Right passenger seatbelt struck side of aircraft during flight, damaging honeycomb material and skin surface. □ Right rear door popped open during termination of approach. Top hinge broke as rotorwash blew door forward, causing door to pivot and punch hole in fuselage. □ Severe high frequency vibration developed as pilot was hovering downwind to takeoff position at 200 feet agl over snow-covered ground. As pilot was setting aircraft down, visual reference was lost. Incident damage to cross tubes and underside of fuselage.

Precautionary landings □ Loud banging and rushing noise was heard from engine area during hover. Bleed air Y fitting blew out of defuser assembly. □ Aircraft developed severe lateral and vertical vibrations. Caused by failure of main rotor blade assembly. Inspection revealed water and ice accumulation in red main rotor blade spar area. No visible damage or corrosion was found. □ Aircraft was overtorqued when pilot encountered whiteout conditions while landing at night in flight trail formation.

TH-55

Precautionary landings □ Failure of fuse caused lateral cyclic trim motor to be inoperative. □ Pilot smelled fumes of burning insulation or rubber. Caused by failure of radio receiver-transmitter.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

T-42

Precautionary landings □ During cruise flight, pilot saw crack in windshield, proceeded to airfield, and landed. Caused by materiel failure of windshield. □ No. 2 engine chip detector light came on. Oil analysis revealed high iron content.

U-21

Precautionary landing □ (A series) Crew smelled strong odor of fuel. Copilot turned heater switch off and pulled temperature control circuit breaker. Exhaust fumes and smoke were then detected in cockpit. Postflight inspection revealed heater failure was caused by blockage of fuel spray nozzle. Blockage was caused by accumulation of soot and carbon from uneven burning of JP-4.

U-8

Precautionary landing □ (F series) No. 2 ➤

Selected mishap briefs

engine began losing power in cruise flight and quit momentarily during descent to airfield. Engine was operating under partial power at touchdown. Caused by fuel contamination in right auxiliary tank, possibly from installation of new tank.

OV-1

Precautionary landing □ (D series) Nose gear failed to indicate up after takeoff. IP took control and lowered gear, which indicated safe down. Postflight inspection revealed fractured nose gear strut would not allow nose gear to go to full up during retraction. Cause of fracture is unknown, but could have been caused by lateral overloads over long period of student training.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landing □ Muffled, banging noise was heard from right jump seat floor area. Landing was made but no discrepancies were found and flight was resumed. Noise came back and mission was aborted. Twenty pieces of rivets, rivet shank, and 14.75-inch screwdriver were found when inspection panel was removed. Screwdriver was rubbing against tail rotor push-pull tube. Aircraft had flown 30 hours since work had been performed.

AH-1

Ground accident □ On completion of main rotor blade tracking operation, crew chief lowered top of flag to ground to check mark, simultaneously raising bottom of flag into rotor disc, damaging blade.

Precautionary landing □ Engine oil bypass light came on and oil pressure fluctuated between 60 and 90 psi. Inspection revealed oil level was low. Oil consumption check indicated consumption was within normal limits.

T-42

Precautionary landing □ Both alternators were lost during flight. Suspect broken diode during installation of battery due to location of battery charger current sensor kit.

C-12

Precautionary landing □ (A series) Aircraft was leveling at 25,000 feet and pilot was adjusting power for cruise flight. Propeller levers were set for climb and could not be moved in either direction. Upon landing, pilot attempted to adjust propeller levers and found that full travel of both controls was possible. Cowlings had been removed and engine adjustments made the previous day. Light to moderate rainshowers were occurring when maintenance was performed. Moisture remaining

in engine compartment and on linkages froze at altitude and caused binding of propeller levers.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ During high gusting winds, top of rotor blade box that was not secured came off and hit right side of tail boom. □ Mechanic was riding on skid of aircraft during ground maneuver. Bump or rut on flight line caused mechanic to lose his balance and step to ground. Wheel of landing gear ran over mechanic's right heel.

AH-1

□ Tail rotor was not tied down during high winds and flexed into vertical fin. Tail rotor tiedowns were not available.

OH-58

□ As mechanic was lying on the ground taking a fuel sample, some of the fuel spilled over the sample bottle and splashed onto the ground and in mechanic's eyes, requiring hospitalization. □ Strong winds caused main rotor blade to come free from tiedown lashing and hit main rotor assembly of adjacent aircraft.

U-8

□ As instructor pilot walked under wing during preflight, his head hit pitot tube, causing lacerations.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 3-9 FEB 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	0	1	24	26
AH-1	0	0	0	1	1
CH-47	0	0	0	6	6
OH-6	0	0	0	2	2
OH-58	1	3	0	9	13
TH-55	0	0	0	2	2
T-42	0	0	0	4	4
U-21	0	0	0	1	1
U-8	0	0	0	1	1
OV-1	0	0	0	1	1
C-12	0	0	0	1	1
Total	2	3	1	52	58

0 Fatalities, 5 Injuries
Estimated costs: $94,500

Have you seen TF 20-6041, "Recipe for Inadvertent Soup"? It's available now at your Audiovisual Support Center.

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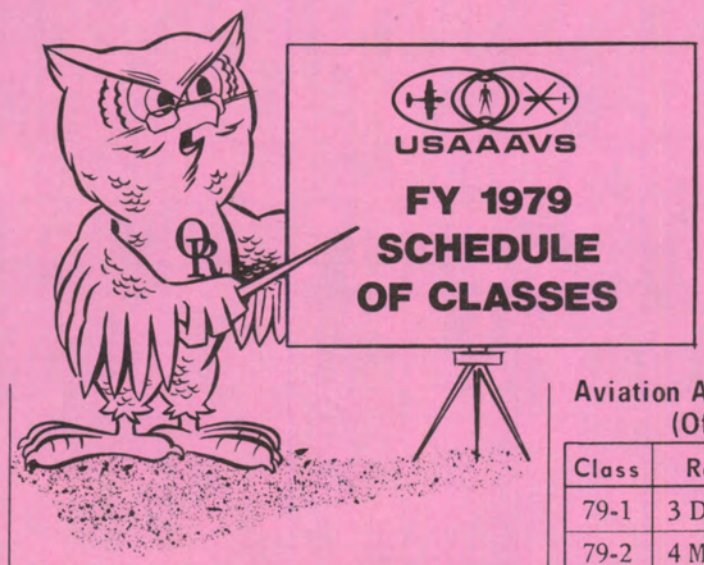

Aviation Accident Prevention Management Course (NCO and Civilian)

Class	Report	Start	Close
79-1	15 Oct 78	16 Oct 78	27 Oct 78
79-2	14 Jan 79	15 Jan 79	26 Jan 79
79-3	18 Mar 79	19 Mar 79	30 Mar 79
79-4	15 Apr 79	16 Apr 79	27 Apr 79
79-5	17 Jun 79	18 Jun 79	29 Jun 79
79-6	22 Jul 79	23 Jul 79	3 Aug 79

Aviation Accident Prevention Course (Officer and Civilian)

Class	Report	Start	Close
79-1	3 Dec 78	4 Dec 78	15 Dec 78
79-2	4 Mar 79	5 Mar 79	16 Mar 79
79-3	1 Apr 79	2 Apr 79	13 Apr 79
79-4	8 Jul 79	9 Jul 79	20 Jul 79
79-5	9 Sep 79	10 Sep 79	21 Sep 79

Aviation Safety Officer Course

Class	Report	Start	Close
79-1	1 Oct 78	2 Oct 78	1 Dec 78
79-2	7 Jan 79	8 Jan 79	2 Mar 79
79-3	22 Apr 79	23 Apr 79	15 Jun 79
79-4	15 Jul 79	16 Jul 79	7 Sep 79

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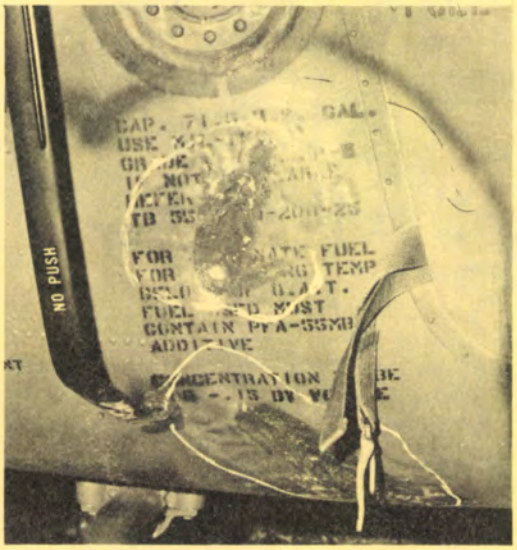
$5,000 seatbelt



Seatbelt was left unfastened and hanging outside aircraft when passenger exited. Aircraft was flown for about 20 minutes with belt banging the fuselage.

Here's what can happen when the pilot's checklist is not followed. Last October, a passenger's seatbelt was left unfastened and hanging outside the aircraft and caused a major accident with damage costs of more than $5,000. Recently, an OH-58A incident resulted from the same cause.

Checklists are written to be followed. The checklist not only eliminates the need for the pilot to memorize normal procedures and their sequence, but also insures no portion will be inadvertently omitted. While most pilots follow checklist procedures through "Engine Starting and Runup," it appears that some tend to ignore the "Before Takeoff" portion. The checklist is a proven tool designed to protect you and your aircraft. To be effective, it must be used properly.

We are interested in ideas on how to Murphy-proof the outboard seatbelt straps so they can't hang outside the aircraft should the pilot fail to check them. If you have any suggestions, please forward them through EIR channels or call Major George G. Reese Jr., AUTOVON 558-4202/4198.■

RV-1D/OV-1D safety-of-flight

■ 172030Z Feb 78, subject: Safety-of-Flight Advisory Message No. OV-1-78-4.

Summary: This message is an update of corrective actions required by safety-of-flight message No. OV-1-78-3. DA and contractor labs are exercising top priority in analyzing and testing suspect ring gears to determine cause of cracking. To date, the cause and corrective actions have not been identified. Investigation has included teardown analysis of engines with suspect gears with cracks. In addition, engine test cell runs are being conducted to further identify the problem. Both interim and long-range fixes are being considered. **Contact:** William Hearst, TSARCOM, AUTOVON 698-6868, commercial 314-268-6868. ■

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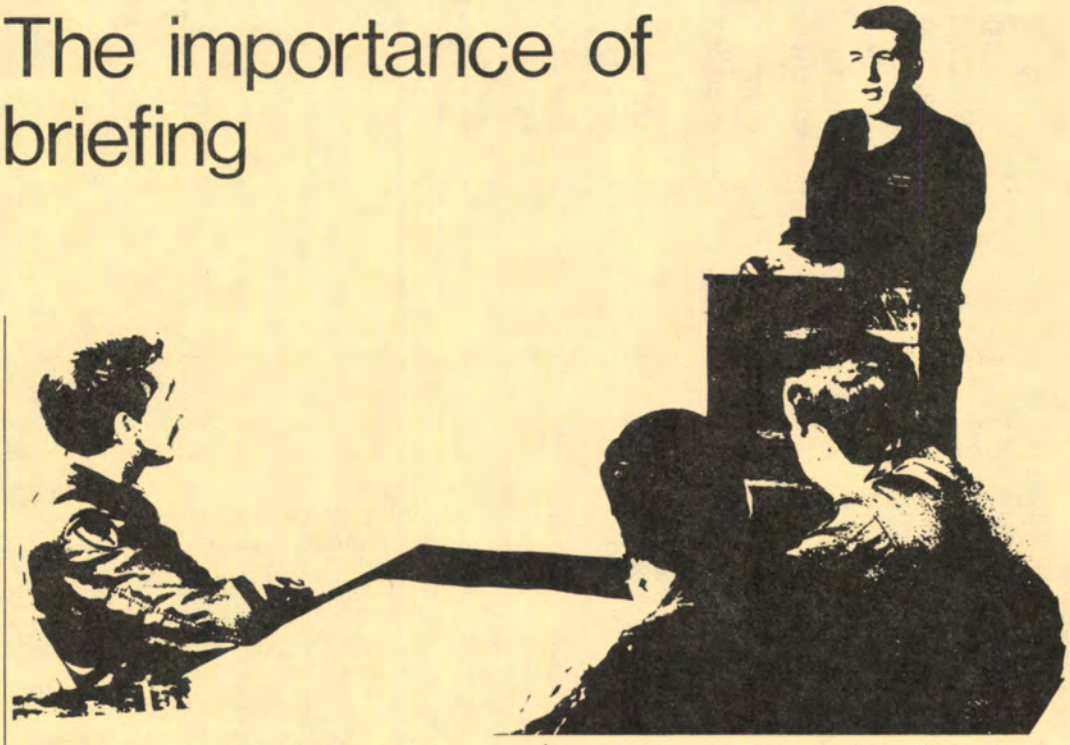
USAAAVS

The importance of briefing



While engaged in a flight involving external weight/rescue hoist training, a UH-1 crashed out of control. There were no injuries but the helicopter was a strike. The Board concluded that the primary cause was the lateral center of gravity limitations of the UH-1 were exceeded during the hookup of an unanticipated load to the rescue hoist.

Upon concluding takeoffs and approaches with an external weight attached, the instructor pilot (IP) allowed the pilot under instruction (PUI) to progress to the rescue portion of the flight. The two crewmembers who were on the ground helping to hook up the external weight basket had been briefed that one of them would be hoisted aboard as the rescuee during the rescue hoist training.

As the PUI flew the helicopter into position for what he thought was to be a simulated rescue, he was directed into a 20-foot hover over the cargo basket by the crew chief. The crew chief then extended the hoist arm to the 90-degree position and lowered the cable. Both crewmembers on the ground were confused because the horse collar, necessary for hoisting personnel, was not attached. Since the one crewman had been briefed that he would be hoisted into the helicopter, he did not know at this point what was expected of him. Looking to the crew chief for direction, he was signaled by hand to hook up the hoist cable to the cargo basket again. When this was completed, the crew chief took up the slack in the cable and cargo sling. (At this point both the IP and PUI believed that they had the crewman in the hoist ready to be brought aboard.)

As the PUI lifted the helicopter slightly and stabilized in a hover with the weight 2 to 3 feet off the ground, the aircraft fell off sharply to the right. Despite taking control of the helicopter at this time, the IP was unable to regain control. The helicopter continued to spiral to the right with the cargo basket digging into the ground and bouncing laterally under the aircraft, to the point of being almost level with the main rotor blades. The helicopter then impacted the ground after 360 degrees of right spiral.

Because the IP originally scheduled was late for the briefing, another IP was

assigned 30 minutes prior to launch time. The late start of the mission resulted in a hurried brief. A standard NATOPS brief was not followed nor did the IP question the PUI on his knowledge of emergency release procedures relating to the hoist and external weight operations. Had he covered these procedures thoroughly, it is likely that the accident would have been prevented.

When the PUI realized the helicopter was out of control, he told the crew chief on ICS to "cut the cable," rather than using the guillotine switch located on the center pedestal. The UH-1 NATOPS Flight Manual directs the IP to cover emergency guillotining of the hoist load with both the PUI and crew chief as part of the briefing. Since this wasn't done, it deprived the PUI of knowledge which could have saved the situation, as he was in a much better position to guillotine the load using the pedestal-mounted switch, rather than have the crew chief do it.

Additionally, the briefing was inadequate in that all persons concerned with the simulated rescue hoist operation were not in agreement concerning the exact procedures which were to be followed. Both pilots and the two crewmen on the ground were briefed that one of the crewmembers would be hoisted by use of the horse collar. Since the crew chief did not have this understanding, the stage was set for the overload on the hoist cable when the basket was lifted unknowingly and on an increased moment arm.

As a Monday morning quarterback, it appears that a thorough briefing conducted routinely and without haste would have afforded two excellent opportunities to prevent the accident from occurring.

- Had the crew chief understood that one of the crewmembers was to be hoisted via the rescue cable, he would have lowered the horse collar. This would have been well within the lateral center of gravity limitations of the helicopter's lifting capability.
- Had the PUI been briefed concerning emergency release procedures during the hoist operation, he possibly could have prevented losing control of the helicopter by guillotining the load using the switch on the center pedestal.

This is one more instance where short-cutting or deviating from NATOPS procedures led to an aircraft accident. The NATOPS program evolved as a way to enhance aviation safety and it works—but only if everyone adheres to the spirit and intent of the program.

From Naval Safety Center WEEKLY SUMMARY

Selected mishap briefs

Rotary wing

UH-1

Incident □ Left cargo door was lost in flight. Crew chief said he put the pin in the door prior to flight.

Precautionary landings □ Master caution and engine fuel pump caution lights came on. Caused by defective pressure switch. □ Hydraulic light came on during takeoff. Hydraulic fluid was contaminated with water. Fluid and filter were replaced. □ Fuel odor was noticed on downwind for landing. Failure of preformed packing caused fuel leak. □ Engine rpm was erratic. Caused by failure of overspeed governor. □ Fire warning light came on. Fire alarm box was replaced. □ Master caution light came on with no segment light illumination. Forty-two-degree gearbox chip detector wire was broken at plug. □ Master caution and transmission pressure lights came on and oil pressure gauge needle dropped to zero. Caused by blown gasket on internal transmission oil filter.

AH-1

Forced landing □ Aircraft yawed right, loud popping sound was heard, and N2 was observed at 7000 rpm, rising rapidly. Autorotative landing was made. Caused by failure of fuel control/overspeed governor.

Precautionary landings □ Pilot noticed binding in pedals during cruise flight. Excessive teflon on tail rotor guide tube caused it to bind against tail rotor control tube. □ No. 1 hydraulic pump cavitated three times and No. 1 hydraulic caution light came on. Pilot landed and noted seep from fitting on pressure line from hydraulic pump and fitting on line to hydraulic lockout valve. Fittings were tightened and reservoir refilled.

CH-47

Incidents □ Upper drag link on right rear landing gear broke during rearward taxi. Gear rotated 90° and collapsed forward into gear well. □ Blade strike occurred during hover in confined area with sling load.

Precautionary landings □ No. 1 engine failed. No. 1 fuel flow divider apparently stuck closed, preventing fuel flow to combustor. □ Pilot landed when weather went below VFR minimums. Weather had been forecast as good. □ After engine start, instrument check revealed zero oil pressure on forward transmission. Caused by failure of oil pressure transducer.

Human factor mishap □ Electrical spark jumped from circuit breaker panel and hit copilot's upper arm, causing numbness and lack of movement. Armature relay contacts failed inside relay, causing hole to burn in relay housing, letting electricity short through relay to circuit breaker panel housing, then to copilot's arm.

OH-58

Accident □ IP took control during hover in LZ. Aircraft started slow right turn and IP could not stop turn with left pedal. Right cyclic was applied to move away from tree line. Nose pitched down and IP applied aft cyclic and lowered collective in an attempt to level aircraft and arrest turn. Turn stopped and collective was lowered further, resulting in hard landing.

Major damage to bottom of fuselage, landing gear, tail boom, tail rotor, and drive train.

Forced landing □ Pilot was on hooded instrument flight under radar control when he felt aircraft start an abrupt descent. Instruments showed that N_1 and N_2 were decreasing and pilot initiated autorotation. Caused by failure of air accumulator double check valve.

Precautionary landings □ Pilot noticed TOT at 900° during straight and level flight. Postlanding inspection revealed bleed air fitting at 10 o'clock position blew out of diffuser. □ Battery overheated and fumes filled aircraft. □ Pilot heard loud humming noise and felt high frequency vibration in antitorque pedals and throughout airframe. Maintenance found No. 2 and No. 3 hanger bearing hot and ice accumulation around oil cooler area.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-8

Precautionary landing □ (F series) Power was reduced to 31 inches of manifold pressure for cruise flight. As propeller control levers were pulled back from 3200 rpm, a 500- to 600-rpm fluctuation developed. Power was further decreased to 25 inches of manifold pressure and airspeed was reduced with no apparent benefit. Postlanding inspection revealed oil consumption of No. 1 engine had rapidly increased since the last intermediate inspection. Compression leakage test showed 100 percent loss of compression on No. 2 cylinder. Teardown analysis revealed damage to top outer edge of piston. Oil ring was frozen in its seat and propeller bulkhead was damaged by being hit by all three propeller blades.

C-12

Incident □ (A series) Yawing motion was felt during touchdown when full aircraft weight rested on undercarriage. Pilot initiated rudder and reversing action without using brakes. Postlanding inspection showed both inboard main tires blown and both outboard tires worn excessively. Snow was on departure runway and slush accumulated in wheels of main landing gear. Freezing temperatures at flight altitude caused brakes to be frozen on touchdown at destination.

U-21

Incidents □ (F series) Crew had trouble with moisture freezing left and right main gear brake assemblies before takeoff. Crew chief sprayed brake assemblies with deice fluid and takeoff was uneventful. Temperature at takeoff was 20° F. in blowing snow. Upon landing, left and right brake assemblies were frozen. Both right main gear tires blew. Left brake assembly broke loose before left tires blew. Aircraft was stopped by reversing engines. □ (A series) Pilot, taxiing from parking ramp to active runway, started right turn onto taxiway too soon and taxied into fire extinguisher, damaging propeller blades and nose gear door assembly.

Precautionary landing □ (A series) Flap motor failed when flaps were raised. Flaps stopped at approach and aircraft returned to airfield and landed. ►

Selected mishap briefs

Human factor mishap □ (H series) Pilot became unable to exhale through oxygen mask during cruise flight at 22,000 feet msl. There was a constant flow of oxygen through the mask even with the regulator turned off. Pilot hooked into rear oxygen regulator and was able to continue mission until pressure dropped to 200 psi. Descent was then started and mission aborted. Caused by flow control valve sticking open in pressure position.

OV-1

Accident □ (C series) Aircraft crashed one-half mile short of runway and was destroyed by impact and fire. Both crewmembers sustained fatal injuries. Accident is under investigation.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Fire warning indicator light came on. Suspect short in heat sensitive wire of fire detection system. Inspection revealed abrupt bend in wire. □ Crew detected fumes and smoke in cockpit and aircraft was landed. Reading on d.c. voltmeter was between .3 and .4. Three days before this mishap, maintenance officer had to start aircraft with APU. Two days later, aircraft could not be started with battery and APU was used for initial start. All other starts that day were by battery. It appears that one cell failed in battery, causing overtemp condition and resulting in failure of the other cells.

OH-58

Precautionary landing □ Pilot felt vertical vibration while picking aircraft up to hover. During climbout after takeoff, vibration increased and at 80 knots pilot decided vibration was abnormal and returned to airfield. Maintenance found swashplate/uniball friction to be too little and reshimmed swashplate.

U-8

Precautionary landing □ (D series) Left main gear light failed to illuminate when gear was extended before practice stall maneuver. Caused by broken ground wire for gear down light microswitch.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 10-16 FEB 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	1	0	31	32
AH-1	0	0	1	3	4
OH-58	1	0	2	9	12
CH-47	0	2	0	8	10
U-8	0	0	0	3	3
C-12	0	1	0	0	1
U-21	0	2	0	1	3
OV-1	1	0	0	1	2
T-42	0	0	0	1	1
Total	2	6	3	57	68

2 Fatalities, 0 Injuries
Estimated costs: $1,143,558

Don't go sit on it

Aircrewmen know better than to step on the "greenhouse" on the Huey or climb up the "little ladder" on the side of the OH-58. They know these items will break and they'll have to answer to someone for damaging an aircraft. So why do some aircrewmen sit on their helmets?

Photo furnished by CW3 Gruhn, ASO, DPT Avn Div, Ft. Benning

This photo shows one of five helmets recently turned in for cracks around the earcups. It is suspected the cracks were caused by someone sitting on the helmet. Once a helmet is cracked through the shell, it can no longer protect the head as it was designed to.

The answer to preventing this kind of helmet damage lies in changing the just-turn-it-in-and-get-a-new-one attitude toward life support equipment. The next time you see someone sitting on his $118 helmet, warn him that he may be causing unseen stress damage that could cause the helmet to fail when he needs it most. ■

Know your seats

Are any aft-facing seats installed aboard your **U-21** or **C-12** aircraft? Better check them right away. First of all, they may be of the "standard" variety which are **not** authorized for installation in an aft-facing configuration as they are not designed to absorb crash loads when facing aft. Second, even if your seats are approved for aft-facing installation, they are **not** to be occupied by any passenger who weighs more than 170 pounds—the maximum load aft-facing seats are designed to absorb in the event of a crash.

So, inspect your seats by checking the placard attached to the aft crosstube located between the seat legs. If an "X" is stamped on the line which reads "FWD or AFT FACING," or if the **seat** part number is 50-535024-1, you're OK (refer to technical advisory message from TSARCOM, 041520Z Feb 78).

But remember, even a seat approved for aft-facing installation has limitations. Passengers who weigh more than 170 pounds should follow the advice given by a lawyer to his client about to be electrocuted: "Don't sit down!" Instead, take another seat—a forward-facing one.

NOTE: **U-8F** users should refer to technical advisory message from TSARCOM, 172100Z Feb 78, for information concerning seats authorized for installation in aft-facing configuration, permissible location of aft-facing seats, occupant weight limitation (170 pounds), and required placard information. ■

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It's that time again

With the coming of winter, it's time to brush up on winter hazards and take steps to avoid or minimize the impact of cold weather operations. Winter operations require special precautions from the planning phase to touchdown. Just about every cold weather aircraft accident not directly caused by mechanical failure or a maintenance error can be laid at the door of a pilot who did a competent **routine** job of flying but who got into trouble because of a special problem he had not anticipated. He had all the skill he needed. Where he lost out was in failing to appreciate the fact that cold weather demands the **extra** ounce of prevention, the **extra** margin in alertness, and foresight.

Flight planning and preflighting in winter weather should always be done with extreme care. Cold weather creates a "hurried atmosphere" with attendant shortcuts that can be fatal. Obtain current detailed weather info and be certain you understand all weather conditions that exist or could occur en route and at destination and plan for an alternate airfield. And it is absolutely essential that survival gear be carried on all flights.

The effects of icing, low ceilings and visibilities, snow on runways and taxiways, and freezing temperatures present hazards to trap the unwary aviator in the icy, and all too often deadly, grip of winter. As the season approaches once again, ASOs and supervisors should take a close look at SOPs and insure that winter precautions are addressed. And all personnel should be made aware of the hazards that may exist in the hangar, on the flight line, and during flight. ■

Attention ASO students

The Aviation Safety Officer Classes for FY 78 have been reduced from 10 weeks to 8 weeks. Therefore, the closing dates for FY 78 are adjusted as follows:

Class	Old Date	New Date
78-1	16 Dec 77	2 Dec 77
78-2	17 Mar 78	3 Mar 78
78-3	2 Jun 78	19 May 78
78-4	15 Sep 78	1 Sep 78

Students should insure unit personnel officer is notified of this change before departure from home station. ■

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USAAAVS

Accident analysis

ANALYSIS 77-3
Type aircraft: U-21A
Time: 1107
Classification: Major (total loss)
Injuries: Multiple fatalities
Estimated cost: $1,008,844 (acft, injuries)
Mission: IFR service support

	Grade	Age	FW Hrs	Tot Flt Hrs
Pilot	CW4	39	3,833	5,472
Copilot	CPT	30	1,564	1,656

The accident

The flight route selected required a minimum en route altitude of 13,000 feet for the second leg of the flight, after crossing the first intersection with a minimum crossing altitude of 12,000 feet.

Following takeoff, radar contact was established with departure control, and after a series of vectors, the pilot was cleared on course and instructed to maintain 10,000 feet as he had requested. Approximately 25 minutes later, the pilot was contacted by the center and told that radar service was terminated. He was then instructed to contact the center on another frequency. This was a transfer of control from the center radar sector to the center nonradar sector. The pilot acknowledged the instructions to change radio frequency, but when he was unable to make contact, he requested an alternate frequency. Another was issued him, but again he could not make contact; so he reestablished communications with the center on the original frequency. The center responded twice, but received no further transmission from the aircraft, which crashed into the side of the mountain approximately 43 minutes after takeoff.

The causes

■ The flight crew did not maintain an awareness of the aircraft's position on the airway in respect to a critical intersection. This resulted in the aircraft being flown through the intersection at an altitude

2,000 feet below the MCA. Although radar service had been provided, the Air Route Traffic Control Center (ARTCC) had shifted to manual control of the flight. The flight crew was apparently unaware of this shift and was relying on ARTCC to advise the flight of altitude changes and position fixing. Last communication with the aircraft was received by the ARTCC 8 minutes and 20 seconds after the controller estimated the arrival of the aircraft at the critical intersection. Copilot was not required to report his position under ARTCC radar control. Relying on ARTCC to advise him of required altitude changes, he failed to fix his position via (1) elapsed time since last position fix, (2) distance measuring equipment, (3) cross check with identifiable VHF omnidirectional range, or (4) request for position fix from ARTCC radar control. As a consequence, the crew did not use all the navigation aids available to them.

The cures

■ Major commands direct:

□ Installation/area standardization boards to insure that all aviators are made fully aware that the pilot in command is ultimately responsible for the safe navigation of an aircraft regardless of the ATC service being provided.

□ Commanders to insure that clearance authorities appointed IAW par. 4-5, AR 95-1, and pilots having their own clearance authority, fully understand the responsibilities attendant to this authority.

□ Installation/area standardization boards to establish procedures for the immediate dissemination of information regarding procedural changes to the Instrument Flight Rules. These boards should also monitor the procurement and distribution of FLIP and other IFR-related publications to insure full access by all aviators.

□ Commanders to use the services of FAA representatives and ATC personnel, when available, in conjunction with the academic and instrument training phases of their CRF programs. Subjects covered should include the Terminal Instrument Procedures (TERPS) and the Air Traffic Controllers Manual as well as Army regulations.

□ Aviation safety officers to include an update and discussion of Instrument Flight Rules as a mandatory agenda item during scheduled safety meetings.

■ Include questions in the Annual Writ which will reinforce the importance of MEAs and MCAs during flight planning and conduct of the flight.

■ Change FM 1-5 to expand information on flight planning, en route procedures, and ATC procedures as pertains to MEAs and MCAs.

■ Depict MCAs on low altitude en route charts in such a manner that their existence is easily recognizable. Suggest a bolder print for MCAs in addition to the flag.

■ Review the low altitude charts to determine if they contain unnecessary data which could be eliminated.

■ All low altitude charts should utilize the large 1'' to 10 NM or 1'' to 12 NM scale. This would simplify interpretation of the charts and reduce cluttering.

(These cures are possible remedies and not necessarily the only appropriate ones.)

Materiel failure/malfunction mishap analysis

77-1
Type aircraft: AH-1G
Classification: Major (total)
Injuries: 2 major
Estimated cost: $510,233 (aircraft, injuries)
Mission: Service

The mishap

During a 25-foot hover check, the pilot initiated a left pedal turn. Ninety degrees into the turn, the rate of turn increased violently and the pilot applied full right pedal with no response. The aircraft continued to turn left, descended, and crashed.

The causes

■ Tail rotor silent chain, P/N 205-001-748-1, failed. CCAD report indicates that a pin in one set of links apparently came out of the chain, causing it to jam and eventually break. This type chain has an extensive history of malfunctions and it is difficult to detect inadequacies in it during preflight or maintenance.

■ Maintenance inspection was inadequate. Maintenance personnel were not familiar with correct inspection procedures that require use of a 10X magnifier, P/N 205-001-748-1, for the silent chain. TWX messages and up-to-date PMS cards were not available at the on-site maintenance facility.

The cures

■ Incorporate the improved tail rotor pitch change mechanism into an MWO program for the AH-1G. The AH-1S pitch change mechanism eliminates this problem.

■ A program to modify the AH-1G and Q models to S configuration is on-going.

■ Improve supervision of maintenance activities to insure that remote facilities receive publications and equipment to conduct required maintenance inspections.

(These cures are possible remedies and not necessarily the only appropriate ones.)

Selected mishap briefs

Rotary wing

UH-1

Accident □ Aircraft struck two cables strung across a river 50 feet above the ground. Ninety-degree gearbox separated from aircraft. Aircraft landed and main rotor struck tail boom. Main rotor and transmission separated.

Incident □ Aircraft on training flight landed on stump in unimproved landing area, puncturing hole in underside of fuel cell.

Forced landings □ While taxiing for takeoff, pilot heard loud bang, followed by squeal. Aircraft yawed right and pilot autorotated. Power turbine wheels were frozen and showed signs of damage. □ Loud grinding noise was heard on takeoff, followed by slight yaw and decrease in rotor and engine rpm. Pilot entered autorotation and landed. Clip retainer broke, causing severe angle on forward coupling of main drive shaft. Coupling teeth completely sheared off, causing power loss.

Precautionary landings □ Hydraulic warning light came on, followed by complete hydraulic failure. Caused by pin-hole leak in hose assembly. □ On final approach, pilot smelled odor and saw mist coming from battery vent. Caused by internal failure of battery. □ Pilot picked up to hover and noticed unusual feeling in pedals. Caused by broken link in silent chain. □ No. 1 hydraulic segment light came on. Caused by faulty pressure switch.

AH-1

Incident □ During engine start at night, main rotor was displaced perpendicular to fuselage and starter was engaged. Before reaching engine idle throttle position, several loud "pops" were heard and engine was shut down and inspected. Holes were found in both tail rotor blades.

Forced landing □ Entering low-level autorotation, IP noticed rotor rpm was decreasing with engine rpm. Suspect sprag clutch failure.

Precautionary landings □ Transmission oil bypass light came on, oil temperature indicated 101° C., oil pressure was 55 psi, and OAT was 29° C. Caused by transmission oil bypass valve failure. □ SCAS hardover on all three channels occurred during cruise flight. System was punched off, airspeed reduced to below 100 knots, and aircraft landed. Caused by failure of sensor amplifier unit. □ Forward fuel boost pump light came on at 4,200 feet and went out at 4,000 feet. It came on again at 2,700 feet and went out at 2,000 feet. Caused by failure of pressure switch. □ Master caution light came on, followed by No. 1 hydraulic segment light and stiffness in controls. Pilot initiated hydraulic failure emergency procedures and landed. Caused by failure of hydraulic line quick disconnect. Locking tines were worn sufficiently to allow hydraulic quick disconnect coupling to back off from fitting receptacle.

TH-1

Incident □ Damage to white main rotor blade was found during postflight inspection. Aircraft had been on NOE training flight.

Forced landing □ Engine and rotor rpm increased. Pilot executed emergency procedure for high side governor failure. Power could not be regained in emergency governor position and pilot reduced throttle

Selected mishap briefs

to flight idle and autorotated to dry riverbed. Suspect fuel control/emergency governor failure.

Precautionary landings □ During simulated forced landing, engine oil pressure fluctuated 40 to 85 psi. Caused by failure of relief valve. □ Tail rotor pedals jumped and No. 1 hydraulic system caution light came on. Postflight inspection revealed tail rotor SCAS actuator, hydraulic servo flow control and wire bundle were burned. Pressure line to actuator was leaking. Servo had chafed through insulation and shorted wire bundle.

CH-47

Incident □ During night landing at tactical LZ, aircraft landed on artillery piece it was going to load internally. Three holes were torn in skin at station 480 and main former was torn in two places. Artillery crew did not leave enough room between gun and light used for landing.

Precautionary landings □ No. 1 engine oil pressure dropped to 25 psi at 95% N1. Engine condition lever was placed in ground and pressure dropped to 18 psi. Engine was shut down and single-engine landing was made. Caused by engine failure. □ Internal failure of combining transmission caused chip detector light to illuminate.

CH-54

Incident □ Aircraft was landing on 4° right slope with 3° downslope. On landing, aircraft started to roll forward. Copilot applied aft cyclic and touched brakes. Main rotor blade flexed down and struck tail rotor drive shaft.

OH-6

Incidents □ Aircraft landed for passenger pickup, and after passenger was secured, pilot handed him a headset. Passenger then tossed hearing protector that he had brought with him back to individual who came with him. Hearing protector struck and damaged two main rotor blades. □ Main rotor blades flexed down after touchdown autorotation and struck antenna mount on top of intake cowling.

OH-58

Accident □ Aircraft struck power lines during cruise flight. One fatality, one major injury, and two minor injuries.

Precautionary landing □ Aircraft was in climb when pilot felt severe high frequency vibration and heard grinding noise from aft of pilot's station. Postlanding inspection revealed threads on tail rotor trunnion stud and nut were worn, causing nut to slip.

TH-55

Forced landing □ Engine quit at power reduction for simulated forced landing. Inspection revealed malfunction of fuel injector and dash pot was not properly adjusted.

Precautionary landing □ Electrical failure occurred during hovering flight. Caused by failure of alternator.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

U-3

Precautionary landing □ All electrically

powered equipment failed during night training flight. Landing gear was lowered manually and aircraft landed. Left engine starter relay failed, causing starter to motor continuously and drain all power from aircraft.

U-21

Forced landing □ (A series) Smoke in cockpit/cabin area was caused by malfunction in combustion head assembly of heater. Interior of combustion head had excessive amount of carbon buildup which caused intensity of heater igniter to be reduced and excessive amount of fuel to accumulate. When sufficient source of ignition was available, proper fuel/air mixture was not correct for a continuous burning action and minor explosion resulted. Explosion extinguished fire and heater blower motor blew vapors into cockpit/cabin area.

U-8

Precautionary landing □ (D series) No. 1 engine rpm started decreasing during climb and stabilized at 1000. Oil pressure dropped from 50 psi to 30 psi. Prop was feathered and engine secured. Chip detector light flashed once before feather and came on steady after feather. Metal was found in oil filter.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

UH-1

Precautionary landings □ Illumination of fire detector light was caused by short in wire leading to light. □ Transmission oil pressure fluctuated and then dropped below 25 psi. Transmission lines were installed 104 hours before failure. Line was clamped to bracket on tail rotor output quill, causing line to chafe at bottom of clamp on another oil line at back of hell hole. □ Crew detected fumes in cockpit, transmission oil pressure dropped to 15 psi, and segment and master caution lights came on. During final approach, oil pressure dropped to 5-7 psi. Loop clamp was improperly installed and hose assembly rubbed against elbow. Hole caused by rubbing allowed transmission oil to be pumped out of transmission. □ Fire warning light came on. Fire detector element on right side was chafing on oil line to Nos. 3 and 4 bearing strainer and was not seen during daily inspection.

CH-47

Precautionary landing □ Crew engineer noticed drive shaft mount bolts rotating on No. 9 drive shaft. Caused by undertorque of bolt.

OH-58

Precautionary landing □ Aircraft, landing on slope at field site, was settling right side low and tail low on touchdown at excessive rate. Left forward cyclic and collective could not compensate and aircraft continued to settle. On contact with the ground, spike knock occurred for about 2 seconds. Transmission isolation mount was improperly torqued during installation.

U-21

Precautionary landing □ (A series) Improperly seated left wing cap caused fuel to leak out of cap.

For more information on maintenance mishaps, call AUTOVON 558-3913/3901.

Sex and the EIR

One thing about the EIR program—it can never be accused of being discriminatory. Anyone, male or female, is urged to submit an EIR any time there is a need for one. The trouble is that when we identify a problem, we are often reluctant to notify the agency that can correct it.

This may be due to some thoughts about EIRs. For example, EIRs are only acted on by the pound. Right? Wrong. A single EIR doesn't carry enough weight to do any good. Right? Wrong again! EIRs seldom get to the right people. Right? Sorry—wrong again! Granted some EIRs may take the round-about scenic trip getting to their destination but they eventually get there.

USAAAVS receives numerous calls regarding deficiencies in a variety of items. The person calling usually asks for assistance in correcting the deficiency. When we contact the appropriate agency regarding the deficiency it is not unusual to be told that they are not aware a problem exists. No EIRs have been submitted. It stands to reason that if a deficiency in equipment is not known, a solution cannot be obtained.

You, the user, are well qualified to identify deficiencies in equipment. The problem is selling you on the importance of taking the time (and interest) to submit an EIR. Don't wait for someone else to do it for you. Quite often the very reason you have to live with a problem so long is that no one bothers to submit an EIR.

There is an injustice regarding the effectiveness of the EIR. It is a valuable tool in getting a deficiency corrected or a whole new item. For example, the EIR played an important part in producing the UTTAS, the SPH-4 helmet with improved ear cup seals and retention system, Nomex uniforms, the crashworthy fuel system, and replacement of nonstandard UH-1 pilot/copilot seats. These are only a few of the fixes brought about by the EIR. A deficiency existed and someone cared enough to do something about it. It works! Problems just don't go away by themselves.

If you know of a deficiency send in an EIR. Accident prevention is the name of the game. Help us help you—send an information copy of the EIR to Commander, U.S. Army Agency for Aviation Safety, Fort Rucker, Alabama 36362. ■

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There are procedures which leave little or no excuse for

Running out of gas

Pilot of this U-8 missed his fuel computation by 40 minutes.

One of the most prominent and least forgiving problems in Army aviation today is fuel exhaustion. A breakdown of 22 fuel exhaustion cases shows 4 major and 1 minor accident, 1 incident, 2 precautionary landings, and 14 forced landings. Fortunately, those involved in the 14 forced landings and 2 precautionary landings just happened to be over suitable terrain when they ran out of gas. The difference between a major accident and a forced landing in cases of running out of gas is a fine line. Depending on the phase of flight you're in and the terrain you're over when your fuel is gone, a few seconds can make the difference.

The following briefs are typical:

■ An OH-58 pilot figured he would have 15 minutes fuel reserve upon arrival at his destination. He knew that AR 95-1 required him to have a 30-minute fuel reserve for VFR flight. Further, he relied primarily on his fuel gauge, the least reliable fuel indicator. The pilot was within 5 minutes of an Army airfield when his low fuel warning light came on, but he decided to continue to his destination approximately 15 minutes away. Minutes later, the engine failed and the pilot was forced to land.

■ Investigation of an engine that quit during autorotation revealed fuel exhaustion as the cause. The instructor pilot knowingly took off with an inoperative fuel gauge and with less than a full load of fuel. He was in such a hurry that he did not have the fuel gauge repaired or the tank topped off.

■ A chopper engine quit due to fuel exhaustion while the aircraft was being hovered for parking at a cross-country destination. Thirteen minutes later another helicopter had engine failure while hovering into the same parking area. Failure was again caused by fuel exhaustion. Fourteen minutes later a third helicopter was entering the same parking area and ran out of fuel while still at a hover.

All three aircraft were from the same home base. And it is conceivable that all three could have ended up in the same trees or same swamp.

■ An OH-6 engine failed after 45 minutes of flight and the pilot made a successful forced landing. The low fuel ►

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USAAAVS

Running out of gas

Pilot's faulty estimate of fuel required led to major accident as result of hard landing causing structural damage.

warning light did not illuminate. Aircraft records indicated the fuel quantity gauge was inaccurate. The 2408-13 showed that the tanks contained 52 gallons, and a visual check during preflight verified fuel in the filler neck.

A line mechanic, unfamiliar with the OH-6 crashworthy fuel system, attempted to fuel the aircraft without pulling and locking the antispill valve installed in the filler neck. When the aircraft wouldn't accept fuel, the lineman thought it was full. The 2408-13 showed that the tanks were full and no fuel had been added. The aircraft had no fuel leaks and all systems operated normally. The engine-driven fuel pump was changed in the field but the old pump was found to be operating normally on the test bench. The aircraft was fueled with JP4 IAW proper procedures and operated normally for 2 hours and 45 minutes.

■ The crew departed home base in a UH-1H and arrived at their destination the next day. After resting for two days, they prepared to ferry a UH-1H back home.

The pilot filed an IFR flight plan and received his weather briefing. He determined his true airspeed to be 84 knots, total distance to facility serving the destination as 129 nautical miles, and estimated time en route as 1 hour and 30 minutes. His weather briefing listed the winds at his selected altitude as 250 degrees at 25 knots. An alternate airfield was required, based on forecast destination weather, but he did not file for an alternate.

The aircraft log book had a circle red X condition for an unreliable fuel gauge, restricting this aircraft to 2 hours flight. Based on the pilot's experience as a maintenance officer and his observations during the 30-minute test flight, he listed 2 hours and 30 minutes of fuel on board the aircraft.

The crew topped off their fuel tank with 52 gallons of JP4. They departed the airfield at 1534, after 10 to 15 minutes ground runup and hovering for departure. Their entire flight was conducted under IFR conditions soon after departure.

After departing they were dropped from radar and advised to contact destination at intersection A. The pilot reported intersection A to destination tower who directed them to hold at intersection B at 1736 (2 hours and 2 minutes after takeoff). Sometime shortly before or just after they reached intersection B, the winds increased to about 40 knots. The crew never became aware of this problem. They through they were having a VOR problem because they did not receive station passage indication in the proper time frame based on their estimated ground speed of 60 knots. They never physically made a ground speed check. The destination controller at that point computed their ground speed at 36 to 37 knots but didn't question the crew because he knew very little about helicopters and thought it might be normal.

At 1750 (2 hours and 16 minutes after takeoff) the aircraft was cleared to destination VOR and was instructed to hold there. Shortly after entering holding, the low fuel warning light came on. The crew did not believe the warning light with the fuel gauge indicating 470 pounds of fuel, even though the unreliable fuel gauge had been written up. The crew did not report this condition to the tower. The pilot reported departing intersection B at 1756

(2 hours and 22 minutes after takeoff) and asked the tower how long he would have to hold. They told him it would be only a few minutes.

At 1810 (2 hours and 36 minutes after takeoff) the pilot told the tower that he only had 20 minutes of fuel left on board and requested a DF steer to the airfield. The tower advised them of the terrain elevation in their area and gave them a DF steer to the airfield, a direction of 320 degrees. The pilot received permission to descend and find a place to set the aircraft down. At terrain altitude (1,400 feet indicated) the aircraft was still IFR but the crew could occasionally see treetops directly below. Ten minutes later (2 hours and 46 minutes after takeoff) the engine quit and the pilot zeroed his airspeed and cushioned the aircraft into the treetops.

The crew disregarded a circle red X condition for an unreliable fuel gauge which restricted the aircraft, which had a crashworthy fuel system, to 2 hours flight duration. The pilot figured his reserve of 45 minutes as part of the 2 hours and 30 minutes fuel when in fact his reserve should have been part of 2 hours fuel. This would have restricted his flight to 1 hour and 15 minutes which had to include flying time and approach to an alternate airfield. Based on this, the flight should not have left the airfield. **Note:** Inasmuch as there is nothing officially published concerning flight restriction with an inoperable fuel quantity indicator, it is the accepted practice and policy for USAAVNC to place its UH-1Hs under a circle red X with the following flight restrictions: For a UH-1H with a noncrashworthy fuel system installed, the maximum allowable flight time will not exceed 2+00, and for UH-1H aircraft with crashworthy fuel systems installed, the maximum allowable flight time authorized is 1+45.

With only minor alteration of the circumstances in each of these cases, all could have ended in disaster. Reliance on faulty fuel gauges and improper fuel management, preflight, planning, and refueling procedures are the factors most often found in fuel exhaustion cases.

Do you know the fuel capacities and consumption rate with varied power settings for the aircraft you fly? Do you always check your fuel before each flight and carry an adequate fuel reserve? Do you constantly monitor your fuel consumption by elapsed time or do you rely on the fuel gauges?

Following are a few simple recommendations which can effectively prevent fuel exhaustion mishaps.

■ Ensure that both flight and maintenance crews are thoroughly familiar with the fuel system aboard their aircraft, and provide any training deemed necessary.

■ Ensure that the fuel quantity and warning systems are properly maintained.

■ Perform thorough flight planning. Compute fuel needed, including reserve, and ensure an adequate amount is on board.

■ Properly manage fuel and perform cross checks during flight.

■ Always take the safest course of action. If the gauge indicates ample fuel but the warning light illuminates, assume the warning light to be correct. Similarly, if the gauge shows a low fuel state while calculations indicate ample fuel, assume the gauge to be correct. Avoid taking unnecessary risks. When in doubt, make a precautionary landing. ■

Accident analysis

ANALYSIS 77-17
Type aircraft: UH-1B
Time: 0945
Classification: Major (substantial)
Injuries: None
Estimated cost: $82,000 (aircraft)
Mission: Annual gunnery training

	Grade	Age	RW Hrs	Tot Flt Hrs
IP	CW2	Unk	3,067	3,077
Pilot	CPT	Unk	1,933	1,979

The accident

Four UH-1Bs left the airfield and flew low level in trail formation to the range. Upon arrival, they made one sweep downrange to show the students the range boundaries and targets. The aircraft then made a left turn to land at the landing line. No. 1 aircraft landed at its appropriate spot on the landing line, which was on sloping terrain. No. 2 aircraft approached to the left of No. 1, but could not land at its designated spot because of a wooden pallet and stake which were directly behind the tire used as a parking marker. Pilot of No. 2 aircraft then moved slightly to the left and rear, looking for a place to land. No. 3 aircraft approached to the rear and left of No. 2 and started to hover forward to park. When the pilot attempted to land

on the slope, the tail of the aircraft went too low, so the pilot increased collective to level the aircraft. As the aircraft returned to a hover, it began pitching and rolling. The IP, thinking this instability was due to dynamic rollover, rapidly lowered collective. The aircraft landed hard, resulting in mast bumping.

The causes

■ IP misinterpreted aircraft performance during the slope landing. He became concerned about the close proximity of the other aircraft in the flight and when the aircraft became unstable, he misinterpreted the situation during a moment of panic.

■ IP misinterpreted aircraft performance because of inadequate unit training. He had not performed IP duties for the past year and was not given a flight examination before being assigned IP duties, as required by paragraph 1-12, AR 95-63. This lack of currency caused the IP to be apprehensive about his duties, which possibly

caused him to overreact to the situation.

■ The flight leader inadequately planned the flight due to excessive self-motivation. He was overly mission-oriented and tended to rush to accomplish a task. He reconnoitered the area and operated four aircraft in an area designated for use by three aircraft. The loading zone pads did not conform to minimum clearance requirements and the touchdown points were rough and sloping.

■ The flight leader inadequately planned the flight because of inadequate supervision by the unit commander. The unit commander previously accompanied the flight leader on the recon mission of the loading area and felt the area was marginal, but did not discuss this with the flight leader.

The cures

■ Insure personnel are ready and capable of performing assignments of increased responsibility, i.e., IP or PIC. This task can best be performed by the unit IP/SIP on an evaluation flight. The aviator could then be placed in a controlled stress-producing situation and his reactions evaluated. This evaluation requirement should also be contained in the Utility Helicopter ATM.

■ Improve monitoring of personnel and unit training to insure compliance with paragraphs 1-12 and 1-14, AR 95-63. Higher commands should implement this monitoring through frequent inspection visits by their standardization boards. Also, a directive should be issued to subordinate commands establishing this policy.

■ Improve monitoring of personnel and unit training, particularly during field exercises. Unit commanders should insure that excessively self-motivated individuals comply with regulations and SOPs. To implement this remedy, the Aviation Commander's Readiness Course (COI 2G-F15) should include instruction on how to detect excessively motivated personnel and constructively channel their energies.

■ Improve monitoring of unit commanders. Higher commanders should insure that subordinates adequately supervise mission planning in accordance with SOPs. This improved supervision could best be accomplished by frequent visits to subordinate units, especially during field exercises. Also, a directive establishing this policy should be issued to subordinate commands.

TOTAL MISHAPS FOR 17-23 FEB 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	2	0	10	12
AH-1	0	0	0	1	1
OH-58	0	1	1	6	8
U-8	0	0	0	1	1
Total	0	3	1	18	22

0 Fatalities, 0 Injuries
Estimated costs: $6,551

Selected mishap briefs

Rotary wing

UH-1

Incidents □ Left cargo door came off in flight. Pin was in place at takeoff. Suspect ground troop snagged pin chain with field gear and pulled it loose. □ Chalk 1 in flight of 3 was making approach to panel marker in LZ. Area was too short for entire flight, so Chalk 1 landed long. Panel marker was pulled into rotor system, causing strike on main rotor blade.

Precautionary landings □ Hydraulic pressure and master caution lights came on. Caused by failure of master caution control box. □ Tail rotor chip detector light came on. Caused by lack of lubrication in 90° gearbox. Filler cap came off in flight. □ Compressor stall occurred during landing. □ Right fuel boost pump light came on. Pump was replaced. □ Battery relay shorted out in flight.

AH-1

Precautionary landing □ Pilot noticed binding in antitorque pedals during low-level flight. Caused by worn bearing in tail rotor silent chain assembly.

OH-58

Incident □ Aircraft hit wires during takeoff from hover. Antenna tip was broken and right side of nose section was creased.

Forced landing □ N1 dropped to 60% and N2 dropped to 90% during letdown on final approach. Power-off landing was made to small ice-covered lake. Shuttle valve inside double check valve froze shut. Pneumatic flow through accumulator was stopped, affecting amount of fuel metered by fuel control.

Precautionary landings □ Pilot had to circumnavigate snowshowers, causing him to use more fuel than planned. Ten minutes from destination, 20-minute fuel warning light came on and aircraft was landed. □ D.C. generator light came on. Caused by failure of starter/generator. □ Partial power loss and high frequency vibration occurred and aircraft yawed to left. Pilot lowered collective to enter autorotation and power was restored. Postlanding inspection revealed compressor section of engine was dirty.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-8

Precautionary landing □ (F series) Right main landing gear indicated unsafe during training flight. Flyby was made and gear appeared down and locked. Pilot bounced gear on runway, took off again, and returned for safe landing. Caused by failure of landing gear actuator.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

The voltage "control"

Everyone who flys knows there is a voltage regulator in the aircraft electrical system which is intended to regulate the output of the generator or alternator, as the case may be. This device is intended to allow an output which keeps the aircraft battery fully charged, and prevents it from being overcharged. At times in aircraft, we use, for short periods, very large quantities of electricity such as in starting the engine or when activating the electrically operated flaps or landing gear. The voltage regulator during such periods controls the alternator or generator so that it does not burn itself out attempting to meet these peak loads. After the peak load has been met by using or drawing some electricity from the battery in addition to the limited generator or alternator output, the regulator then causes the alternator or generator to recharge the battery. The charging is slowed to a trickle when the battery is brought up to full charge.

In all of this it can be seen that the voltage regulator will only function properly when it is connected to a battery. The battery in the electrical system serves as a reference to the voltage regulator. In a sense, therefore, the battery is the voltage "controller" in the aircraft electrical system.

In the case where the system uses a generator, the generator will run wild burning itself out if the battery becomes disconnected or runs out of water. In the case of an alternator system, no current will be produced if the battery becomes disconnected or runs dry.

Therefore we would make certain points with airmen.

Always turn all radio equipment off prior to starting your engine. Failure to do so means that when the starter is engaged, the voltage in the electrical system drops considerably below the normal because the generator or alternator is not yet operating. This low voltage condition can damage some types of radio gear. Also, the needless use of electricity in the radio gear during engine starts means there is less current available for starting which can add to your difficulties in cold weather. As soon as the engine starts and the generator or alternator is operating, voltage regulation exists and properly regulated current is available for operation of all electrical gear.

It is very important that all electrical contacts between the battery, the voltage regulator, and the alternator or generator be kept clean and secure. Dirty or loose connections can produce the same effects as if there were no battery in the aircraft, which in turn can cause a total lack of alternator output to an excessive generator output which burns out radio gear, lights, and electrically operated instrumentation.

Also, one should not continue to try to use an aged battery which no longer functions properly. One must frequently check the battery water level, perhaps as often as once a week in hot weather. If the battery is worn out or if it is allowed to run out of water the results can be a lack of alternator output or an excessive generator output. The battery is the reference the voltage regulator uses to keep the entire electrical system in balance. If the battery is not functioning properly, the voltage regulator probably will not function properly.

The battery is therefore the real "heart" of the electrical system in your aircraft. Maintain it well and treat it properly. ■

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Nine receive Broken Wing Award

Nine aviators received the Army Aviation Broken Wing Award from September through December 1977.

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 Change 5 to AR 385-10.

Broken Wing Award recipients

CW2 John P. Airington
62d Avn Co, 11th Avn Bn, APO NY

PA Willi Goergen
EURO-NATO Class 77-7
USAAVNC, Fort Rucker

CW2 Edward L. Helquist
Dugway Proving Ground

CW2 Alberto L. Moros
Troop C, 1st Sqdn, 17th Cav
Fort Bragg

CW3 Charles J. Nelsen
55th Avn Co, APO SF

CPT Eric S. Sawyer
Avn Support Facility, RI National Guard

CW2 Edward J. Sloan
Avn Support Facility, MO National Guard

CPT Jimmy A. Watt
704th MID, APO SF

CW3 Eric H. Young
A Co, 3d Avn Bn, 3d Inf Div, APO NY

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F/L and P/L data needed... you can help

USAAAVS is collecting data from selected units for a 180-day period to determine the cost of forced and precautionary landings (F/L and P/L) as part of an overall effort to improve operational readiness. Data collected will be used to justify improvements in the components that fail or malfunction. These mishaps rarely if ever involve injury to personnel or damage to the aircraft. Additionally, the components that cause these mishaps are usually low-cost items.

USAAAVS has prepared a simple, one-page, self-explanatory report form to be used to report data elements that are capable of being costed. These report forms were submitted the latter part of February to 14 units selected for participation by FORSCOM. However, participation from other units would be greatly welcomed. It is important that all precautionary landings occurring during this period be reported including those which are now exempt, that is, those due to "normal" fuzz found on chip detectors in which the plug was cleaned and reinstalled. However, this report does not void the requirement to submit a PRAM under the provisions of AR 385-40.

If your unit is also interested in taking part in this project, call USAAAVS, AUTOVON 558-4510/4812, or write USAAAVS, Directorate for Technical Research and Applications, ATTN: Mr. Emil Spezia, Fort Rucker, AL 36362. ■

Yours for the asking

A book of safety talks designed to provide safety meeting material for ASOs is now available. The book contains 52 lesson plans written by students attending the USAAAVS Aviation Safety Officer Course. The lesson plans can be enlarged, condensed, or combined to fit your needs for safety meeting material. Subjects covered include hot refueling operations, inadvertent IMC, midair collisions, NOE hazards and emergency procedures, slingload procedures, and many others. To get your copy, write Commander, USAAAVS, ATTN: IGAR-PG, Fort Rucker, AL 36362, or call AUTOVON 558-4479, commercial 205-255-4479. ■

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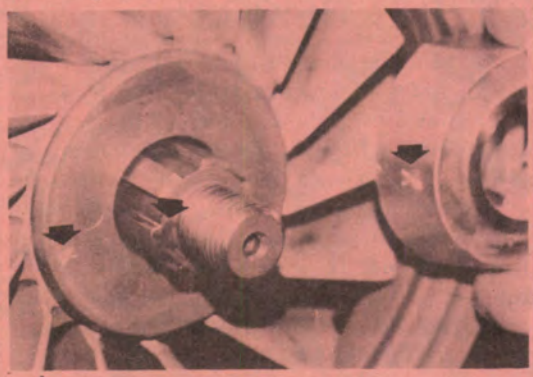
USAAAVS

Align those Xs on U-8 supercharger components

Ever wonder what might happen if the U-8 supercharger impeller assembly is not properly balanced? Then take a look at photo No. 1 and wonder no more!

1. Damage shown resulted from out-of-balance condition caused by misaligned supercharger components.

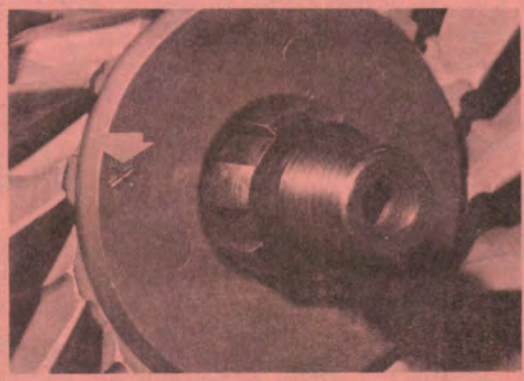
To insure this gear-driven supercharger assembly is properly balanced, the X on the impeller and the X on the spacer must both align with the X on the drive shaft spline (photo No. 2).



2. Xs on impeller, shaft spline, and spacer must be aligned during assembly to insure proper balance.

Misalignment of these reference marks has been noted on several failed engines which had supercharger drive shaft seals replaced. To prevent additional failures from this cause, the procedures outlined in TM 55-1510-201-35, paragraph 5-47, must be rigidly followed when replacing supercharger drive shaft seals. On completion of the TM procedure in accordance with paragraph 5-47-E (3), be sure to verify axial freedom of the supercharger drive shaft gear. Absence of axial freedom indicates the shaft spacer is improperly positioned.

In addition, U-8 maintenance records should be checked, and in those instances where these records **clearly** indicate the supercharger drive shaft seal has been **field** replaced, an inspection should be made to verify correct alignment of the supercharger components. (Refer to technical advisory message 121600Z Jan 78 from TSARCOM.)



3. Markings on some supercharger drive shafts may have worn off or inadvertently been omitted, making it impossible to visually identify spline to be used for component alignment.

Now comes the problem. What if no X can be noted opposite any shaft spline (photo No. 3)? How can we know for

certain the supercharger components are properly aligned? In such instances, contact Mr. Robert Fetch, AUTOVON 698-6868, commercial 314-268-6868, for specific guidance as well as for any additional information you may need.

4. X indented on shaft end during overhaul will eliminate spline identification problem in future.

To prevent recurrence of this problem, U-8 supercharger shafts will be indented with an X on the shaft end at the proper spline position (photo No. 4). ■

Copy change

Page 2 of the 22 Feb 1978 FLIGHTFAX carried an article on mandatory addressees for PRAMs. Change paragraphs b, f, and g of your copy to read:

Paragraph b. DA WASH DC//DACS-ZA//DAMO-RQ//DAMA-WSA//DAIG-SD//DALO-AV//

Paragraph f. CDR BMDSCOM HUNTSVILLE AL (for Kwajalein Missile Range mishaps only)

Paragraph g. NGOAC, NGB-AVN-S Aberdeen Proving Ground, MD (for U.S. Army National Guard) (When ARNG aircraft are involved, info copies will be sent to CDR TRADOC, CDR FORSCOM, and appropriate commanders of CONUSA numbered armies.) ■

More on AN/PRC-90 radios

TM 11-5820-800-12 states that failed AN/PRC-90 survival radios should be sent to the Lexington Army Depot, Lexington, KY. This depot is no longer active. Failed radios should now be sent to Commander, Sacramento Army Depot, ATTN: Transportation Officer, Sacramento, CA 95801. The shipping container should be marked "Condition F." The radios will be repaired and put back into service. Replacement radios should be requisitioned from Commander, CERCOM B-16, Fort Monmouth, NJ 07703. ■

TOTAL MISHAPS FOR 24 FEB-2 MAR 78

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	0	0	27	28
AH-1	0	0	0	5	5
CH-47	0	1	0	1	2
CH-54	0	0	0	1	1
OH-6	0	0	0	1	1
OH-58	0	1	0	6	7
TH-55	0	1	0	1	2
T-28	0	0	0	1	1
T-42	0	0	0	1	1
U-8	0	0	0	2	2
U-21	0	0	0	5	5
OV-1	0	0	0	1	1
Total	1	3	0	52	56

0 Fatalities, 1 Injury
Estimated costs: $107,058

Selected mishap briefs

Rotary wing

UH-1

Accident □ Lead aircraft in flight of five hit trees during approach to LZ and came to rest right side up. Both main rotor blades were damaged, skids destroyed, and right chin bubble and left greenhouse broken. Pilot sustained minor back injury.

Precautionary landings □ Loud bang was heard during cruise flight, with no yaw or instrument fluctuation. Postlanding inspection revealed FOD to all stages of compressor and top and bottom halves of stator vanes. □ Rpm dropped to 6500. Efforts to restore operating rpm were unsuccessful. Rpm continued to drop to 6050 and running landing was made. Inspection of linear actuator revealed that a small connecting pin had worked its way out of the forward end of the linear actuator, disengaging the electric motor from the shaft. □ Binding in cyclic control was caused by failure of right cyclic servo. □ Excessive vibrations were noted in flight. Collective sleeve lever trunnion bearing was replaced. □ Rotor tachometer failed on takeoff. Caused by failure of tachometer generator. □ Transmission low oil pressure annunciator light came on. Caused by defective internal transmission oil filter gasket. □ Aircraft flew into unforecast icing conditions. Pilot had to land to clear windshield of ice accumulation. □ Master caution and transmission oil pressure segment lights came on and transmission oil pressure dropped to zero. Internal transmission oil filter gasket failed.

AH-1

Precautionary landing □ Pilot heard loud humming noise while landing. Caused by failure of oil cooler fan bearings.

CH-47

Incident □ As aircraft was being ground taxied for shutdown and refueling, aft rotor blades hit telephone pole.

Precautionary landing □ Aircraft entered IMC and pilot followed inadvertent IFR procedures. Actual weather was much worse than forecast.

CH-54

Precautionary landing □ As No. 1 engine was being shut down, N1 dropped to 15%. Pilot motored starter to extinguish fire in engine. Engine temperature climbed to peak at 700, then cooled. Metal particles were found in exhaust stack. Engine seized after shutdown. Caused by internal failure of engine.

OH-6

Precautionary landing □ Engine oil low bypass light came on. Oil pressure and temperature were within normal limits. Suspect failure of seal assembly which caused oil to be burned in engine. Aircraft landed with about one quart of oil.

OH-58

Incident □ Aircraft on NOE mission/demonstration struck tree, damaging rotor blades.

Precautionary landings □ D.C. ammeter fluctuated approximately 10 amps, there was a static sound, and instrument lights varied in intensity. D.C. caution light illuminated twice during landing. Caused by worn starter generator brushes.

□ Ceiling and visibility deteriorated and pilot landed in field because of moisture on windscreen. □ Engine oil bypass light came on. Inspection revealed engine oil tank filler cap chain was lodged between filler cap locking handle and filler cap, resulting in improper seal between filler cap and engine oil tank and causing loss of engine oil. □ Master caution panel and engine chip detector light came on. Caused by failure of fault annunciator panel.

TH-55

Incident □ During coast down at low rotor rpm, main rotor blade struck tail boom tube. Aircraft was parked and shut down without following procedures outlined in flight training guide.

Precautionary landing □ Main rotor tachometer needle dropped to zero during hover. Caused by broken rotor tachometer cable.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Amendment to OH-6/OH-58 safety-of-flight message

■ 021935Z Mar 78, subject: OH-6A-78-2/OH-58A-78-2 Amendment to Message 10 Feb 78 Safety-of-Flight Message OH-6A-78-1/OH-58A-78-1 ("Technical" "Urgent With Limitations") for OH-6A/58A Helicopters: Inspection of the T-63-A-700/5A Power Turbine Coupling Nut (TB 55-1500-200-20-20). **Summary:** Message OH-6A-78-1/OH-58A-78-1 is amended because inspection results to date show that nut corrosion can progress more rapidly than had been predicted initially. Therefore, the time to initial inspection and time to reinspection have been reduced. **Contact:** Will Fisk, AUTOVON 698-6868, commercial 314-268-6868.

Fixed wing

T-28

Precautionary landing □ Pilot lowered gear handle and nose wheel gear indicated up. Low pass was made by tower and gear appeared to be down and locked. Landing was made without incident. Switch was replaced.

U-8

Precautionary landing □ (D series) Engine overspeed occurred when prop lever was moved slightly to adjust rpm.

U-21

Precautionary landings □ (A series) Left brake locked during landing roll. Caused by failure of shuttle valve. □ (H series) RMIs failed. Caused by internal failure of navigation junction box.

OV-1

Precautionary landing □ (D series) Landing gear indicator showed in transit during prelanding check. Gear was recycled several times with the same results. Pilot blew emergency blowdown bottle to insure gear was down and locked and landing was made. Circuit breaker was reset, gear check performed, and aircraft released for flight.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Selected mishap briefs

Maintenance

UH-1

Precautionary landings □ Aircraft was on test flight to check main rotor tracking when severe vertical vibration occurred. Spacer sleeve, which may have been installed incorrectly, slid off extension assembly. □ Aircraft was slow to respond to cyclic input during landing. Hammer was binding against left lateral servo. □ Bleed band actuator fluctuated during takeoff. Actuator was improperly adjusted.

AH-1

Precautionary landings □ IP noticed high frequency vibration developing in pedals in flight. Inspection revealed bad shims in synchronized elevator and loose supports on oil cooler. □ No. 1 hydraulic caution light came on while aircraft was descending from 8,000 feet. Pedals became stiff and running landing was made. No. 1 hydraulic system module filter was not properly torqued.

T-42

Precautionary landing □ Aircraft was being test flown for reinstallation of engine. When No. 2 engine was shut down and propeller feathered, accumulator failed to cycle propeller and engine would not restart. Six attempts to restart engine were unsuccessful and aircraft was landed. Accumulator was not properly charged and propeller would not unfeather.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ Individual was using workstand to paint around right windshield of UH-1. While moving workstand, he looked up at windshield and pushed stand into chin bubble, breaking it. □ Mechanic was disassembling main rotor hub assembly, using maintenance stand. Assembly slipped from stand to floor, landing on its top and shattering pillow blocks.

CH-47

□ Six men tried to maneuver aircraft through door of hangar by rotating blades to clear the door. One of the aft blades was not rotated soon enough and hit door.

OH-58

□ Aircraft was being moved from ramp into hangar. Ramp had not been plowed and ruts were frozen in the snow. While towing the aircraft, one of the ground handling wheels stuck in a rut, causing hard jerk on tow bar. Tow ring pulled out of right skid, damaging landing gear. □ OH-58 was moved out of hangar and parked 4 feet from another OH-58. Aircraft was left unattended on one ground handling wheel. UH-1 hovered past OH-58s and rotorwash caused one OH-58 to rotate into the other OH-58, breaking windshield of one and bending horizontal stabilizer of the other.

U-21

□ As aircraft was being towed along edge of ramp, right wingtip hit unoccupied guard shack located 12 feet from edge of ramp. Wing walkers were not used.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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AVIATION STANDARDIZATION
DIRECTORATE FOR EVALUATION AND STANDARDIZATION, USAAVNC, FT. RUCKER, AL 36362
STACOM 26 ■ 15 MARCH 1978 COL CHARLES S. WINGATE ■ 558-2603/3514

Attention training managers of the Aircrew Training Program

TRADOC is in the process of evaluating the effectiveness of the Aircrew Training Manuals (ATMs) with the goal of improving them. To accomplish this, USAAVNC is coordinating the evaluation efforts of TRADOC Schools/Centers responsible for the ATMs. Evaluative questionnaires and structured interview questions have been developed to determine the adequacy of the ATM as a systematic training management tool for the commander in implementing both aircrew and individual aviator training programs. Copies of these questionnaires have been sent to MACOM and CONUSA aviation officers. We ask that each commander, operations officer, training officer, IP/SIP, IFE, maintenance officer, or other knowledgeable managers of the Aircrew Training Program complete a questionnaire and return it to the Directorate of Evaluation and Standardization, Fort Rucker, AL 36362. Contact your aviation officer to obtain questionnaires.

QUESTIONS? Call CPT Jeffery Hovious, AUTOVON 558-2501/6487. Your contribution to a better aviation training program will be appreciated. ■

Get it together!

PS Magazine, issue 289, December 76, page 40, and issue 296, July 77, page 44, contain information for maintenance personnel that interprets maintenance policies and procedures. This information and interpretation could be confusing to aviators in regard to required equipment for VFR and IFR flight.

Let's get it all together.

TM 55-1500-328-25 states that inspection of components on a calendar basis such as the magnetic compass may be accomplished during the **nearest** intermediate or periodic inspection.

AR 95-1 (paragraphs 4-18a and b) requires a magnetic heading indicator, with a current calibration card for VFR flight. An indicator is either an RMI or magnetic compass.

Applying the criteria for VFR flight, the TM and the AR state that if compass calibration is delayed till the next intermediate or periodic inspection and the compass calibration is overdue, the aircraft is on a red dash. If the aircraft has only one compass and the compass calibration is overdue, the aircraft is on a red X.

AR 95-1 (paragraphs 4-22a and c) requires a magnetic heading indicator **and** a magnetic compass with current calibration cards for IFR flight.

If compass calibration of one of the above instruments is delayed till the next intermediate or periodic inspection and the compass calibration is overdue, the aircraft is on a circle red X (restricted from IFR flight). ■

HIT check procedures

Inquiries and suggestions have been received from the field in reference to HIT check procedures, specifically recording procedures. ➤

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Fort Rucker, Alabama 36360

A check with TSARCOM indicates that the following HIT check procedures should be followed: After recording your egt difference from baseline, you find that your difference is 10° C., or greater, from that recorded last. Repeat the test and if the reading does not change, notify the maintenance officer. It is left to the discretion of the operational aviation unit whether or not an entry will be made on the DA Form 2408-13 when the HIT check readings are 10° C., or greater, from that recorded last. Any reading over 20° C. difference from **baseline** will be recorded on the DA Form 2408-13 (if 30° C. or greater, the aircraft will not be flown). **All** HIT checks will continue to be recorded on the HIT check egt log in the aircraft logbook. ■

Position reports, questions and answers

■ Paragraph 2-32 of FM 1-5, Instrument Flight and Navigation for Army Aviators, states that it is best to make an altimeter check prior to starting the engine(s) in rotary wing aircraft. There are problems with this procedure because of operational restrictions for aircraft equipped with the standard pressure altimeter and the AIMS altimeter. What is the correct procedure for an altimeter check and for determining whether or not an altimeter is within acceptable limits for IFR flight?

The following procedures are recommended:

a. Prior to engine start, set the pressure altimeter to field elevation and note the reading in the Kollsman window.

b. After engine start and rotor engagement, place the current altimeter setting in the Kollsman window.

c. Compare this reading with the previous reading in the Kollsman window. If the difference exceeds ±.07, do not accept the aircraft for IFR flight.

d. For aircraft equipped with AIMS altimeters two notes apply:

(1) First, dash 10s state that acceptable error is ±75 feet. The correct acceptable error is ±70 feet. DA Form 2028 has been initiated to have the affected dash 10s corrected.

(2) Secondly, the "before starting engine check" calls for the altimeter to be set to field elevation. This cannot be accomplished in aircraft equipped with the AIMS altimeter because of the one-minute warm-up equipment. After power has been applied to the AIMS system for a minimum of one minute the procedure outlined in paragraphs a, b, and c above would apply.

DA Form 2028 has been initiated to have the affected dash 10s and -CLs call for setting the AIMS altimeter to field elevation in that part of the checklist which would ensure that power has been on for at least one minute.

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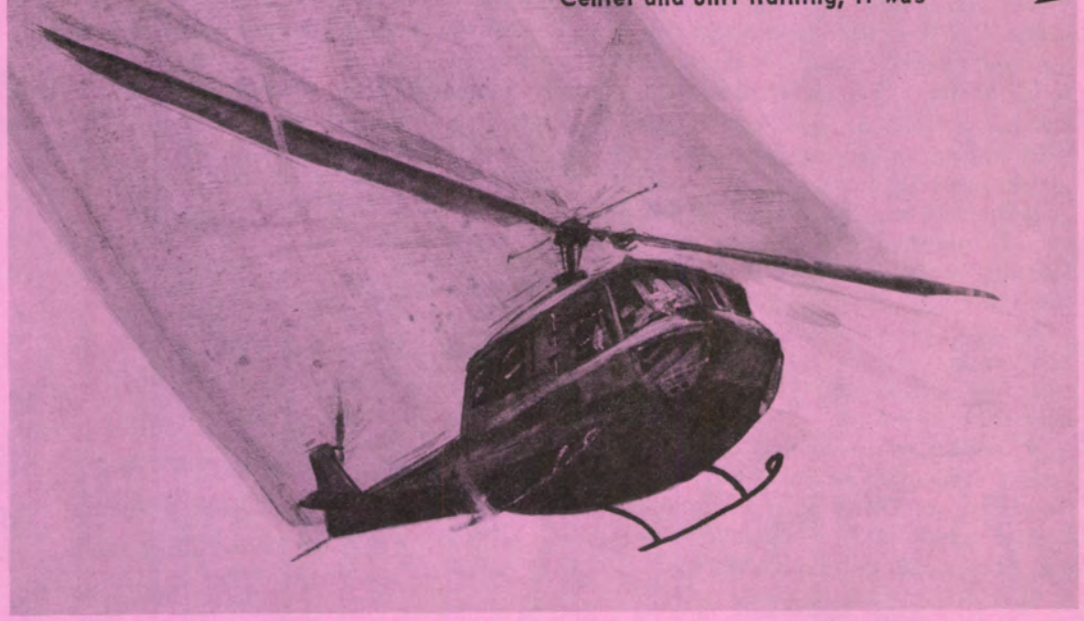
Simulated antitorque training proven effective

Simulated fixed-pitch antitorque training for Initial Entry Rotary Wing students was discontinued in 1975 to minimize risks to personnel and equipment. This maneuver was only to be demonstrated by IPs. It was felt that the training produced more mishaps than were caused by failure of pilots to cope with the actual emergency. However, Training Circulars (TCs) 1-35 and 1-36 required field units to grade antitorque emergency procedures during annual flight standardization checks. Since students were not being graded in this maneuver at the Aviation Center, field units were forced to provide initial training.

To provide consistency between Aviation Center and unit training, it was ►



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USAAAVS

Apparently, the best course of action for loss of component or thrust emergencies is to autorotate immediately

recommended that field units also limit simulated antitorque failure maneuvers to demonstration only. However, several major commands disagreed with this, stating that this training was a valid requirement and should be reinstated as a graded maneuver for initial entry students.

To resolve this difference, the Deputy Chief of Staff, Operations and Plans requested that USAAAVS evaluate this type of training for its effectiveness in preventing mishaps during actual emergencies. An evaluation of 108 actual and 13 simulated malfunctions and failures of the antitorque system in UH-1 series, T/AH-1G, OH-58, and OH-6 aircraft was made.

This evaluation revealed that . . .

■ Present training is oriented to teach aviators to handle loss of or impaired control.

■ **Aviators involved in antitorque mishaps that resulted from loss of or impaired control coped with this situation successfully.** That is, there were minimal materiel damages and injuries. Most mishaps were classified as forced or precautionary landings.

■ Present training does not appear to provide effective skills to cope with a loss of component or loss of thrust malfunction.

■ Loss of component and loss of thrust resulted in greater aircraft damage and more injuries than did loss of or impaired control.

■ **Cobra pilots were more successful in coping with a loss of thrust malfunction than UH-1 and OH-58 pilots.** The most logical reason for this appeared to be that AH-1 aviators are required by emergency procedures to autorotate immediately whereas UH-1 and OH-58 aviators are required to continue flight to a suitable landing area. This frequently allowed aircraft performance in UH-1s and OH-58s to deteriorate to a point where a successful autorotation was difficult to perform.

■ **Antitorque training mishaps were not disproportionate when compared with other types of simulated training mishaps.** A high proportion of materiel damage and injuries which did occur during training was the result of making running landings to poorly selected areas.

■ During training, the AH-1 accounted for a disproportionate share of mishap costs, due to design features such as high center-of-gravity, narrow skid landing gear and limited visibility from the aft crew station making alignment difficult during touchdown.

■ Aircraft damage and personnel injuries during actual in-flight emergencies were 12 times more severe than those which occurred during training.

■ **Apparently, the best course of action for loss of component or thrust emergencies is to autorotate immediately.**

As a result of the study, simulated antitorque training outlined in TCs 1-35 and 1-36 as a graded maneuver was reinstated in June 1977.

Actions to take. . .

Conduct antitorque training in T/AH-1G and OH-58 aircraft to hard surfaces only. UH-1 training may be conducted to hard surfaces or other approved training areas with emphasis on good ground recon.

A no-no

APH-5 helmet (left) is obsolete. The only authorized helmet for Army aviators is the SPH-4 (right).

A pilot involved in a recent OH-58 accident was wearing an APH-5 helmet. This is a no-no. The APH-5 is characterized by its lack of retainability during a crash sequence, its inability to provide adequate sound attenuation, and its excessive weight. The Army recognized these deficiencies in 1972 and declared the APH-5, APH-5A, and APH-5B obsolete.

The SPH-4 is now the only authorized helmet for Army aviators (CTA 50-900). Any aviator who continues to wear the obsolete APH-5 is asking for trouble, because he is not getting the best protection available.

ASOs, check out the pilots in your units. If any of them are wearing the APH-5, tell your commanders so they can remedy the problem and possibly save a life. ■

Breakdown in teardown and analysis program

Approximately one of every ten components issued a USAAAVS control number for teardown and analysis never gets analyzed. Often, failed components on aircraft being repaired at direct support or higher maintenance levels end up at an overhaul depot even though control numbers were assigned them for teardown and analysis. In many instances, exhibits have lain at post central supply locations for months, with no effort having been made to forward them for teardown and analysis.

While reasons for such bottlenecks vary, we can help prevent a breakdown in our teardown and analysis program by requesting control numbers and preparing and shipping exhibits in accordance with provisions found in AR 95-5, and then taking follow-up actions to insure the procedure has been completed and the components in question have arrived at their intended destination. In short, the solution lies in "communicating" to verify all necessary steps have been accomplished.

Should you need additional information concerning teardown analysis, contact MSG Farris, AUTOVON 558-4202/4198, or write to: Commander, USAAAVS, ATTN: IGAR-AP, Fort Rucker, AL 36362. ■

TOTAL MISHAPS FOR 3-9 MAR 78

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	1	1	33	36
AH-1	0	1	0	5	6
CH-47	0	1	0	0	1
CH-54	0	0	0	1	1
OH-58	1	1	0	7	9
TH-55	0	0	0	1	1
T-42	0	0	0	1	1
U-21	0	0	0	4	4
C-12	0	0	0	2	2
C-7	0	0	0	2	2
U-8	0	0	0	1	1
OV-1	0	1	0	0	1
Total	2	5	1	57	65

1 Fatality, 1 Injury
Estimated costs: $225,789

Accident analysis

ANALYSIS 77-18
Type aircraft: AH-1G
Time: 1555
Classification: Major (substantial)
Injuries: 2 (minimal)
Estimated cost: $509,983 (aircraft)
Mission: Tactical training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	28	2,464	2,589
Copilot	1LT	27	306	306

The accident

A flight of three AH-1Gs took off in loose trail formation. According to a previous PIREP, cloud bottoms were about 2,000 feet and cloud tops were about 9,500 feet agl to the west of the takeoff area. However, the flight leader stated that there were holes in the clouds to the west and they could possibly get through them and go VFR. About 2 miles into the flight, the formation entered clouds and the flight leader turned right to go around a mountain on the west, and continued north to remain VFR. The pilot of No. 3 aircraft established an airspeed of approximately 70 knots and an 800 fpm climb. The climb continued around the mountain to about 8,000 feet. At this time, the No. 3 pilot told the flight lead that he was unable to keep up with the flight. Lead acknowledged and the flight continued. Reaching 10,000 feet, the No. 3 pilot again told flight lead that he was unable to keep up and that he was 3 to 5 miles behind the No. 2 aircraft. Climb continued on around the mountain. At 12,400 feet msl (about 150 feet agl) the No. 3 pilot made a right turn. While maintaining a 400 fpm climb at 50 knots airspeed, the pilot saw a hill directly ahead. Rather than continue the right turn up a 10-degree slope or left turn down a 20-degree slope, he tried to go over the hill. At this time, engine speed decreased to 6350 rpm and the rate of climb stopped. The pilot made a cyclic climb of about 250 feet which dissipated the airspeed to 10 knots. He then slightly lowered collective and initiated a right turn, but rpm continued to decrease. The aircraft settled and crashed.

The causes

■ Pilot of No. 3 aircraft failed to select an alternate route compatible with aircraft performance (a violation of paragraph 4-1e, AR 95-1). He did not have a means of readily determining aircraft performance limitations after becoming separated from the formation. The operator's manual is too large to use during flight and the -10 CL does not present aircraft performance information.

■ Flight commander inadequately briefed the aviators because of inadequate written procedures for normal operations. Requirements for formation flight mission briefings in par. 3-6b(2), AR 95-1, are too general to aid in conducting an adequate premission briefing. For example, AR 95-1 requires flight commander to brief "pertinent information" which is not definitive enough.

■ Flight commander failed to respond to repeated communications from No. 3 aircraft because of inadequate unit training. He had received no instruction on his responsibilities as a flight leader and either was unaware of or ignored his

responsibility to provide command, control, and supervision of aircraft in his flight.

The cures

■ Provide aviators with a quick and convenient method (such as a "whiz-wheel" type device) to determine aircraft performance relative to mission planning in flight.

■ Revise paragraph 3-6b(2), AR 95-1, to provide more definitive guidance as to what types of information beyond that specified in paragraph 4-1 should be included in premission briefings involving formation flying. As a minimum, briefings should include information covering routing, altitudes, formations, aircraft separation, inadvertent IFR procedures, lost communications procedures, alternate routing, call signs, frequencies, formation breakups, and emergencies.

■ Upgrade unit training to include a program to identify and train individuals to be flight commanders. Develop guidelines for units to use in developing a program to train flight commanders in conjunction with pilot-in-command qualification training programs.

Materiel failure/malfunction mishap analysis

77-11
Type aircraft: UH-1H
Classification: Incident
Injuries: None
Estimated cost: $168,978
Mission: Service

The mishap

Aircraft was in cruise flight at 2,500 feet agl and 95 knots when weight in white main rotor blade broke loose from its mount and was slung through tip cap, causing near uncontrollable vibrations. Pilot entered autorotation and switched governor to emergency when rotor rpm started to deteriorate. Hard landing resulted in incident damage to aircraft.

The cause

■ Main rotor blade weight retention system failed because of undetected corrosion that was allowed to progress due to maintenance not being performed. Currently, there is no scheduled requirement to check blade weights except at blade TBO. Corrosion or rust forming in these areas remains undetected.

The cure

■ Revise TB 55-1520-210-PM to include written inspection procedures to require visual inspection of blade weights during scheduled phase maintenance. A possible solution would be to remove tip caps and visually inspect blade weights.

Selected mishap briefs

Rotary wing

UH-1

Accident □ Control was lost on takeoff and aircraft rolled on side, with major damage to all components.

Incident □ Aircraft landed skids level on what was thought to be fairly level ground. When troops were loaded, aircraft settled to the ground, bending right skid tube on small stump covered by grass.

Forced landing □ Aircraft was on short final at about 50 feet agl when N2 rpm began to decrease. Aircraft was landed with engine rpm at 5400. When collective pitch was lowered, N2 rpm continued to decrease. Suspect fuel control malfunction.

Precautionary landings □ Pilot saw vapor coming from battery vent tube and main generator loadmeter indicated an increased load. Caused by defective battery. □ Pedals stuck during final approach. Caused by internal failure of tail rotor hydraulic servo. □ Ten minutes after takeoff, engine oil temperature was noted at just under 140 degrees C. Caused by failure of flow control thermostat. □ Engine oil pressure dropped to zero and master caution and engine oil pressure caution lights came on. Crimped starter-generator garlock seal allowed loss of engine oil. □ Transmission oil pressure gauge fluctuated between 0 and 50 psi, then dropped to 0. Caused by failure of oil pressure transmitter. □ Banging noise was heard from cabin floor area behind copilot's seat, accompanied by high frequency vibrations. Vibrations were caused by cracked oil cooler bracket. Banging noise was caused by oil canning of upper bulkhead behind copilot's seat, between pilot's and copilot's greenhouses, above upper console panel.

AH-1

Incident □ Aircraft hit tree during NOE hover, damaging main rotor and tail rotor blades.

Precautionary landings □ Master caution light and engine fuel pump segment light came on. Inspection revealed insulation had backed off terminal, allowing lug to contact metal and short out system. □ Pilot was maneuvering into position to fire rockets when he overtorqued aircraft to 65 psi.

CH-47

Incident □ Leaking hydraulic system was discovered during flight and pilot decided to fly to a municipal airport. About 5 miles from airport, flock of 80-100 ducks flew into path of aircraft. Aircraft struck six ducks and two of them went through right chin bubble. Pilot continued to airport and landed. Hydraulic leak was caused by pinched preformed packing in directional flow valve.

CH-54

Precautionary landing □ Second stage servo caution light came on. Caused by failure of pressure switch.

OH-58

Accident □ Aircraft crashed into heavily wooded ravine during NOE training

flight. Pilot was killed and IP injured. Investigation is in progress.

Incident □ While flying low level, pilot was momentarily blinded by sun and aircraft struck tree limb, causing hole in nose section.

Precautionary landings □ Fog reduced visibility to about one-half mile and pilot decided to abort mission. □ Engine oil temperature rose to maximum indication and remained there. Gauge mounting screws had worked loose in flight. □ Fuel filter caution light came on. Fuel filters were changed in fuel control and fuel pump, and aircraft was tested and released for flight.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

T-42

Precautionary landing □ Fumes were noted in cockpit during takeoff. Caused by failure of fuel gauge.

U-21

Precautionary landings □ (A series) Right main gear failed to give safe down indication during landing. Personnel in tower confirmed gear was down and aircraft was landed. Caused by failure of actuator assembly. □ Ice on landing gear prevented proper functioning of landing gear indicator system. Slush on runway coupled with icing conditions aloft created the problem.

C-12

Precautionary landings □ (A series) Cabin and cockpit filled with smoke during cruise flight. Within 15 seconds smoke was so thick that pilot's flight instruments were not visible. Oxygen masks were in use when oil was seen running from No. 1 engine. Engine was secured and cabin pressure was dumped to clear smoke from cockpit. Single-engine landing was made at home base. Pressure oil transfer tube assembly on No. 1 engine was fractured. □ During takeoff, pilot noted abnormal power lever alignment to maintain torque. No. 1 engine required higher N1 with higher TGT and fuel flow for a selected torque. Power was reduced on No. 1 engine until N1 rpm for both engines matched. Caused by internal failure of No. 1 engine high pressure bleed valve.

C-7

Precautionary landing □ No. 1 engine was leaking an excessive amount of oil. Caused by ruptured oil gasket at accessory case.

U-8

Precautionary landing □ (D series) Right engine power surged, white puff of smoke was emitted from engine cowling, and engine stopped operating. Internal failure of engine accessory gearbox caused generator separation and engine failure.

OV-1

Incident □ (C series) Postflight inspection revealed left outboard access door was missing. Upper center section support ►

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Selected mishap briefs

was damaged. Pilot stated all latches were engaged and locked on preflight.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Series of bangs was heard from engine area and N2 fluctuated from 6300 to 6600 rpm. Egt was 560 degrees, N1 92%, and torque 25 psi. Power was reduced and noise stopped. Caused by incorrectly adjusted bleed bands and inlet guide vanes. □ Vertical fin tail rotor drive shaft cover came open in flight. Pilot noticed excessive forward cyclic required for cruise flight and landed. Dzus fasteners on drive shaft cover were not secured before flight. □ Engine fire warning light came on. Caused by loose ground connection in fire detector indicator.

AH-1

Precautionary landing □ Whining noise was heard on downwind leg, followed by hydraulic system segment light. Post-landing inspection revealed cracked hydraulic fitting. Crew chief applied excessive torque when tightening fitting prior to flight.

OH-58

Precautionary landings □ Low rpm audio activated and pilot noted N2 at 93%. Collective was reduced and maximum beep could not get N2 above 102%. Power-on landing was made. Inspection of pneumatic air line from coupling of double check valve to coupling at overspeed governor revealed air leak. Fitting was not properly installed after double check valve was cleaned and it worked loose after several hours of flight, causing air leak. □ Severe lateral vibration occurred at 1,500 feet agl and 1:1 vibration occurred during descent. Swashplate support assembly was out of adjustment.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

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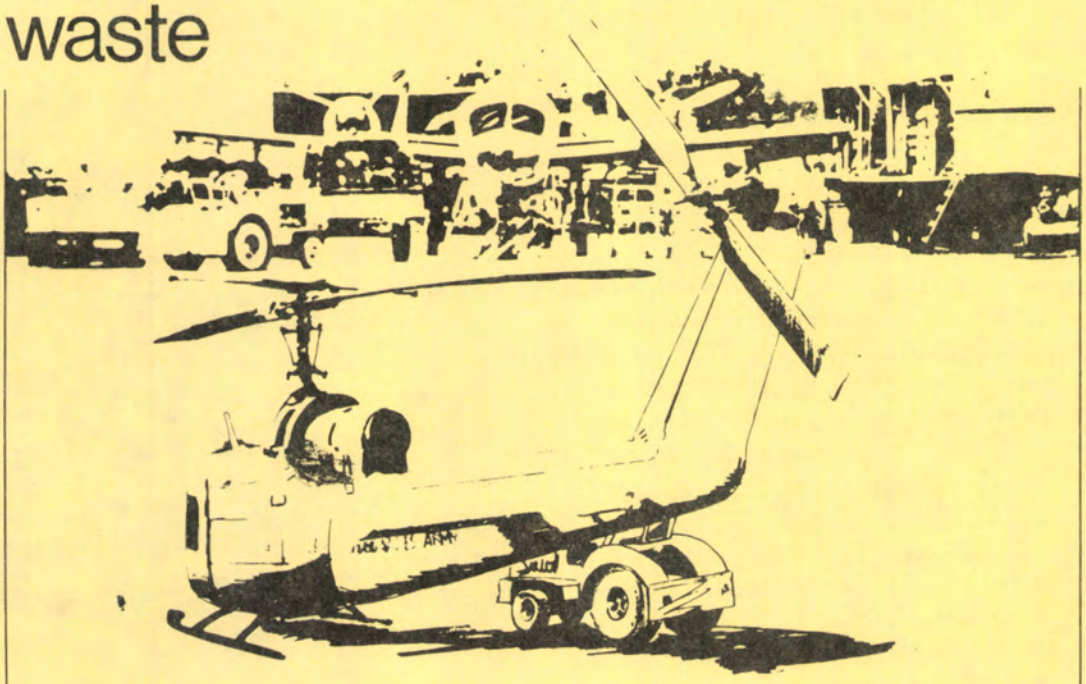
Expensive, needless, and easily preventable . . .

Ground accidents, a costly waste



Aviation unit safety programs are primarily targeted at the prevention of major aircraft accidents. The lower accident rate reflects the success of this concentrated effort. However, the prevention of ground accidents does not get the same concentrated effort. These mishaps don't get the attention, exposure, and concern of major accidents, yet they are caused by careless acts that are easily preventable. It would seem logical that the same dedicated effort applied to aircraft accident prevention—particularly on the part of supervisors—could be applied to the ground accident problem. Obviously, this has not been the case . . . consider the following:

■ An inexperienced and unauthorized individual was attempting to move a tug that was parked about 6 feet in front of a C-12. He started the engine and lost control of the tug. The tug hit the nose ➤

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USAAAVS

Ground accidents, a costly waste

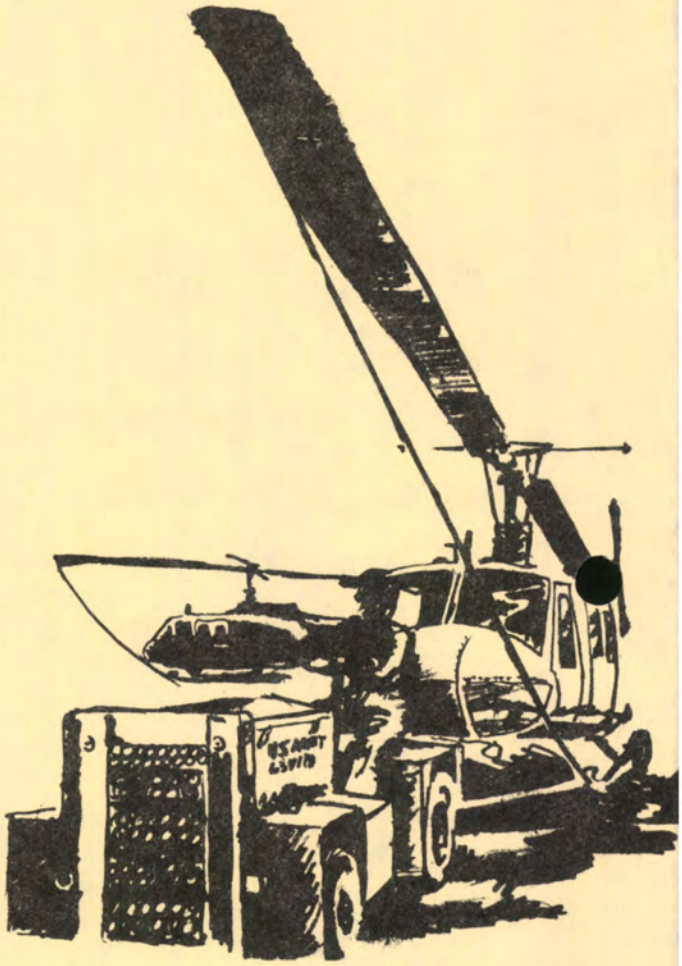
gear and pushed the C-12 into the hangar wall. **Cost: $55,000**

■ As a UH-1H was being towed from a hangar, the tug accelerated rapidly forward. The operator first tried to stop the tug with brakes and then by pushing the neutral button. He hit the reverse button instead and the aircraft struck a parked forklift which had been 5 feet behind the aircraft at the original position and the main rotor struck the hangar wall. Several loose items left on the floor of the tug could have become lodged in the accelerator and/or brake. **Cost: $20,000**

■ Tug was being hooked up to tow a U-21 from the hangar. As the hook on the tow bar made contact with the receiver retainer latch of the tug, a chock fell from the tug engine cowling to the tug floor. The chock hit the accelerator pedal and pushed it into high power position with the tug still in reverse. The tug lunged against the tow bar and caused the aircraft to start moving backward. The tug pushing against the aircraft caused the nose of the aircraft to lift and the tail hit the hangar floor. The tow bar snapped and the tug, still running at a high power setting, penetrated the left engine cowling. **Cost: $36,000**

■ Tug driver, towing a CH-47 to the flight line, took a shortcut across soft dirt. The left landing gear sank in the soft dirt and the driver continued to tow until the left landing gear collapsed. **Cost: $3,500**

■ A POL driver refueled the right side of a CH-47 and attempted a U-turn to reposition the tanker on the left side. The exhaust stack hit the right front blade of



the forward rotor head. POL driver was not using ground guide. **Cost: $44,100**

■ An avionics repairman was told to unlock the front door of an AH-1 and reach over the gunner's seat to unlock the pilot's door. He was told that there should be a red flag attached to the pin on the pilot's door lock. He found two pins with red flags, one in the front seat and one in the back seat. He removed the pin in the rear seat but replaced it. Then he removed the pin in the front seat and tried to replace it

but could not. He pulled the handle and turned it, triggering the explosive canopy removal system. **Cost: $14,186**

■ AH-1 main rotor tiedown ropes broke during high winds. Blade flexed into gunner's canopy of AH-1 parked nearby. Main rotor tiedown was not properly secured. **Cost: $1,353**

■ AH-1 tail rotor was not tied down and flexed into vertical fin. Tiedowns were not available and forecast of high winds was not disseminated. **Cost: $9,500**

These accidents are typical of those reported with alarming frequency. They are the result of carelessness, lack of attention to detail, and disregard for established procedures and regulations. They go unchecked because supervisors are failing to give aircraft ground operations the attention they deserve.

Actions to take. . .

■ Closely supervise all aircraft ground handling operations.

■ Insure established procedures are followed and when procedures are lacking, take the initiative to change them to emphasize safety.

■ Don't be caught up by the tempo of operations and shortcut procedures, orders, or instructions. Chances are they were written because of an accident caused by someone improving or taking shortcuts.

■ Emphasize the importance of extra precautions when overcrowded conditions exist in hangars.

■ Communicate at all times and at all levels. Let someone know what has been done and what still needs to be done.

■ Insure timely and wide dissemination of information pertaining to weather, safety, and procedural changes.

■ Assign only experienced personnel to operate tugs.

■ Establish and enforce rigid controls to prevent unauthorized use of tugs and other vehicles.

■ Insure that tugs and other vehicles are kept in top mechanical condition.

■ Insure that POL handlers use ground guides and proper signals.

■ Prohibit unnecessary operation of motorized vehicles around aircraft and maintain strict control of vehicles.

■ Insure OJT programs are being conducted, including initial, refresher, and remedial training.

■ Insure maximum attendance and participation at periodic safety meetings and stress that ground accidents are a serious problem deserving a concentrated prevention effort. Almost all aircraft ground handling accidents are preventable by the conscientious performance of individual duties.

Accident analysis

ANALYSIS 77-19
Type aircraft: UH-1H
Time: 2127
Classification: Minor
Injuries: None
Estimated cost: $9,854 (aircraft)
Mission: Night troop support

The accident

As helicopter was being cranked for takeoff, crew chief noticed an unusually long flame and a large amount of black smoke coming from the exhaust. He told the pilots who immediately turned off the fuel, rolled off throttle, and continued to engage the starter. At this time there were no unusual instrument indications. The crew was approximately 25 seconds into the start with egt at 420° C. and gas producer at 32% N_1. The pilots continued motoring the starter for about 20 seconds until the crew chief told them there was a fire at the front of the engine. They exited the aircraft and were unable to extinguish the fire using several fire extinguishers. The fire was finally extinguished with moist sand.

The causes

■ The power plant mechanic, who was being trained on the job, inadequately performed required maintenance because of inadequate supervision by the maintenance supervisor. The mechanic installed a fuel control unit in the aircraft without using required TM 55-2840-229-24. As a result, he connected the P1 sensor line to the N_2 governor and the N_2 governor fuel purge line to the fuel control. This cross connection allowed the fuel from the fuel control to exit the P1 opening at the engine inlet.

■ Technical inspector violated paragraphs 110-113, TM 55-411, by inadequately performing a required maintenance inspection. He did not detect the cross connection because of inadequate attention.

■ Technical inspector failed to detect the cross connection because of equipment design. Due to the close proximity and use of the same size threads, the P1 sensor line and N_2 governor purge line can be easily cross-connected, making this condition difficult to detect.

The cures

■ Improve supervision during on-the-job training and insure by-the-book maintenance procedures.

■ Inform personnel, through meetings, publications, and directives, of problems and remedies regarding inadequate attention while inspecting maintenance performed. Inspections should insure that hazard-producing conditions are minimized.

■ Redesign existing equipment to preclude the possibility of cross-connecting lines. A possible solution could be to color code the lines. Redesign of existing equipment may not be economically feasible. However, consideration of this problem should be given to design of future systems.

Selected mishap briefs

Rotary wing

UH-1

Accident □ Details unknown. Suspect loss of 90° gearbox. Five injuries.

Incidents □ Aircraft on medevac mission landed on sharp object which punctured hole in left lower fuel cell panel. □ Main rotor blades hit tree during termination of approach, damaging blades. □ Main and tail rotor blades hit trees as crew was maneuvering aircraft for concealment during training flight.

Forced landings □ As power was applied for takeoff, rotor rpm bled off to 6100-6000. Caused by failure of overspeed governor. □ Aircraft was at 1,300 feet on test flight. Engine failed when collective was lowered and throttle reduced to flight idle. Idle detent was checked and throttle did not go to closed position. Engine was submitted for teardown analysis.

Precautionary landings □ Fire warning light came on at 20 feet and 25 knots. Inspection revealed fire warning harness was shorted at cannon plug due to prolonged exposure to normal vibration levels. □ Hydraulic caution light came on. Caused by failure of pressure switch. □ Transmission oil pressure began to drop during final approach and caution light came on. Transmission oil started running out of bottom of aircraft. Caused by ruptured transmission internal oil filter gasket. □ Hydraulic leak occurred during runup. Caused by failure of O-ring at main hydraulic filter. □ Hydraulics failed and caution light came on. Running landing was made. Caused by ruptured hydraulic line from hydraulic pump to filter. □ Vapor was seen coming from upper battery vent during final approach. Caused by internal failure of battery.

Other □ Cargo hook released external load when arming switch was placed in arm position. Caused by loose terminal prong on relay solenoid.

UH-1 open door insurance

With the coming of hot weather, the age-old problem of open cargo doors coming off in flight is ready to crop up again. As a matter of fact, two in-flight door losses have already occurred in the past couple of months. Yet, the solution is simple. To begin with, check your doors for condition and proper operation, and make it a habit to inspect locking pin installation after each troop lift. In addition, read and heed the instructions found in TMs 55-1520-210-10, -20, and -34. Open or closed, we want the doors to fly with the aircraft—not on their own. ■

AH-1

Forced landing □ Aircraft was at hover during test flight when N_1 fell to 75%. Hovering autorotation was made. Caused by failure of P1 multiplier of fuel control.

Precautionary landing □ Moderate SCAS hardovers were noted in yaw and roll channels. SCAS amplifier was out of adjustment.

CH-47

Precautionary landings □ No. 1 engine fire light flickered during hover before takeoff. Caused by chafed sensing element on lower inboard side of engine. □ As aircraft was on approach to landing crew engineer saw hydraulic fluid on ramp and tail of aircraft. Caused by failure of utility ►

Selected mishap briefs

hydraulic pump. □ During winching operation, leak developed at fitting on brake line. □ Unforecast weather caused crew to land short of destination. Flight was resumed when weather conditions improved.

CH-54

Precautionary landings □ Caution light and voice warning system (VWS) indicated No. 2 rectifier failure. No. 2 rectifier was shut off and 5 minutes later caution light and VWS indicated No. 2 generator failure. Generator was recycled with no results and then shut off. Burning odor was then noticed in cockpit. All electrical equipment was shut down and aircraft landed. Caused by internal failure of No. 2 generator. □ Transmission oil pressure light came on. Caused by failure of oil pressure switch.

OH-58

Incidents □ Engine began surging in flight and power was lost before intended landing spot could be reached. Incident damage to cross tubes and skid. □ Right rear seatbelt was left unfastened after passenger drop-off. Damage from belt hitting side of aircraft was found on postflight.

Precautionary landings □ Transmission oil hot light came on. Caused by defective thermostat switch. □ While in cruise flight, pilot noticed egt climbing, crosschecked N2 tachometer, and noticed needles fluctuating. Caused by clogged double check valve. □ Engine-out audio and engine-out caution light came on. N1 went to zero, but all other engine instruments indicated normal. Caused by failure of engine tachometer generator. □ Master caution and segment lights for generator and inverter came on and all radios were lost. Pilot reset master caution, turned all electrical switches off, and recycled generator switch. Generator came back on line and aircraft was landed. Caused by failure of voltage regulator. □ Hydraulic pressure warning light came on during landing and cyclic and collective became stiff. Caused by loose hydraulic elbow tube.

Safety-of-flight message

■ 211400Z Mar 78, subject: Safety-of-Flight Message, Operational for **OH-58A/OH-6A** Helicopters (OH-58A-78-4 and OH-6A-78-4). **Summary:** This message gives the following restriction: All OH-6A and OH-58A helicopters powered by T63-A-5A or T63-A-700 engines equipped with the old style double check valve, P/N 6854622, are restricted from NOE, contour, low level, and night flight and they must be flown at an altitude to afford safe autorotation in the event of failure. **Contact:** Will Fisk, TSARCOM, AUTOVON 698-6868, commercial 314-268-6868.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landings □ (A series) Landing gear failed to retract on takeoff. Gear was recycled and still failed to retract. Gear handle was placed in down position, with green indication. Tower confirmed gear was down. Inspection revealed electrical wire to gear extension switch had come off. □ (A series) Suspect elevator trim servo froze during cruise flight. Trim could not be moved manually. After 10 more minutes of flight, electric trim

became inoperative, causing auto pilot to fail. Cruise flight could be maintained with one pilot holding the controls, but during descent and landing both pilots had to be on the controls to control aircraft and counteract trim setting. This was the sixth occurrance of a trim servo malfunction. Trim servo had been replaced once, but problem was not corrected.

U-21

Precautionary landing □ (D series) Wings and nacelles visually checked dry after takeoff. Passing through 7,500 feet msl, fuel started siphoning from left nacelle filler cap. Airspeed was reduced to 110 knots with no appreciable reduction in fuel siphoning. Aircraft was landed and fuel cap reseated. Fuel started siphoning again during takeoff roll and takeoff was aborted. Fuel cap was replaced.

U-8

Precautionary landing □ (G series) Right landing gear green light did not illuminate during landing. Wire from right gear microswitch was broken and terminal block wiring was old.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Incident □ Left cargo door came off during flight. Portion of lower door rail had been cut out, allowing door to be disengaged from cabin door rail. Door retainer was not used and air flow caused door to separate.

Precautionary landing □ Transmission oil pressure fluctuated and left fuel boost pump light came on. Grounding wire to boost pump was not grounded.

AH-1

Precautionary landing □ Master caution light came on, with no segment warning light. Ground wire connection to engine fuel pump segment warning light was dirty, causing illumination.

Check those AH-1 engine mounts

You may be receiving engine mount (tripod) assemblies, P/N 209-060-112-1, for your AH-1G/Q with engine mount fitting, 209-060-121-9, installed instead of 209-060-121-1. The -1 is for the AH-1G and the -9 is for the AH-1S. The part number is cast into the edge of the fitting (see photo). You may use this mount on the AH-1G/Q if proper engine alignment can be obtained in accordance with the dash 20. However, this mount is not to be used on the AH-1S nor may the AH-1S mount assembly, P/N 209-062-126-5, be used on the AH-1G/Q. ■

OH-6

Precautionary landing □ Fuel filter light came on as aircraft was on short final to airport. Fuel filter was found partially clogged. Fixed Base Operator fuel supply was contaminated. ►

Selected mishap briefs

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Maintenance advisory messages

□ 162255Z Mar 78, subject: Maintenance Advisory Message **OH-58A/OH-6** Helicopters (OH-58A-78-3 and OH-6A-78-3). Message gives instructions to reduce the cleaning and inspection interval of the old style hexagonal-shaped double check valve from 150 hours to 100 hours.

□ 202125Z Mar 78, subject: Maintenance Advisory Message for **OH-58A** Helicopters, Retorque of the Upper Clamp on the Fuel Hose Inside the Fuel Tank, Message No. OH-58A-78-5. Message informs OH-58 operators that a 50-hour retorque requirement of the upper clamp on the fuel hose inside the fuel tank has been established.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ Individual on guard duty drove his vehicle into the side of a parked UH-1. Driver was tired and suffering from a flu-type illness. He did not see the aircraft until the impact. □ Towing tractor was left parked in front of aircraft while individual attached towbar to aircraft. Engine was running and gearshift was in park position. Towing tractor rolled backwards, striking left side of aircraft. Gearshift indicator did not work properly. Vehicle was in reverse instead of park. Parking brakes were also inoperative.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 10-16 MARCH 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	4	3	26	34
AH-1	0	0	1	3	4
CH-47	0	0	0	7	7
CH-54	0	0	0	2	2
OH-6	0	0	0	1	1
OH-58	0	2	1	14	17
C-12	0	0	0	2	2
U-21	0	0	0	1	1
U-8	0	0	0	1	1
Total	1	6	5	57	69

0 Fatalities, 5 Injuries
Estimated costs: $100,660

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Getting aviation safety training films

Judging by the questions we receive from ASOs, there is much confusion on how to get USAAAVS aviation safety films for safety meetings. So much so, that the films are not being used as effectively as we'd like.

Here's how it works

USAAAVS 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 all military-produced 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 identified by catalog number TF 46-. ➤

JUST RELEASED

"Helicopter Mast Bumping: Causes and Prevention"

IT IS VITAL THAT EVERY HELICOPTER PILOT SEE THIS NEW FILM

A study of Army mishap experience involving UH-1 and AH-1 helicopters shows that mast bumping in flight can cause mast failure and rotor separation. Analysis shows that mast bumping is directly related to the pilot's handling of these aircraft. This film shows what causes mast bumping in the Huey and Cobra, the in-flight conditions which lead to mast bumping, and stresses what pilots must do to avoid it. The film should be shown as many times as necessary to insure that every helicopter pilot understands what causes mast bumping and what to do to avoid it.

"Helicopter Mast Bumping: Causes and Prevention," catalog number TF 46-6077, is available now at your local Training and Audiovisual Support Center.

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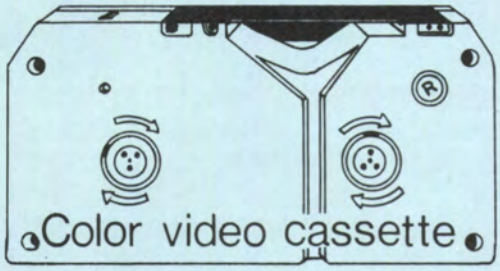
USAAAVS

Getting aviation safety training films

USAAAVS also publishes a listing of Army, Navy, and Air Force safety films. This listing is revised as new films are released. The current listing is identified as the second edition, Safety Training Films, dated September 1977, and is available by writing to Commander, USAAAVS, ATTN: IGAR-PG, Fort Rucker, AL 36362.

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 ¾-inch color video recording cassette (available through normal procurement channels) to: Commander, USAAAVS, ATTN: IGAR-PG, 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 15 to 20 minutes in length and fit nicely in a 50-minute safety meeting.



ARNG distribution

USAAAVS aviation safety films, in videotape format, are distributed to ARNG units through the Army National Guard's Fort Rucker based Multi-Media Program. The videotapes 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. Listed are safety presentations provided to ARNG facility learning centers to date.

TITLE	AGENCY
Man and Safety, Motivation	Air Force
Man and Safety, Supervision	Air Force
Master of the Sky	USAAAVS
Aircraft Accident Prevention Survey	USAAAVS
Great Balls of Fire	Air Force
Teardown Analysis	USAAAVS
Oil Analysis Program	USAAAVS
Safety Briefing by CPT Charles Nowlin	USAAAVS
Helicopter Icing	USAAAVS
A Night On Jackrabbit Mesa	Air Force
SPH-4—The Aviator's Protective Helmet	USAARL
'5C' Recipe for Inadvertent Soup	USAAAVS
Power-Off Landings	USAAAVS
Emergency Procedures, UH-1	USAAAVS
Helicopter Mast Bumping—Causes & Prevention	USAAAVS

In addition to USAAAVS 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. ■

Parachute operation hazards

During a recent training mission, a parachute static line became entangled in the tail rotor of a UH-1 and the 90° gearbox was torn loose from its mounting. The aircraft crashed and was destroyed, but the crew escaped with only one minor injury. Another UH-1 pilot supporting a local sport parachute club had to make a precautionary landing when the left side sound-absorbing blanket came off, blew out of the aircraft, and struck the synchronized elevator.

Specific instructions for eliminating these potentially hazardous conditions have been submitted on DA Form 2028 for inclusion in TM 57-220 and TM 55-1520-210-10.

Actions to take...

■ All units using helicopters for parachute operations should review their parachute SOPs. Add the following to that portion of the SOP pertaining to disconnection of static line snap hooks from anchor line cables installed in the aircraft: "After the last parachutist has exited the aircraft, the crew chief or jumpmaster will pull in all static lines and place them in a kit bag or hold them secure until the aircraft has landed. CAUTION: At no time during flight will the static line snap hook or snap hook safety pin be removed from the aircraft static line anchor cable. Once the aircraft has landed the static line will be removed from the anchor line cable."

■ Add the following to that portion of the SOP pertaining to aircraft preparation and inspection: "Remove all sound-absorbing blankets from the cargo compartment of the aircraft."

T63-A-700/5A power turbine coupling nut ...a partially solved problem

A recent OH-58A accident occurred because the power turbine coupling nut failed due to corrosion, causing the engine to come apart. Fortunately the aircraft was at a hover when the engine failed and the pilot was able to get it on the ground with no further damage. This accident surfaced the T63-A-700/5A coupling nut problem.

Because of the catastrophic potential, corrective action has to be quick and effective. Engine repairmen from major commands have received coupling nut inspection training at Corpus Christi. TSARCOM safety-of-flight message OH-6/OH-58-78-1 and -78-2 outlining coupling nut inspection criteria/procedures have been issued. TSARCOM message 022210Z March 78, subject: Disposition of Unserviceable T63-A-700 Engines, states that engines may be turned in to local Allison Division service centers for repair. However, at present it appears that units would be better off sending the engines to CCAD as the turn-around time should be shorter.

It is essential that unserviceable engines be turned in for repair as soon as possible. Presently, unserviceable engines are not being received at CCAD at the rate expected. Engine shipping containers are available and can be requisitioned under NSN 8145-00-034-1063. If problems are encountered that will impede shipment of unserviceable engines, and they cannot be resolved locally, contact Mr. Marv Gordon, TSARCOM, AUTOVON 698-2921. ■

Selected mishap briefs

Rotary wing

UH-1

Accident □ Aircraft was landed on slight slope in LZ, with the terrain sloping down to left of aircraft. As power was applied for takeoff, aircraft pitched up and over on right side. Main rotor struck ground and transmission severed tail boom. Pilot sustained minor injury.

Incident □ As aircraft was picked up and hovered backwards, tail rotor struck forward blade of aircraft parked in rear.

Forced landing □ Loud bang was heard in cruise flight and engine and rotor tachometer were seen to be decreasing. Aircraft was autorotated. Caused by failure of fifth-stage compressor bearing.

Precautionary landings □ Several loud noises were heard from transmission area, followed by illumination of master caution light and hydraulic segment light and loss of hydraulic control. Running landing was made. Caused by cracked hydraulic line fitting. □ Transmission oil pressure fluctuated between 50 and 60 psi with power changes. Caused by defective transmission pressure gauge. □ Rotor tachometer failure was caused by loose pin in connector plug. □ Pilot smelled fumes in cockpit. Caused by defective battery. □ Master caution light came on 3 minutes after takeoff. Caused by internal failure of control panel. □ Pilot overshot landing area and developed high rate of descent. Sixty psi torque was required for about 2 seconds to stop descent. □ Low rpm warning light and audio came on. Engine needle on dual engine tachometer dropped to zero but rotor needle stayed in the green and engine continued to run. Caused by sheared N2 tachometer gear shaft.

AH-1

Incident □ While night hover firing, aircraft descended and landed hard with forward movement. Skids were torn from aircraft.

Precautionary landings □ As aircraft was flying NOE, bird flew out of tree and hit left portion of forward battery compartment cover. □ Loud banging noise was heard from nose of aircraft after takeoff, and something hit windscreen. Postlanding inspection revealed forward nose battery cover had come off in flight. □ DC generator light came on. Caused by failure of voltage regulator.

CH-47

Precautionary landings □ Crew encountered unforecast weather below VFR minimums (rain and fog). Mission was aborted. □ Copilot's jettisonable door slipped from its sealed position, causing one-half inch gap between fuselage and upper aft portion of door frame.

CH-54

Precautionary landing □ Utility hydraulic system failed while aircraft was on GCA. Caused by failure of packing and washer on pressure line from utility hydraulic pump.

OH-58

Accident □ Aircraft struck tree during contour flight, damaging chin bubble, crew door, horizontal and vertical stabilizers, and tail rotor blade.

Incidents □ Tip of rotor blade hit tree limbs during NOE flight. □ As aircraft was about 20-25 feet above intended landing point after reconnaissance flight, main rotor blades struck and severed two copper wires.

Precautionary landing □ Ammeter began to rise and generator went off line during climb after takeoff. Pilot reset generator but it did not come back on line. Caused by failure of voltage regulator.

TH-55

Precautionary landings □ Main transmission gearbox light came on. Caused by failure of oil pressure switch. □ Grinding noise was heard in flight. Caused by failure of forward upper frame bearing.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Murphy revived

During a recent OH-58 test flight, N_2 increased to 108 percent and the pilot added collective. However, during aircraft descent, rotor rpm increased and N_2 rose to 107 percent. The pilot retarded the throttle and reduced N_2 to 101 percent, then autorotated the aircraft, terminating with power. Following the precautionary landing, inspection revealed the two cannon plugs attached to the dual tachometer (NSN 6680-00-150-1525) were crossed.

This occurrence is reminiscent of a rash of similar ones that occurred 12-15 years ago. Needles would split and pilots would autorotate. And some of these autorotations terminated in incidents; others, in accidents—all because cannon plugs were crossed.

We have enough problems worrying about Murphys rising in new equipment without having to revive any old ones that have long been laid to rest; so, check your aircraft to insure correct mating of the cannon plugs with their respective tachometer receptacles, and color code both the plugs and receptacles to insure proper matching in the future. ■

Fixed wing

C-12

Precautionary landing □ (A series) Landing gear failed to retract on takeoff. Gear was recycled and still failed to retract. Gear handle was placed in down position, with green indication. Tower confirmed gear was down and aircraft was landed. Caused by electrical wire to gear extension switch coming off.

T-42

Precautionary landing □ No. 1 engine cylinder head temperature increased to maximum during initial power reduction on climbout. Caused by short in cylinder head temperature bulb.

OV-1

Precautionary landing □ (C model) Immediately after takeoff, pilot and copilot saw and smelled smoke in cockpit. Mission was aborted. Oil was leaking from No. 1 tachometer generator on No. 2 engine. Smoke from hot oil entered cockpit by way of engine band and air conditioning system.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Selected mishap briefs

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Maintenance

UH-1

Precautionary landings □ Pilot felt binding in collective after takeoff. Caused by worn collective friction liners. □ At 475 pounds of fuel, 20-minute fuel light and master caution light came on. Caused by clogged fuel boost pump "T" fitting finger screens. This was the second occurrence of this type in the unit in 2 days. All aircraft were grounded for a one-time inspection and cleaning of these filters.

AH-1

Incident □ Aircraft was on gunnery mission. When rocket was fired, it glanced off canopy and went through main rotor blade. As aircraft was landed, right inboard rocket pod fell off. Caused by failure to properly secure rocket pod to aircraft.

OH-58

Precautionary landings □ N2 increased to 108% and indicated a tendency to climb further. Collective was increased to reduce N2 and rotor rpm. When descent was attempted, N2 and rotor rpm increased rapidly to 107%. Throttle was retarded and aircraft landed. Inspection revealed two cannon plugs attached to tachometer were interchanged. □ Engine oil pressure and torquemeter dropped to zero. Inspection revealed oil sample bottle cap in oil reservoir. Cap had blocked oil flow, causing loss of oil pressure.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 17-23 MARCH 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	1	1	27	30
AH-1	0	2	0	4	6
CH-47	0	0	0	5	5
CH-54	0	0	0	1	1
OH-58	1	2	0	8	11
TH-55	0	0	0	2	2
C-12	0	0	0	3	3
U-21	0	0	0	2	2
T-42	0	0	0	1	1
OV-1	0	0	0	2	2
Total	2	5	1	55	63

0 Fatalities, 1 Injury
Estimated Costs: $112,156

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The one with the toolbox

The trend to underrate the importance of the person with the toolbox is often evident in accident prevention programs. They are almost always targeted at pilots because the pilot, statistically, is highest on the list of accident cause factors. Does this mean that maintenance people make fewer errors, or that our statistics give 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 accident was questioned about the accident while still in the hospital. After he had given a clear description of what happened, the accident investigator asked him if he could think of anything unusual about the aircraft that could have contributed to the accident. 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 ➤

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USAAAVS

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. This man 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 man 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 accidents.

■ In aviation, every error must be treated as though it will cause an accident. 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 man 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. ■

Phone number change

The number for the USAAAVS duty officer (1800-0700 hours) is now AUTOVON 558-3477, commercial 205-255-3477. ■

Accident analysis

ANALYSIS 78-1
Type aircraft: OH-6A
Time: 1250
Classification: Major (total)
Injuries: 3 (major)
Estimated cost: $153,309 (acft, injuries)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	29	829	829

The accident

After completing a field exercise, an OH-6 pilot decided to fly for an hour in the local area to get his minimums before returning to the airfield. He had no mission assignment, did not get a weather briefing, and did not file a flight plan. Another officer and a crew chief asked for a ride back to the airfield and the pilot agreed. The crew chief sat in the left front seat and the officer/passenger was in the right rear seat. After flying around the local area for 20 to 30 minutes, the pilot flew to an area 8 miles away to show his passengers where some of his relatives lived. He brought the aircraft to a high out-of-ground-effect hover (300-400 feet agl) and waved to someone on the ground. Shortly afterwards, the crew chief noticed a decrease in engine sound and saw that N2 was decreasing. He tried but failed to get the pilot's attention. The crew chief finally succeeded in getting the pilot's attention as N2 decreased through 80 percent. The aircraft started a slow turn to the right as antitorque control was lost and the turn rapidly progressed to a violent spinning descent. The aircraft hit the ground right side up with a slight nose-low and right roll attitude.

The causes

■ The pilot improperly monitored his instruments while hovering out-of-ground-effect because his attention was directed outside the aircraft. By not crosschecking his instruments, he was not aware of the decrease in N2 until the crew chief brought it to his attention. By that time N2 had decreased to a point where neither directional control nor altitude could be maintained.

■ The pilot identified the emergency as "settling with power" and applied forward cyclic pitch but did not reduce collective pitch. An immediate reduction of collective pitch would have alleviated either or both the ineffective antitorque control and settling with power. The pilot took improper flight control action because of inadequate written procedures. The operator's manual does not address the condition commonly known as "settling with power" nor loss of effective antitorque control at a hover within the avoid area of the height-velocity diagram.

The cures

■ Inform personnel, through safety meetings and directives, of the importance of dividing one's attention to permit continuous crosschecking of instruments so awareness of potential problems will be immediate.

■ Revise the operator's manual to provide a discussion on how to recognize and recover from settling with power and loss of effective antitorque control at a hover within the avoid area of the height-velocity diagram. Consideration should also be given to including a similar discussion in appropriate TMs for other rotary wing aircraft.

Selected mishap briefs

Rotary wing

UH-1

Accident □ After completion of practice antitorque maneuver, SP was hovering forward for another takeoff and lost control. Aircraft landed hard when IP attempted corrective action. Minor damage.

Incidents □ Pilot was making minimum descent autorotation. Autorotation was normal until pilot applied excessive collective pitch at 25 feet. Corrective action by IP was ineffective because of low altitude and aircraft landed hard, with incident damage. □ Pilot untied main rotor blade and told medic (who pilot thought was crew chief) to position blade for start. Medic did not remove tiedown strap from blade and, during engine start, tiedown strap hit tail rotor blade.

Precautionary landings □ Hydraulic light came on during runup. Hydraulic filter input line was improperly machined by DS facility. □ About 1½ hours into flight, cyclic became stiff and began pulsating in lower left to upper right quadrant. Caused by failure of irreversible valve. □ Pilot heard unusual whistling sound and landed. Caused by bonding separation on main rotor blade. □ Master caution and hydraulic segment warning lights came on and hydraulic power was lost during climbout. Running landing was made. Smoke was billowing from oil cooler fan compartment due to hydraulic fluid spraying on aircraft heater. Hydraulic fluid return line from tail rotor servo had hole in servo end of line. Hole was in mesh at the point where the mesh meets the flange part of the fitting. Possible tampering by unknown personnel may have caused hole. □ Pilot noticed left side sound-absorbing blanket coming loose during descent from 9,000 feet. Aircraft was supporting local sport parachute club. Blanket finally came completely loose and blew out of aircraft at 3,000 feet, striking left synchronized elevator. □ Compressor stall occurred during takeoff. Caused by failure of bleed band actuator. □ Crew chief smelled fumes during refueling operation, opened engine compartment, and discovered fuel pressure differential switch throwing JP-4 over engine. □ Pilot applied full left pedal at termination of approach, but aircraft would not respond. Aircraft turned 360° and pilot made hovering autorotation. Caused by failure of silent chain. □ Liquid substance was seen on copilot's windshield coming from battery vent tube. High resistance in one cell overheated battery, causing expanded electrolyte to flow through battery vent onto copilot's windshield. □ Intermittent hydraulic failure occurred, preceded by squeal from hydraulic pump. Deteriorated O-ring caused loss of hydraulic fluid.

AH-1

Incidents □ Aircraft was returned to rearm pad following rocket firing. Postflight inspection revealed tail rotor strike had occurred. Pilots noticed nothing unusual during flight. □ Postflight inspection revealed damage to vertical fin and lower right portion of tail boom. Cause unknown.

Forced landing □ Pilot heard loud noise during fueling process and leaped from aircraft with fuel nozzle in his hand, spraying right side of aircraft and into engine air intake, causing engine surge and overtemp.

Precautionary landings □ Collective pitch stuck at 35 psi torque. Collective could not be lowered and attempts to reduce rpm

resulted in blade stall. Aircraft flew onto runway in excess of 100 KIAS. Collective came free on touchdown and aircraft stopped after about 4,000 feet of ground run. Caused by failure of cylinder assembly servo. □ Pilot noticed left pedal binding during takeoff and made running landing. Caused by worn silent chain.

CH-47

Precautionary landings □ Flight engineer saw sparks and smoke coming from No. 2 generator on short final. Caused by failure of generator. □ After paradrop completion, No. 2 hydraulic indicator fluctuated, resulting in loss of No. 2 hydraulics. Caused by boost pump failure. □ No. 2 engine quit when right forward auxiliary pump was turned on during engine start and runup. Caused by contaminated fuel in right forward auxiliary fuel tank. Refueling truck had water in tank.

OH-58

Precautionary landings □ Pilot noticed cyclic binding in flight. Caused by failure of force gradient assembly. □ Engine oil temperature increased during flight. Caused by failure of temperature indicator. □ TOT went to approximately 950° for about 1 second during start, then declined to normal range. Aircraft continued to run at flight idle for 2 minutes for cooling and shutdown. Pilot failed to recognize abnormal start until after TOT exceeded normal limits. □ Master caution and oil bypass lights came on. Caused by malfunction of oil low level switch. □ Master caution and fuel boost caution lights came on. Caused by faulty fuel boost transmitter pressure switch.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-21

Precautionary landing □ (A series) No. 1 secondary low pitch stop light came on and propeller governor idle stop circuit breaker pulled. Caused by failure of solenoid switch.

C-12

Precautionary landing □ (A series) Burning odor and smoke filled aircraft during cruise flight. Emergency descent was initiated and oil was seen streaming from left engine cowl. Caused by crack in weld of oil pressure transfer tube assembly.

U-3

Precautionary landing □ Technical observer noticed oil leaking from No. 2 engine cowling, followed by rapid drop in oil pressure. Caused by hole in hose assembly. Oil pressure line from engine block to firewall was routed outboard of left-hand nacelle support. This installation allowed the oil pressure line to rub against the rubber oil line.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Left fuel boost pump caution light came on as aircraft was hovering for departure after refueling. Crossover screen had not been removed from crossover fitting and screen was clogged. □ Strong fuel odor was detected in cockpit during takeoff. Main fuel filter vent line was improperly installed, causing fuel to siphon from line.

Selected mishap briefs

AH-1

Other □ Ball peen hammer hit leading edge of main rotor blade during blade tracking check. Hammer had been left on aircraft and as rotor blades gained rpm hammer was displaced.

Forced landing □ During hover for takeoff, pilot felt aircraft yaw left 10°, then right 10°. Pedals jammed and hovering autorotation was made. Roll of safety wire was found in base of vertical fin about 2 inches from tail rotor control cables.

Precautionary landings □ Postflight inspection revealed oil leaking from under No. 4 bearing pack. Oil strainer housing assembly was dented, causing leak.
□ While firing 40mm grenade launcher during low-level gunnery pass, turret depressed to lower limit. Grenades exploded below aircraft. Fragments from explosions damaged main rotor blades and one tail rotor blade. Voltage input to turret drive assembly elevation unit was improperly adjusted.

OH-58

Precautionary landing □ As aircraft was in left turn, cyclic became fixed. After much force was applied to cyclic, popping sound was heard and cyclic could be moved to neutral. Postflight inspection revealed that cannon plug from disconnected FM radio had lodged in control linkage.

OV-1

Precautionary landing □ (D series) Pilot noticed smoke entering cockpit on takeoff. Smoke was caused by burnt hydraulic fluid from No. 2 engine getting into cockpit air vents. Pressure side of hydraulic line had been chafed by chin cowl latch. Chafing had not been detected on PMD. New line was installed and clamps adjusted to prevent chafing.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ As helicopter was being guided into tight parking spot inside hangar, right skid hit steel doorstop. New electric doors had been installed and doorstop was no longer needed. It was removed after this mishap. □ Mechanic was installing ground handling wheels on left side of helicopter. He thought he had wheels installed, but when he started to jack up helicopter, wheels came loose, pinning his left hand and arm between wheel and gun mount.

AH-1

□ As wrecker was backed into hangar, mirror of wrecker hit tail rotor blade of AH-1, damaging blade and static stop.

CH-47

□ As electrical doors were being opened to allow aircraft to enter hangar, inner door hit aft rotor blade. Individual was not authorized to operate electrical doors.

OH-6

□ Aircraft were parked and main and tail rotor blades were secured. Wind gust, estimated at 50-60 knots, pivoted the tails of two aircraft into a third aircraft. Lack of tiedown rings in pavement and spacing between aircraft were contributing factors.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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New phone numbers 558-6487/7174

Our readers are reminded of the new phone numbers listed on the STACOM logo. Both numbers are appropriate for calls during duty hours. After duty hours (Fort Rucker is in the Central Time Zone) calls should be made to 558-6487 as that number is incorporated with our automatic answering device. ■

ATMs, TCs, FTGs

It has come to our attention that there is considerable confusion concerning training literature and its use. This includes the Aircrew Training Manual (ATM), the Qualification Training and Standardization TC, and the USAAVNC Flight Training Guide. We recommend the following publications be used until such time as the second draft ATMs are published:

■ **UH-1**–Use TC 1-35 for analysis of maneuvers and use TC 1-135 (ATM) for task, conditions, and standards. Use TC 1-135 (ATM) for the flight evaluation guide.

■ **AH-1**–Use TC 1-36 for analysis of maneuvers and TC 1-136 (ATM) for task, conditions, and standards. Use TC 1-136 (ATM) for the flight evaluation guide.

■ **OH-58**–Use TC 1-37 for analysis of maneuvers and TC 1-137 (ATM) for task, conditions, and standards. Use TC 1-137 (ATM) for the flight evaluation guide.

■ **OH-6**–Use TC 1-38 for analysis of maneuvers and TC 1-137 (ATM) for task, conditions, and standards. Use TC 1-137 (ATM) for the flight evaluation guide.

■ **CH-47**–Use USAAVNC Flight Training Guide for CH-47 AQC, Mar 75, for analysis of maneuvers and TC 1-139 (ATM) for task, conditions, and standards. Use TC 1-139 for the flight evaluation guide.

■ **CH-54**–Use USAAVNC flight training guide for AQC, Nov 75, for analysis of maneuvers and TC 1-139 (ATM) for task, conditions, and standards. Use TC 1-139 (ATM) for flight evaluation guide.

■ **Utility airplanes**–Use TC 1-145 (ATM).

■ **Surveillance aircraft**–Use USAAVNC Flight Training Guide for AQC, Nov 72, for analysis of maneuvers and TC 1-144 (ATM) for task, conditions, and standards. Use TC 1-144 (ATM) for flight evaluation guide.

If there is a maneuver explained in only one publication, use that publication; if there is conflict between publications, use the following order of priority:

(1) Aircrew Training Manual (ATM)
(2) Qualification Training and Standardization (TC)
(3) USAAVNC Flight Training Guide

With the publication of the second draft ATMs (scheduled to be in user hands NLT 1 September 1978) this problem should be eliminated. ■

Nonmilitary weather radar available to aircrews

In addition to the military weather radar facilities (PMSV) depicted in the IFR Supplement, some FAA Flight Service Stations (FSS) located near radar-equipped National Weather Service (NWS) stations ►

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have weather repeater scopes. They can brief a pilot on the displayed weather pattern as to the area covered and the weather movement. Technical analysis of the intensity of precipitation and cells is made by the NWS who in turn forwards this information to the FSS briefer. Check your current IFR supplement for a listing of FSSs offering this service. ■

Did you know?

There are presently more than 300 skeletal structures in the U.S. (radio and television antenna towers) exceeding 1,000 feet agl with some extending higher than 2,000 feet agl. More than 50 towers which exceed 1,000 feet agl are either under construction or planned. Most skeletal structures are supported by guy wires which can extend as far as 1,500 feet horizontally from the structure. VFR aviators, please read and heed. ■

TOTAL MISHAPS FOR 24-30 MARCH 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	2	0	43	46
AH-1	0	2	2	10	14
CH-47	0	0	0	5	5
OH-58	0	0	0	12	12
U-21	0	0	0	1	1
C-12	0	0	0	2	2
U-3	0	0	0	1	1
VC-8	0	1	0	0	1
OV-1	0	0	0	1	1
Total	1	5	2	75	83

0 Fatalities, 0 Injuries
Estimated costs: $143,202

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VOL. 6, NO. 26 □ 19 APR 1978

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A quick onceover

Although aviation technology has progressed by leaps and bounds, the human element appears to have remained static, still clinging to the same old mishap-producing cause factors.

A case in point is the consistency of pilots failing to perform **thorough by-the-book preflight inspections** as they were taught in flight school. Recently an OH-58 pilot who was going to fly his aircraft with the doors removed inspected his aircraft, and along with his crew chief, either secured or removed all loose items—except the rear passenger seat backrest cushion. The cushion blew out of the aircraft during flight, struck the tail rotor and caused a fatal crash. *(See Accident Analysis, page 4.)*

Over the years, failure to properly preflight aircraft has resulted in engines being started with main rotor blade tie-downs installed and aircraft being flown with seat belts dangling outside doors, fuel quick disconnect couplings improperly secured, cotter pins missing from critical components, improperly installed fuel caps, external gust locks left in place, and a host of other discrepancies. These errors have caused in-flight emergencies that often ended in damage to equipment, and sometimes the destruction of aircraft and loss of lives. The sad part is that every one of these mishaps could have been easily prevented had preflight inspections and operational checks been performed by-the-book.

Why do pilots fail to comply with this basic requirement? Reasons vary, but a **sense of urgency to start the mission is a prime one.** It was such a sense of urgency that caused an IP to perform a hurried preflight and cockpit check of his aircraft. In doing so, he failed to note that one elevator gust lock had not been removed. The aircraft crashed on takeoff, killing all three occupants.

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Overconfidence in the ability of the crew chief and other maintenance personnel is another reason. The rash of fuel quick disconnect couplings separating during flight a number of years ago serves as a good example of pilots overrelying on their crew chiefs. When this happens, the established system of checks and balances designed to prevent an error on the part of one individual from going undetected by another is nullified.

A third reason is sheer complacency. A prime example concerns an OV-1 pilot on a cross-country mission. Before takeoff he performed a thorough preflight inspection and cockpit check. Following a refueling stop, he made only a cursory check of his aircraft before resuming flight. One engine failed at a critical point during takeoff and the aircraft crashed, killing the pilot. The cause of engine failure was fuel contamination. The pilot had failed to drain the fuel sumps and check for water and other contaminants following servicing.

The checklist is a matter of individual responsibility. You know this. But how many times have you heard (or said yourself when you were in a hurry): **"The aircraft is okay. Let's just give it a quick onceover."**

Or have you been handed a "revised" checklist with the famous last words: "Never mind what they taught you at school. We do things differently out here."

Do you always insist on a verbal call-out when you are following the checklist and if you don't get verbal confirmation do you assume the worst?

If you are interrupted during a check, do you take up where you left off, or do you start all over again as you should?

Do you always make certain the checklist is in the aircraft?

With the peak summer flying period just ahead, we can expect an increase in accidents caused by preflight failure unless every pilot recognizes the absolute necessity of following the checklist to the letter. ■

Summer fallout

Hot weather is here and helicopters will be flying with doors open or removed so that everyone can enjoy the cooling breezes. Unfortunately, the breezes frequently clean out the cabin of everything that isn't firmly anchored down or removed as required–seat cushions, helmet bags, equipment, etc. Falling objects are bad for public relations and unfortunately they sometimes have close encounters of the worst kind with the tail rotor.

Be kind to yourself and the people you fly over–SECURE THE GEAR! ■

Sand hazard

Thanks to CW3 Harold Hintze, ASO, for bringing to our attention a very hazardous situation which occurred in his unit. Sandbags and wooden blocks were being used to simulate EOD equipment during a nuclear surety mission in a UH-1H. The force of the air from the forward motion of the aircraft during take-off caused the sand to be siphoned from the sandbags and scattered throughout the cabin and cargo compartment. The sand in the air made seeing and breathing very difficult. This situation continued until the aircraft was landed.

From now on, this unit will put their sandbags in other containers, such as plastic garbage bags, to prevent sand/dust from being blown from the bags during flight.

This is the type of information that needs to be shared with other aviation units. It only takes a few minutes to jot down a hazard on an Operational Hazard Report, DA Form 2696. AR 95-5 gives instructions for use of this form. If you think other units would benefit from your experience, send USAAAVS a copy of the report. We'll get the word to the field. ■

Six receive Broken Wing Award

Six aviators received the Army Aviation Broken Wing Award from January through March 1978.

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 Change 5 to AR 385-10.

Broken Wing Award recipients

CW3 Michael J. Gallway
Co C, 503d CAB, Germany

CW2 Terry J. Gooder
18th Avn Co, Fort Bragg

MAJ Jerry L. Laws
Avn Div, Fort Leavenworth

CW4 Gaylen W. Randall
205th Avn Co, Germany

CW3 Glen D. Sliger
Avn Div, Fort Leavenworth

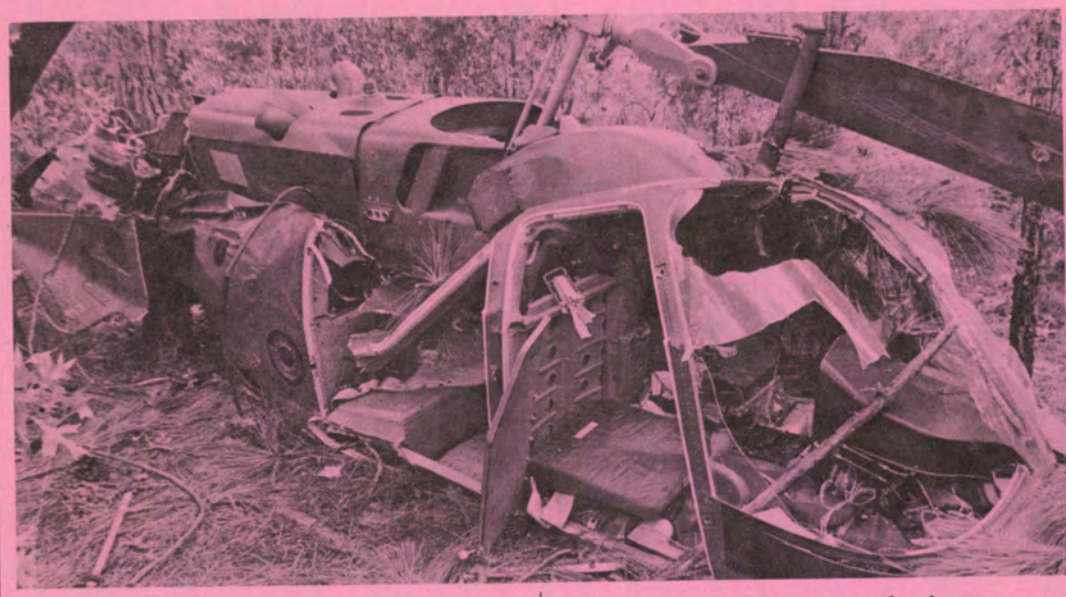
CW3 Georgy A. Waltz
1st Avn Co, Fort Riley

TOTAL MISHAPS FOR 31 MAR-6 APR 78

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	2	2	37	42
AH-1	0	0	1	8	9
CH-47	0	0	0	5	5
CH-54	0	0	0	2	2
OH-58	0	1	3	14	18
U-21	1	0	0	3	4
C-12	0	0	0	1	1
T-28	0	0	0	1	1
U-3	0	0	0	1	1
U-8	0	0	0	1	1
OV-1	0	0	0	2	2
Total	2	3	6	75	86

0 Fatalities, 5 Injuries
Estimated costs: $1,291,422

Accident analysis



ANALYSIS 78-2
Type aircraft: OH-58A
Time: 0925
Classification: Major (total)
Injuries: 1 fatal
Estimated cost: $345,060 (acft, fatality)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CPT	35	1,122	1,122

The accident

The pilot took off on a solo training mission with all doors removed. About 10 minutes into the flight, the rear seat backrest cushion blew out of the aircraft and struck the tail rotor blades. The blades separated from the tail rotor and the aircraft continued approximately 4 kilometers before crashing in trees.

The causes

■ The pilot performed an inadequate preflight inspection. He did not require the removal of the rear seat backrest cushion assembly before flying with doors removed. He was in a hurry because he planned to attend a meeting later that morning and he had already had several delays and apparently did not want to take the time to have the cushion removed before taking off.

■ The pilot performed an inadequate preflight inspection because par. 7-22 of the operator's manual fails to clearly define the components that constitute the term "rear seat cushions."

■ The crew chief failed to remove the rear seat backrest cushion although he was aware of the requirement. He should have removed the cushion on his own initiative. The failure of the crew chief to record removal of the doors on DA Form 2408-13 also indicates the aircraft was hurriedly prepared for the flight.

■ The crew chief failed to remove the rear seat backrest cushion assembly because

of poor judgment. He apparently felt it was not necessary to remove the cushion assembly if the seatbelts were secured tightly against the cushion. He stated he had used this technique before.

The cures

■ Make preflight inspections a frequent topic of unit safety meetings, stressing the necessity of performing preflights by-the-book and emphasizing the hazards of hurried preflights.

■ Revise par. 7-22 of the operator's manual to clarify the requirement to remove both pads, cushioning and the cushion assembly before flight with the doors removed. This requirement should also be printed following item 4, par. 3-9 of the operator's manual, and following item 4, "Fuselage–Right Side Forward," page N-1, TM 55-1520-228-CL.

■ Inform maintenance personnel, through safety meetings, of the hazards of hurriedly preparing aircraft for flight.

■ Revise procedures for normal operation in TM 55-1520-228-20. Paragraph 4-4 should contain a "warning" requiring the removal of all rear seat cushions before flight with the passenger doors removed. This warning should be specific enough to insure there is no misunderstanding on the necessity of seat cushion assembly removal. TM 55-1520-228-PMS, seq. No. 2.8, should also refer maintenance personnel to par. 4-4, TM 55-1520-228-20, for restriction if passenger doors are removed.

Materiel failure/malfunction mishap analysis

77-12
Type aircraft: CH-47C
Classification: Incident
Injuries: None
Estimated cost: $1,355
Mission: Maintenance test flight

The mishap

At some point during maintenance test flight, No. 1 engine lower cowling came loose and was torn from aircraft. It was discovered that cowling was missing after completion of flight.

The cause

■ CH-47A/B No. 1 engine lower cowling, P/N 114P8032-109, was substituted for the proper cowling, P/N 114S3915-41, on this C model aircraft. The cowling was lost in flight because of a possible engine compartment overpressurization from lack of ventilation and the inability of the engine cowling fasteners to properly retain the cowling.

The cure

■ Issue maintenance advisory message requiring inspection of all CH-47C lower engine cowlings to insure the proper cowling is installed and to warn of the incompatibility of the A/B cowling and the C model aircraft.

Selected mishap briefs

Rotary wing

UH-1

Accident □ Two minutes after takeoff, at 60 knots airspeed and about 50 feet agl, low rpm audio and rpm warning light came on. N_2 was at 5800 rpm with N_1 percent decaying. Pilot executed slight deceleration and aircraft hit the ground left skid low, bounced about 1½ feet in the air, continued moving forward, and hit the ground again when tail rotor separated. Tail boom struck a government vehicle and one main rotor blade hit the camper shell on the vehicle as the aircraft slid to a stop. Suspect low-side governor failure. Two minor injuries.

Incident □ Pilot heard loud noise from aft part of aircraft during approach. Aircraft yawed left, followed by engine overspeed in excess of 7000 rpm. Rotor rpm remained at 320. Autorotation was made. During rapid shutdown, another loud noise was heard, followed by left yaw. Skids shifted 2 feet to left and rotor rpm decayed. Tail rotor drive shaft, engine, tail rotor blade, and entire power train were replaced. Cause being investigated.

Forced landing □ Master caution light and engine-driven fuel pump segment light came on during climbout. Engine rpm began to decay during descent, followed by complete loss of power. Caused by failure of engine-driven fuel pump.

Precautionary landings □ Right fuel boost light came on. Caused by leaking seal. □ Hydraulics power failure occurred during flight. Caused by failure of return line to irreversible valve. □ Grinding noise was heard and master caution and hydraulics segment lights came on. Caused by worn and loose tube nipple. □ Crew smelled unusual odor and saw fluid on windshield. Caused by defective battery. □ Master caution light and transmission oil hot light came on. Caused by defective thermostatic switch. □ Hydraulics malfunctioned during cruise flight. Caused by failure of hydraulic line fitting. □ Anti-torque control pedals became stiff during cruise flight. Caused by defective tail rotor servo. □ Forty-two-degree gearbox was leaking during hover/taxi. Input seal was replaced.

AH-1

Precautionary landings □ Master caution and engine oil pressure segment lights came on. Caused by defective engine oil pressure transmitter switch. □ Pilot noticed collective was binding and could not be fully lowered. Postflight inspection revealed boot cover assembly was dented on the underside, restricting down collective movement. □ Transmission oil pressure fluctuated. Postflight inspection revealed transmission oil level was low. IP had drained some transmission oil during preflight and failed to completely close petcock, causing loss of fluid. □ Master caution and No. 1 hydraulic segment lights came on during pylon rock check. Pilot heard loud squeal and lockout valves popping.. Caused by failure of axial piston pump. □ Engine chip detector light came on during maintenance test flight. Caused by failure of No. 2 engine bearing.

CH-47

Precautionary landings □ No. 2 engine began surging in flight and was shut down. Caused by foreign object damage. □ No. 2 hydraulic boost light came on, pressure on

No. 2 boost dropped to zero, and fluid began shooting out of flight control closet. Caused by failure of metal tube assembly.

CH-54

Precautionary landings □ Both generator shafts sheared, causing dual generator failure during hover. □ Crew heard unusual noise during takeoff, coupled with vertical and lateral vibrations. Skin on lower side of main rotor pocket No. 16 separated from spar and curled back along entire length of pocket.

OH-58

Incident □ As aircraft was hovering near undergrowth, rotor apparently sucked 1-inch branch of tree into rotor tip path plane. Tips of both main rotor blades were damaged.

Forced landing □ Pilot noticed loud buildup in engine noise during last 10 minutes of flight. Aircraft yawed to left during hover and pilot autorotated. TOT rose to 845° C. and torque dropped to 10 pounds. Ground personnel noticed 2-foot flame emitting from exhaust stacks. Cause unknown pending analysis.

Precautionary landings □ Partial power loss occurred during takeoff. Caused by sticking double check valve. □ Transmission chip detector light came on. Caused by failure of main transmission planetary gear. □ Master caution light and 20-minute fuel warning light came on and aircraft was landed. Pilot had not visually checked to insure fuel tank was full. Aircraft had been flown 2.4 hours the previous day and there was no record of the aircraft being refueled. When aircraft was refueled at the site of the precautionary landing, it took 54.5 gallons to fill the tank. □ Main transmission chip detector light came on. Transmission assembly was changed because of excessive metal particles. □ N_2 rpm bled down to 93 percent during cruise flight. Caused by failure of bleed valve assembly.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-21

Accident □ (D series) Aircraft yawed severely to left immediately after lift-off and left wing tip struck the ground. Aircraft pivoted on wing, landed in upright position, slid backward for 200 feet, and burned. Suspect engine failure. Three minor injuries.

Precautionary landings □ (A series) Right main landing gear down light did not illuminate when gear was lowered. Gear was lowered manually and unsafe indication remained. Tower confirmed gear was down and aircraft landed. Caused by failure of down lock indicator switch. □ (A series) Fuel was seen venting overboard through center of right nacelle fuel cap. Suspect transmitter failure caused transfer pump to overfill nacelle tank. □ (A series) Fuel was seen siphoning from left nacelle fuel filler cap. Cap was not properly secured.

T-28

Precautionary landing □ Engine started surging 1 minute after takeoff. Manifold pressure was reduced to 32 inches, prop was placed in low pitch, and power was then reduced to 20 inches. Engine surged

Selected mishap briefs

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to 27 inches manifold pressure. Postflight inspection revealed carburetor malfunction.

U-3

Precautionary landing □ Fuel was seen siphoning from right auxiliary tank. Cap was improperly seated.

U-8

Precautionary landing □ (F series) No. 2 chip detector light came on. Small metal pieces were found on chip detector.

OV-1

Precautionary landings □ (D series) No. 1 engine egt started to rise during approach for landing and engine was shut down. Caused by failure of temperature gauge. □ (D series) During cruise flight, main tank overflow valve started siphoning fuel overboard because flapper valve was stuck in open position. Pilot of another aircraft called OV-1 pilot to tell him of the problem.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Incident □ Postflight inspection revealed holes in tail rotor drive shaft cover. Pilots opened drive shaft cover and found a ¼-inch ratchet wrench in drive shaft tunnel. Section of drive shaft and hanger bearings were also damaged. Rust and corrosion on wrench indicated it had been in aircraft for some time.

Forced landing □ Engine surged several times during flight. Caused by improper inlet guide vane adjustment.

Precautionary landing □ Loud bang was heard during climbout and aircraft yawed slightly. Variable inlet guide vanes were 2° out of adjustment.

OH-58

Forced landing □ Engine rpm dropped to about 25% N_2 during cruise flight. Caused by fractured P-3 line. Suspect line was preloaded at installation.

Precautionary landing □ Shortly after takeoff, low rpm audio started to beep intermittently and electrical power was lost when attempt was made to contact tower. Suspect voltage meter was checked before battery was fully charged, causing crew chief to receive an erroneous reading and set meter improperly.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

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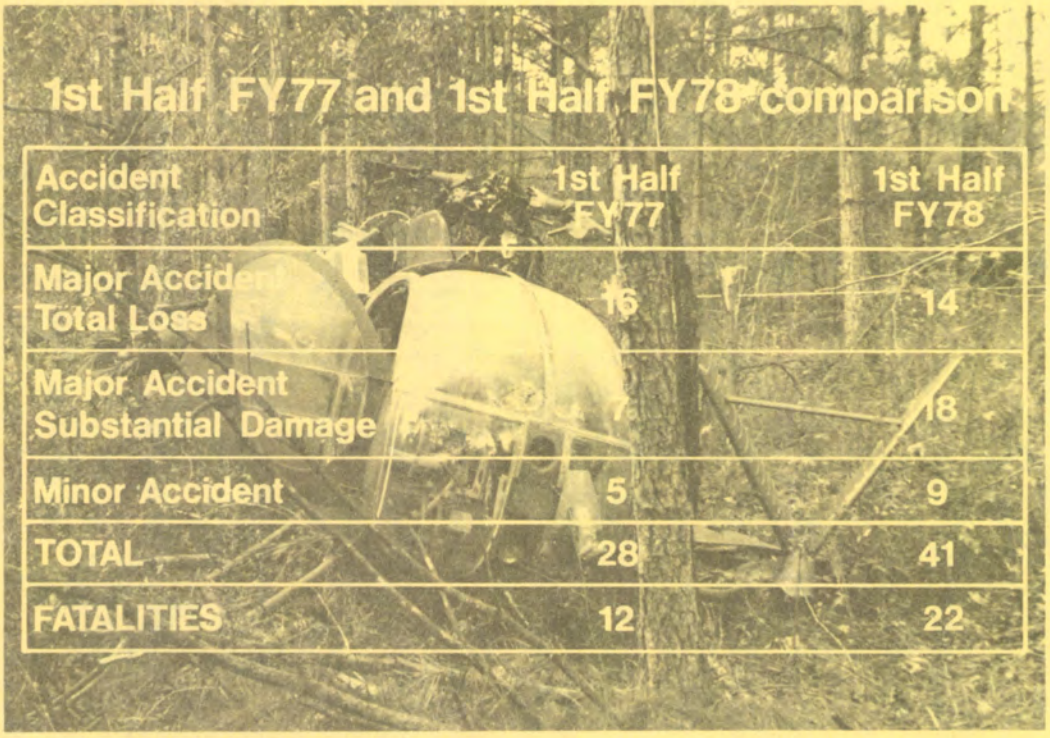
The halfway point and the months ahead

At the halfway point of this fiscal year, accident fatalities had nearly doubled and the total number of accidents far exceeded that of the same period a year ago. The 5.40 accident rate for FY 77 has increased to 6.65 per 100,000 hours for the first half of FY 78. If this upward trend is allowed to continue, the Army will have greater accident losses this year than any year in recent history.

With only 40 percent of the year's total flying hours flown during the first 6 months, 41 accidents and 22 fatalities were recorded. The peak summer flying period is just beginning and the situation is not improving. As of 24 April, 8 more accidents and 3 more fatalities have been recorded. A large part of the ➤



1st Half FY77 and 1st Half FY78 comparison

Accident Classification	1st Half FY77	1st Half FY78
Major Accident Total Loss	16	14
Major Accident Substantial Damage	7	18
Minor Accident	5	9
TOTAL	28	41
FATALITIES	12	22

Prepared by the U.S. Army Agency for Aviation Safety, Fort Rucker, AL, AUTOVON 558-4479. 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 analyses. Direct communication is authorized by AR 10-29.

USAAAVS

Pilot continued to land after encountering white-out conditions and aircraft crashed.

problem is a breakdown in unit training and flight discipline.

The following are typical:

■ During NOE flight, 4 feet above sand dunes, the pilot of an AH-1 interpreted excessive yaw to the right as an antitorque malfunction as opposed to an actual loss of effective tail rotor thrust due to high power requirements and adverse wind conditions. The aircraft was autorotated between sand dunes and was decelerated abruptly. The main rotor severed the tail rotor drive shaft and cover. Pilot was inadequately trained to perform assigned mission.

■ An OH-58 was at a 200-foot hover directing gunnery fire at night when the engine chip detector light illuminated. Pilot attempted a precautionary landing into a cleared area but lost ground reference on short final due to ashes and smoke from rockets. The tail rotor hit a tree and the 90-degree gearbox separated. Pilot overreacted to an engine chip detector light. He had not received sufficient night training on approaches or emergency procedures.

Pilot, who had not received sufficient night training on approaches or emergency procedures, overreacted to engine chip detector light. Tail rotor hit tree during attempted precautionary landing.

■ While hovering forward, an OH-58 crew became disoriented in blowing snow and the aircraft bounced off the ground three times and tipped over on its right side. The pilot failed to use proper procedures for takeoff from snow.

■ A UH-1, approaching an LZ, flew into heavy blowing snow, lost control, and crashed. The pilot was not familiar with procedures in the operator's manual and continued to land after encountering a white-out condition. The crew was not adequately trained for snow environment operation.

■ An OH-6 on final began to yaw right as power was applied. Abrupt and uncoordinated control inputs caused the right yaw, and the pilot lost visual reference and crashed. The pilot exceeded his level of proficiency by attempting a night formation landing to a tactical LZ.

■ An OH-58 was flown low level down a river for approximately 10 miles before it struck and severed two cables about 140 feet above the river. Low-level flight was not required by the mission. All three crewmembers were killed.

■ An OH-58 on another unauthorized low-level flight down a river struck and severed three wires. The pilot was able to set the aircraft down, but there was substantial damage to the windshield, mast, rotor, and plexiglass. The pilot violated FAA directives, ARs, unit SOP, and flight discipline by attempting low-level flight outside the training environment.

■ An OH-58 pilot on an unauthorized

contour flight flew his aircraft into a tree while concentrating his attention inside the cockpit to check his map. The pilot landed, checked the damage, and flew to home base, violating local regulations and flight discipline.

■ An OH-6 pilot was conducting a night flight in the local area. Pilot was flying below 500 feet agl at night on a mission that did not require low-level flight. The aircraft struck and severed two powerlines which were about 200 feet agl. There was an unauthorized passenger on board. Pilot and passenger were killed.

Pilot was flying below 500 feet agl at night on mission that did not require low-level flight. OH-6 hit two powerlines and crashed.

■ An OH-6 pilot was hovering his aircraft out of ground effect (300-400 feet agl) near a house when the tail rotor blade stalled. The aircraft spun rapidly to the right and crashed. The pilot violated flight discipline by putting the aircraft in the avoid zone. He misinterpreted the emergency and initiated corrective actions which aggravated the blade stall.

The prevention of accidents such as these is straightforward. It is a matter of supervision. As long as pilots are assigned missions for which they are neither qualified nor trained, we can expect accidents . . . As long as pilots are allowed to operate their aircraft without regard to established procedures, we can expect accidents. The supervisor must assume responsibility for the failure of his command. When it has been determined that pilots have not had the benefit of a supervisor who knows and assumes his safety responsibility, pilot error then becomes supervisory error.

Unit commanders

Commanders must become more directly involved in unit operations. If your personnel are not qualified, you must qualify them. Unit training programs must fully qualify every pilot in the type mission he will fly and the environment in which he will operate. You must know the limitations of your aviators and careful attention to crew selection is essential.

Pilots inclined to be careless or complacent must be made to change or be replaced and sent to some other duty. Incidents of reckless or careless flying must be dealt with directly and recurrences prevented.

Unit SOPs must be strictly enforced and aircraft must be operated in accordance with established procedures.

Any success in reducing accidents in the months ahead will be directly related to the amount of effort you put forth and how well you apply the lessons learned from past accident experience.

We can ill afford to continue to repeat our mistakes. ■

Accident analysis

ANALYSIS 78-3
Type aircraft: AH-1G
Time: 1025
Classification: Minor
Injuries: None
Estimated cost: $55,364 (aircraft)
Mission: Tactical training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	34	1,333	1,333
Copilot	1LT	27	603	603

The accident

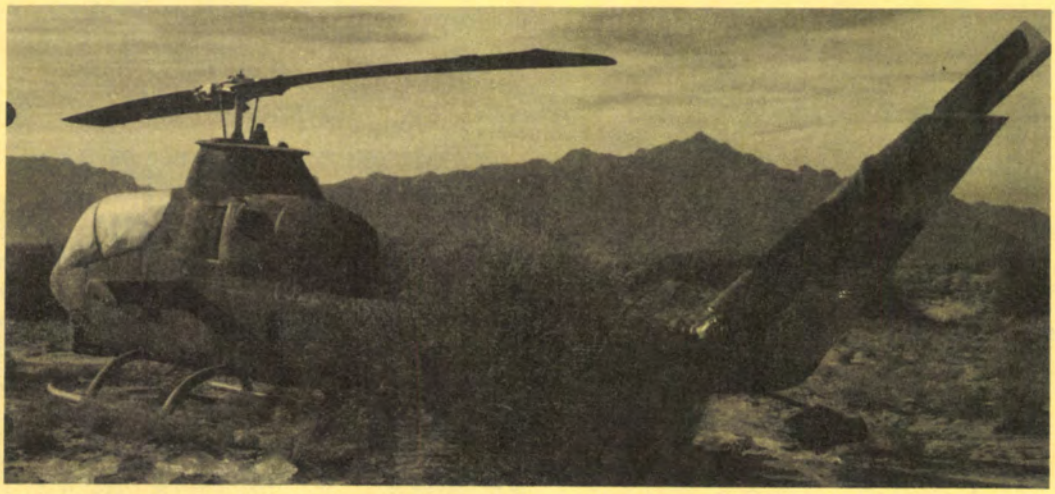
The pilot was flying the last aircraft in a four-ship NOE formation during a desert operation. As the pilot slowed to establish separation from the No. 3 aircraft, he noticed he had 1 to 1½ inches of left pedal remaining. He applied full left pedal to maintain aircraft heading and the aircraft began to turn to the right. The pilot reduced throttle in an attempt to stop the right turn. As the aircraft was descending the copilot told the pilot there was a sand dune in their path. The pilot applied aft cyclic to miss the sand dune and the main rotor struck the tail boom. The aircraft came to rest right side up with the left horizontal stabilizer embedded in the sand dune.

The causes

■ The pilot interpreted inadequate tail rotor thrust resulting from a combination of high power setting, gross weight, and density altitude as tail rotor failure. As a result, he initiated the emergency procedure for loss of tail rotor thrust by reducing the throttle, an action that worsened the situation of inadequate tail rotor thrust. The unit standardization program had not adequately trained the pilot to recognize and react to the characteristics and indications of the various types of tail rotor system failures and limitations.

■ The unit PIC program had not adequately familiarized the pilot with the unit mission. He had received no formal training in desert operations where high density altitude and high temperature create conditions of marginal tail rotor authority when combined with high winds and high aircraft gross weight. The pilot had not received any tactical NOE training since his NOE standardization ride. He had not flown the time in the local area recommended by the unit SOP for release as a PIC and the time that he had flown was not in the unit mission. The pilot was unaware that the other aircraft in the flight were operating with reduced fuel loads.

■ The pilot failed to adequately plan his flight as required by par. 4-1, AR 95-1, and par. 1-5, FM 1-1. He did not consult the performance chart in the operator's manual to determine maximum allowable gross weight for an out-of-ground-effect hover under ambient conditions in the area of operations and did not conduct an out-of-ground-effect hover check before performing terrain flight. As a result, the aircraft took off over maximum gross weight for out-of-ground-effect hover. Eleven minutes after takeoff the pilot slowed the aircraft to a speed below that of translational lift while in a downwind condition and full left pedal was not sufficient to maintain aircraft heading.



The unit training program had not adequately emphasized the hazards peculiar to the local flying area, especially the high density altitude. It also had not impressed upon the pilot the necessity of using performance charts before flight or performing out-of-ground-effect hover checks before terrain flight.

The cures

■ Insure unit training adequately teaches aviators the functioning of the tail rotor in normal and emergency modes. This can be implemented on required standardization flights and through classroom instruction provided by standardization personnel.

■ Upgrade unit training to provide a PIC program which insures pilots are adequately trained in the unit mission and in desert operations. This can be accomplished by insuring that the 50-hour flight requirement of the SOP is enforced and that it is flown in the unit's mission. The unit ATM program should also be tailored to the unit mission.

■ Insure that local flying area hazards are adequately emphasized to unit aviators during unit training and insure aviators fully understand the necessity of adequate preflight and in-flight planning.

TOTAL MISHAPS FOR 7-13 APRIL 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	3	0	31	35
AH-1	0	1	0	5	6
CH-47	0	1	0	6	7
OH-6	0	0	1	0	1
OH-58	4	1	1	7	13
TH-55	1	0	0	0	1
C-12	0	0	0	5	5
U-21	0	1	0	5	6
U-8	0	0	0	5	5
C-45	0	0	0	1	1
OV-1	0	0	0	1	1
Total	6	7	2	66	81

3 Fatalities, 0 Injuries
Estimated costs: $742,000

More U-21 fuel system problems

During the 13-month period ending September 1975, USAAAVS received 23 Preliminary Reports of Aircraft Mishap (PRAMs) concerning U-21 fuel system problems. These included improperly installed fuel filler caps, loose caps, bent fuel cap wells, and materiel failures of components.

Since then, USAAAVS has received 51 additional PRAMs that list U-21 fuel system deficiencies as cause factors. Obviously, we have a problem that needs to be corrected. Yet, while units transmitted 51 PRAMs, they submitted only 10 EIRs. To get action that will produce a permanent cure, we must first justify that action. So, we urge you to do the following:

Insure that personnel associated with U-21 aircraft are aware of this problem, and emphasize the need to prevent physical damage to filler cap wells during refueling. Inspect the caps and seals for any obvious deformities or damage, and make certain the caps are properly installed and secured. Then, if fuel-system-related mishaps persist, be sure not only to submit a PRAM but also an EIR—for every occurrence. ■

Don't clean screens

The maintenance section of the 5 April issue carried a UH-1 precautionary landing attributed to clogged fuel boost pump "T" fitting finger screens. The PRAM stated that all aircraft were grounded for a one-time inspection and cleaning of the filters. This is not the proper procedure. TM 55-1520-210-20, Change 19, page 5-38, par. 5-16k, indicates that screens are to be **removed and discarded** when maintenance or troubleshooting is required on the fuel boost system. ■

Survey participation welcomed

Because of the many requests for information from units not initially selected for the precautionary/forced landing survey, we are including the survey form in this issue on pages 7 and 8. ALL units are invited and encouraged to participate in this program to determine the cost of forced and precautionary landings as part of an overall effort to improve operational readiness. The survey is off to a good start, with more than 100 forms having been received already. Cut out the form and reproduce as many copies as you need for your unit. The results will be printed in FLIGHTFAX next fall. SSG Gerald Kimel, AUTOVON 558-3493/4812, can answer any questions you may have about this survey.

NSN for survival radio antenna

Item 2, paragraph 1-9, page 1-2, Change 2 to TM 11-5280-800-12, gives the wrong NSN for the AN/PRC-20 survival radio antenna. There is a new antenna (P/N M25869A) for this radio. It is flexible and wraps around the radio rather than telescoping into the case. It also comes with a sealing washer. The correct NSN (5985-00-239-7572) is listed in item 1, figure C-1, page C-5, Change 2 to TM 11-5280-800-12. The NSN may not yet be in the Army Master Data File, but the antenna is available. ■

(Thanks to CW3 Harold Hintze, Ft. Bliss, TX, for this information.)

USAAAVS

PRECAUTIONARY AND FORCED LANDING REPORT

Precautionary and forced landings by definition are not costed for mishap prevention purposes because damage and injuries seldom occur. However, these mishaps are costly in terms of maintenance manhours, manhours used in recovery operations, and interruption to unit operation.

Analyses show that components causing these mishaps are relatively low in cost, have a malfunction/failure rate higher than expected, and have a significant effect on aircraft reliability, aircraft availability, and the unit's readiness posture.

The purpose of this report is to gather information that can be used to quantify the cost of these mishaps and justify needed improvements in the components causing the mishaps. For this purpose, complete the report for each forced and precautionary landing. Be as accurate as possible. Each report will be computerized.

The requirement for this report will last only for the period needed to obtain enough cases for a valid sample. Considering the frequency with which these mishaps occur, it is estimated a period not to exceed 180 days will be sufficient.

The report need not be typed. It is self-addressed—just fold, staple, and drop in the mail. Your participation in the interest of more efficient and safer air operations is greatly appreciated.

For more information, call USAAAVS, AUTOVON 558-4510/4812.

A. Mishap classification (check one)
- ☐1 Forced landing
- ☐2 Precautionary landing

B. Date of mishap (enter numerically, e.g., 78 01 13)
Year _____ Month _____ Day _____

C. Time of mishap: Local time _____ (e.g., 1635)

D. Aircraft design model series _____

E. Aircraft serial number _____

F. IAW AR 385-40, Jan 1978, par. 5-8F, a PRAM is
- ☐1 Required
- ☐2 Not required

G. Check one or more from the indicators/indications below what first alerted the crew to the conditions leading to this mishap.

- ☐1 Vibration
- ☐2 Unusual noise
- ☐3 Unusual attitude
- ☐4 Faulty operation
- ☐5 Odor
- ☐6 Fluid leakage
- ☐7 Smoke or fire
- ☐8 Other personnel
- ☐9 Master warning/caution light
- ☐10 Annunciator panel
- ☐11 Voice warning
- ☐12 Fire warning light
- ☐13 Warning horn

RPM WARNING
- ☐14 Light
- ☐15 Audio
- ☐16 Tachometer

CHIP DETECTOR
- ☐17 Engine
- ☐18 Transmission (main)
- ☐19 Gearbox

INSTRUMENTS
- ☐20 Fuel
- ☐21 Oil
- ☐22 Hydraulics
- ☐23 Landing gear
- ☐24 Electrical
- ☐25 Other (specify)
- ☐26 No indication

H. Mission assigned this aircraft was: (check all appropriate ones)
- ☐1 Delayed less than 1 hour
- ☐2 Delayed more than 1 hour
- ☐3 Cancelled
- ☐4 Performed by another aircraft
- ☐5 Rescheduled same aircraft at later date
- ☐6 Assigned another mode of transportation

I. As a result of this mishap indicate the number of hours aircraft was NOT in a mission-ready (NOR) status. If aircraft remains NOR upon submission of this report, estimate. _____

J. As a result of this mishap, indicate total number of manhours lost by: (enter zero as appropriate)
- a. Rated flight crew _____
- b. Nonrated crew _____
- c. Passengers _____

K. Inspection and/or repair of this aircraft at the site of the mishap was performed by: (check as many as appropriate)
- ☐1 Crew assigned the aircraft
- ☐2 Unit maintenance personnel
- ☐3 Field maintenance personnel
- ☐4 Personnel other than established support

L. Recovery of this aircraft from the mishap site was completed by:
- ☐1 Recovery not required
- ☐2 Flown out by assigned crew
- ☐3 Flown out by maintenance crew
- ☐4 Transported by another aircraft
- ☐5 Transported by surface vehicle

M. Indicate the number of hours that elapsed from start to completion of the operation to recover the aircraft from the mishap site: _____ hours lapsed time

N. For the recovery operation, indicate the total number manhours required by: (enter zero as appropriate)
- a. Maintenance personnel _____
- b. Operational personnel _____
- c. Security personnel _____
- d. Medical personnel _____

O. For the recovery operation, indicate the total number of: (enter zero as appropriate)
- a. Recovery aircraft flight hours _____
- b. Surface vehicle hours of operation _____

P. To return this aircraft to mission-ready status, indicate:
- a. Maintenance manhours to repair _____
- b. Cost of replacement part(s) _____

Remarks: _____

_____

_____

(Continue on back if necessary)

Remarks (cont'd) _____

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Selected mishap briefs

Rotary wing

UH-1

Accident □ Aircraft crashed and burned. Three fatalities. Investigation in progress.

Incidents □ Aircraft was on night sling load training mission. Practice load was two 500-pound training bombs welded together. Load was set down and as aircraft was lowered with slack in cable load fell over, jerking cargo hook into bumper area around hellhole. Honeycomb panel was wrinkled and had to be replaced. □ Aircraft was No. 4 in second flight of five flying at night to PZ on dirt road. Aircraft in front made go-around because another UH-1 was shut down in PZ. Blowing dust caused pilot of No. 4 to momentarily lose visual reference and he executed go-around. Copilot advised pilot of possible blade strike and landing was made. Inspection revealed damage to both main rotor blades. □ Mast bumping occurred during termination of practice autorotation, causing incident damage to mast, FM antenna, and tail rotor blade.

Precautionary landings □ Tail rotor chip detector light came on. Caused by failure of 90° gearbox. □ Hydraulic failure occurred in flight. Cracked hydraulic tube caused complete loss of hydraulic fluid. □ Engine chip detector light came on. Inspection revealed small metal particles on mag plug. Aircraft was run up, shut down, and checked again. Mag plug then had large quantities of metal chips. Caused by internal component breakdown. □ Crew heard loud squeaking sound, followed by illumination of master caution light and complete loss of hydraulics. Running landing was made. Hydraulic line flange fitting failed under pressure, allowing hydraulic fluid to bleed out between line and flange. □ Aircraft was lifting out of PZ with troops on board when pilot noticed torque gauge fluctuating around 40 pounds. Neither pilot knew how high it fluctuated so aircraft was set down. □ Pilots smelled something burning and landed. No fire was found, but right forward servo was found loose on mount. Stud had snapped at mounting point.

AH-1

Incident □ Tow rings of skids hit wires during NOE flight. Bright sun above horizon caused reduced visibility.

Precautionary landings □ After SCAS was engaged, master caution, transmission oil bypass, and transmission oil pressure segment lights came on. Caused by failure of transmission internal oil filter gasket. □ Fluid was seen coming from battery vent. Battery switch was turned off. Ammeter dropped from 100 plus to 50 amps. Caused by malfunction of battery.

CH-47

Incident □ Aircraft was sling loading 105mm Howitzer. On landing, Howitzer was lowered to ground and aircraft positioned to put slack in sling. Aircraft drifted forward and pilot applied aft cyclic, causing bottom of aircraft to hit Howitzer.

Precautionary landings □ During ramp check, crew chief noticed leak on hydraulic oil cooler fan assembly and saw smoke. Caused by malfunction of hydraulic fan motor. □ Shortly after takeoff, left engine transmission oil pressure dropped to 15 psi. Caused by failure of oil pressure ►

Selected mishap briefs

transducer. □ As aircraft was sling loading 105mm Howitzer, cargo hook malfunctioned and load fell to ground. Cargo hook cam seat was worn, causing hook to disengage.

OH-58

Accidents □ Main rotor blade hit the ground as aircraft was flying low level. Investigation in progress. □ Powerplant failure occurred during flight and aircraft was landed in extremely rough terrain, causing major damage. □ Aircraft was trail in a flight of three looking for a tactical site. Pilot brought aircraft to 50-foot hover over small pinnacle with his tail into the wind. Aircraft was seen making two 360° turns to the right. Pilot entered autorotation and aircraft landed hard, with major damage. □ Loud noise was heard and aircraft hit powerline as pilot was trying to land to investigate noise. Minor damage to aircraft.

Incident □ Main rotor blades struck tree during NOE hover.

Precautionary landings □ Engine chip detector light came on. Oil filter and chip detector were saturated with metal particles. Caused by internal deterioration of engine. □ Master caution and main transmission chip detector lights came on. Small metal chip was found on main transmission magnetic plug.

OH-58 safety-of-flight

□ 131940Z Apr 78, subject: Safety-of-Flight Message No. OH-58-78-7, One-Time Inspection to Locate Specific Serial Numbered **OH-58A/B/C** Main Rotor Heads to Remove and Replace Suspected Hydrogen Embrittled Parts—TB 55-1520-228-20-23. **Summary**: It has been reported by New Cumberland Army Depot that bolts, P/N NAS 1304-13, NAS 1305-13, and NAS 1306-3H, and retaining latches, P/N 206-010-121-5, may have hydrogen embrittlement due to a problem with the cadmium plating process. These parts were installed on specific serial numbered main rotor heads. The serial numbers are listed in the body of this TB. All OH-58A/B/C helicopters should be inspected to determine if affected heads are installed. **Contact**: Mr. John Morris, TSARCOM, AUTOVON 698-5007, commercial 314-268-5007.

TH-55

Accident □ During engine shutdown after solo training flight, student pilot applied up collective pitch control as he closed the throttle. Helicopter became airborne and then landed hard, resulting in major damage.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landings □ (A series) No. 2 engine oil pressure fluctuated between 55 and 75 psi during cruise flight. Postflight inspection revealed vernatherm in oil cooler was binding on its shaft. Large particles of case sealer were found in nose case screen and engine oil filter. □ (A series) Oil pressure line to nose case cracked at No. 2 bearing boss, resulting in loss of oil into engine air intake, creating smoke and fumes in cabin. □ (A series) Strong odor of electrical fire was noticed in cockpit during takeoff roll. Gear handle was cycled to up position and gear motor

was heard running, but gear would retract only about 45°. Gear was lowered and aircraft landed. Clutch in landing gear gearbox was worn, causing it to slip.

U-21

Incident □ (A series) Nose wheel tire went flat on landing. Tire and rim were damaged.

Precautionary landings □ (A series) Flaps would not retract from 55° position after takeoff. Caused by flap motor malfunction. □ (A series) Fuel started to siphon from right wing tank fuel cap after cruise check was completed. Airspeed was reduced to 120 knots and fuel stopped siphoning. Caused by malfunction of fuel cap. □ (H series) Fuel was seen siphoning from right wing fuel cap during takeoff. Inside ring on fuel receptacle was bent and fuel cap was slightly cocked.

U-8

Precautionary landings □ (D series) Electrical odor was noticed in cockpit. Caused by arcing in right fuel boost pump switch. □ (D series) No. 2 engine began to vibrate during cruise flight, load did not show on No. 2 generator, and static appeared in ICS. Engine was secured and aircraft landed. Generator worked its way loose on mounting studs and disconnected generator drive shaft.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Engine oil pressure fluctuated in flight. Caused by improperly installed preformed packing on internal oil filter. □ Battery vents discharged hot fluid during landing. Caused by improperly adjusted voltage regulator. □ Transmission oil pressure fluctuated. Caused by loose cannon plug on transmitter switch. □ Pilot noticed stiffness in controls and master caution and hydraulic warning lights came on. Locally manufactured hydraulic line was installed incorrectly, allowing fluid to leak at fitting. □ Large amount of hydraulic fluid was seen under aircraft after shutdown in parachute drop zone. Caused by loose hydraulic line connection fitting.

AH-1

Precautionary landing □ No. 1 hydraulic system failed in flight. Running landing was made. Pressure line from No. 1 hydraulic pump chafed against line on No. 2 system. Pressure line ruptured, causing loss of hydraulic fluid.

CH-47

Precautionary landing □ Pilot noticed drop in transmission oil pressure from 26 psi to 20 psi. No. 1 engine transmission oil pressure was set too low.

OH-58

Precautionary landings □ Airspeed indicator did not function during takeoff. Plastic tube (pitot system drain) was broken off. Suspect drain was broken off when aircraft was washed. Most OH-58s have been modified to keep the plastic lines from hanging down, so it was not noticed as missing during PMD or preflight. □ Smoke was seen coming from avionics compartment and battery vents during landing. Caused by improper voltage regulator adjustment. ►

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Selected mishap briefs

C-12

Precautionary landing □ (A series) Pilot heard whistling noise during climb at 12,000 feet. Maintenance had been performed on air conditioning system, necessitating removal of bolts from forward bulkhead of pressure vessel. Loose bolt on avionics shelf was allowing air to escape from vessel, causing whistle.

OV-1

Precautionary landing □ (D series) No. 2 throttle linkage came loose in flight and differential power was used for landing. Engine was feathered after touchdown. Caused by improper safetying procedure.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

AH-1

□ Tug was pulling AH-1 to parking space. Driver could not stop tug and tail rotor of AH-1 hit main rotor blade tip cap of parked helicopter. Caused by worn brakes on tug.

C-12

□ As aircraft was being towed, right wing tip and dipole antenna hit fuel truck. Caused by failure to use sufficient ground personnel.

OV-1

□ Pickup truck was stopped on ramp and operator got out without turning ignition off or engaging parking brake. Truck rolled into OV-1, causing $6,000 damage. □ OV-1 was being prepared for a fuel line change. Right drop tank was checked to make sure it contained no fuel, and was released from wing. Left tank was not checked and when it was released, the two mechanics could not support it because it was half full, and it fell to the ground. Tank was damaged beyond repair.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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Weather forecasts... how good are they?

In many cases, the ultimate responsibility for a go/no-go decision is with the pilot alone. He or she must understand the limitations of the weather forecast used to make that decision. The weather forecaster supporting TAC operations has the resources of both the National Weather Service and the Air Force Global Weather Central at his disposal. In addition, extensive training in the field of meteorology enables the forecaster to understand most of the phenomena that occur in the atmosphere. However, weather forecasting for a specific time and place is still more an art or skill than a science. The accuracy of a weather forecast depends on the time, location, and phenomenon being forecast.

The table below, which is based on forecast verification statistics from TAC bases, shows how forecast accuracy is a function of both criteria and time.

Recent studies indicate the following:

■ Forecasts in the 3 to 6 hour time-frame are most reliable when there is a ►

FORECAST CRITERIA	% OF TIME FORECAST WAS CORRECT AFTER 3 HOURS	6 HOURS	12 HOURS	24 HOURS
Ceiling below 1,000 feet and visibility below 2 miles	75%	60%	50%	45%
Ceiling below 10,000 feet and visibility below 5 miles	85%	80%	70%	65%

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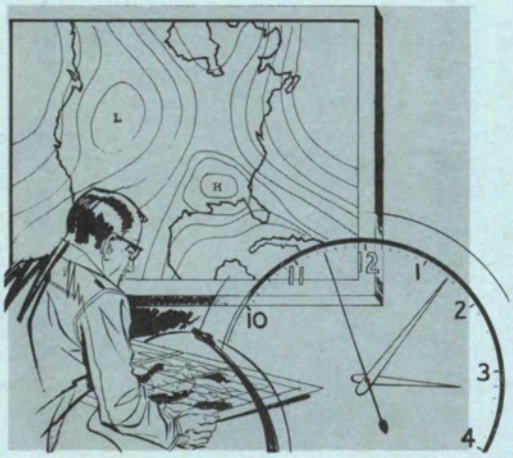
USAAAVS



distinct weather system, such as a front, mid-latitude low pressure area, or an upper air trough approaching a forecast location.

■ The timing and type of weather phenomena associated with fast-moving cold fronts and squall lines are very difficult to forecast accurately.

■ Forecasts made for a time interval are more reliable than forecasts for specific time of occurrence.

■ Forecasts of surface visibility are more difficult than forecasts for ceiling heights. Visibility in snow is the most difficult of all visibility forecasts.

The skill of forecasting specific events—such as thunderstorms or the onset of rain—is highly time-dependent. A recent study concluded: A forecaster can predict the onset of a thunderstorm 1 to 2 hours in advance at least 25% of the time if a weather radar is available. The study also concluded that predictions of the onset of rain or snow within plus or minus 5 hours are correct at least 75% of the time.

Cross-country flight forecasts pose different problems to the forecaster, who must forecast the time, location, and altitude of an event relative to cross-country flight track. Some of the important—and difficult—phenomena that come under this category include:

■ The location and occurrence of severe or extreme turbulence.

■ The location and occurrence of heavy icing.

■ The location, movement, and time of occurrence of thunderstorms which have not yet formed.

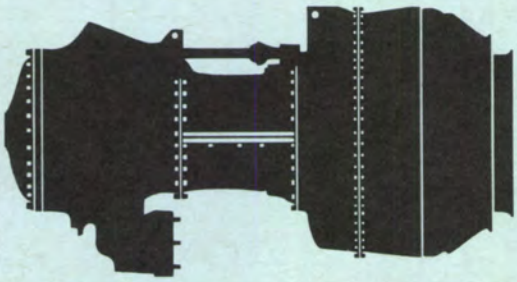
The point is that the atmosphere is in a state of constant flux and forecasts of atmospheric phenomena are highly time-dependent. The pilot should realize that the older the forecast, the greater the chance that some part of it will be wrong. The weatherwise pilot should view the forecast as the best professional advice that is available at the time.

The meteorological community is continually working to improve forecasting skills. Also, to better communicate the degree of certainty associated with expected atmospheric changes to the users of forecasts, Air Weather Service will implement the use of probability forecasts. Probability forecasts will increase the potential value of forecasts to the decision maker; you will hear more on this effort as techniques are improved.

Remember also that weather advisory accuracy is enhanced through the reporting of significant weather phenomena. The observation given in your PIREP allows the weather personnel to pinpoint thunderstorms, turbulence, icing, etc., and to advise other aircrews of the location of weather hazards instead of reporting only the probability. The forecaster exists to aid in the safe accomplishment of your mission. The more help you can give him, the more help he can give you. ■

—From TAC ATTACK

Gas turbine spring fever



Spring has sprung and the hot days of summer are soon to follow. It is also the time of the year one feels like putting off until tomorrow what one can do today. Usually, this is no problem except for our gas turbine engines.

Cold weather to a gas turbine engine is like honey to the bee. The cold air is thick, fat, and wet and makes breathing very easy. Most of our engines have been loafing and relaxing because little effort is needed to get the job done. But this will change with the soaring temperatures of spring and the hot humid days of summer. That same gas turbine is going to have to really strain, huff and puff, and gulp twice as much hot air to get the job done.

Now is the time to give her that spring checkup. Only in this case, it's BB 3100, water, rigging and topping check as called out in the TM instead of the doctor, dentist, honey and sulfur, or castor oil. If you are really interested in bringing that sweet thing on line for top performance, it's time to check the HIT records for which birds can stand a +10° C. increase without getting critical. These engines are the ones that will require troubleshooting for air leaks, variable inlet guide vane (VIGV) and bleed band rigging.

If you have an engine that continues to run hot after all the approved troubleshooting methods and washing procedures have been completed, a hot end inspection is in order. If nothing is found on the hot end inspection, and the engine still will not top because of excessive N_1 speed or exhaust gas temperature, it should be replaced no matter what the operating time is. Attempting to operate an engine that won't top correctly will only lead to trouble.

Adjusting the variable inlet guide vanes or any variable compressor vanes away from the design setting is reducing the serviceable life of the engine to make up for some other discrepancy within it. The engine will operate beautifully until its reduced life limit is reached and then that's it unless some parts are replaced and all adjustments returned to their designed setting. Unfortunately, there is no way to reestablish the design settings on the VIGV unless the engine is returned to depot.

Don't let the hot weather mess up your PE schedule. Get the sick ones before the trouble starts. If you don't, they'll all be down the first hot day with excessive egt or compressor stalls. Remember, spring cleaning is an old American custom.

If a PRAM is required due to an engine or engine accessory problem, submit engine model, series, serial number, total time, time since overhaul, (to nearest hour), overhaul facility, date of overhaul, previous storage history, cause of failure (if known), power settings, and significant engine indications. This is required by AR 95-5, par. 13-4, to determine if a fleet-wide trend is developing.

One final word. First stage compressor blade failures have dropped to nil . . . let's keep it that way. Never spray anything into a running engine. Spray when motoring with the starter only. ■

Accident analysis

ANALYSIS 78-4
Type aircraft: UH-1H
Time: 1320
Classification: Major
Injuries: None
Estimated cost: $76,137 (aircraft)
Mission: Service

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CPT	28	515	515
Copilot	CW2	36	1,052	1,927

The accident

The aircraft, supporting a parachute club, landed at the drop zone to pick up the jumpers. After takeoff and climb to altitude, the jumpmaster released a wind drift indicator over the drop zone, determined the wind velocity was excessive 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. The pilot, unaware that the parachute had deployed, interpreted the unusual attitude to be caused by tail rotor failure and initiated an autorotation. Downwind conditions, load, and the deployed parachute limited the effectiveness of collective pitch application following deceleration, the aircraft landed hard, and the main rotor blade severed the tail boom.

The cause

■ The jumpmaster, because of inadequate written procedures, did not disarm an automatic opening device being used by one of the parachutists after deciding to abort the mission. The manufacturer's instructions for the Sentinel MK 2000 automatic emergency parachute pack release system state: "If the jump is aborted for any reason, the MK 2000 should be disconnected from the cartridge." The jumpmaster interpreted these instructions as not mandatory and consequently did not disarm the device, which was actuated by the aircraft's descent.

The cures

■ Revise parachute portion of unit SOP to require that all automatic opening devices be disarmed before aircraft descent begins.

■ Revise par. 5, section I, AR 95-19, to include procedures for use of all automatic opening devices, especially when they will be armed and disarmed (i.e., when parachutist is returning to the ground aboard the aircraft and before descent is begun). Change par. 114.100 of the United States Parachute Association regulation to read: "1. All automatic openers: Disarm/disconnect before descent begins."

Danger– glass syringe

Recently an OH-58A crew chief used a 10cc glass hypodermic syringe with an 18-gauge needle to lubricate the tail rotor drive shaft hanger bearings of his aircraft. This was in accordance with approved TM procedures. While applying pressure to the syringe plunger, the upper portion broke (see photos) and penetrated his hand, damaging a tendon that required surgery to repair.

To prevent additional injuries from this cause, USAAAVS recommends maintenance units replace all glass hypodermic syringes with plastic ones. And even with these, personnel should exercise caution. If you find you must apply undue pressure to force the lubricant out, check for the cause. You may have a clogged needle.

As an alternative, units may choose to locally manufacture a tip using an 18-gauge needle to fit a regular grease gun, eliminating the need for a hypodermic syringe. ■

A crew chief shares a lesson learned

"Being acting crew chief for our unit's U-21, I held the obvious responsibility of insuring that the aircraft was properly serviced at our destination. The civilian contractor handed me a very large hose and nozzle that the Air National Guard used to fill their C-130s and C-141s, a hose that I had used just once before. When I saw that I was getting minimal pressure, I began filling the No. 1 nacelle tank. When the tank was just about full, I announced that I was shutting off the supply from my end of the hose. Just as I made my announcement, the civilian operator of the fuel truck turned the pressure way up and my tank began to overflow. Naturally, the reaction of all the people in the area at the time was to yell at the civilian to shut off the valve from the fuel truck. Much to everyone's surprise, the man turned the pressure up full blast (3,000 psi), sending me, my hose, and the step ladder ALMOST into orbit. I hit the pavement totally soaked and not exactly smelling like a rose.

"My first reaction was to take the civilian behind his fuel truck and let him know exactly what I thought of his job performance. But even though I had my goggles on, my right eye began to burn, sending me to the nearest watering hole to start flushing.

"My eye is all right now, but I know I wouldn't have had a chance if I hadn't been wearing those little jewels they call goggles. Of course, many other 'what ifs' popped into our heads as the day progressed.

"We can chalk that day up to luck and experience. One thing is for certain. I will never again make the assumption that the person who operates the pressure on a fueling truck always knows what he is doing!" ■

(Thanks to PV2 Amy Beth Ruby, DPT Aviation, Fort Benning, for sharing this experience with our readers.)

Selected mishap briefs

Rotary wing

UH-1

Incidents □ Main rotor blades hit trees as aircraft was landed in confined area. □ Crew chief was preparing to refuel aircraft. Before insertion of fuel nozzle, aircraft spun rapidly to left 360°. Fuel hose was severed and tail boom hit crew chief, who sustained laceration over eye and bruised shoulder and arm. Tail boom was dented. Suspect partial transmission seizure. □ As aircraft was making approach to LZ, it was hit in the right front side and main rotor blade by BB-type pellets. Investigation is being conducted to determine involvement of ground troops. □ Sheetmetal damage on inside of tail boom under No. 2 hanger bearing mount was found during daily inspection. Fitting attachment for blower exhaust heat exchanger had failed in flight, allowing the connected bleed air hose under pressure to whip around in aft battery compartment and forward section of tail boom assembly, causing punctures in sheetmetal.

Forced landing □ Engine chip detector light came on during out-of-ground-effect hover about 70 feet agl. Engine froze about 10-15 feet agl and IP completed autorotation to slope area. Engine was replaced.

Precautionary landings □ Engine oil pressure light came on. Pressure switch was replaced. □ Hydraulic light came on and hydraulic pressure was lost on final for landing. Caused by ruptured hydraulic line between filter and pump. □ Pilot landed in open field after flying into heavy snow shower. Flight was continued after snow shower passed. □ After approach to field location, pilot turned aircraft downwind at 5-foot hover with a 20-knot tailwind. At the same time, a second aircraft hovered upwind of first aircraft. As first aircraft started to descend rapidly, pilot increased power to slow descent and copilot noticed torque reading going through 50 pounds. Upon touchdown, torque had reached 55 pounds for 3 seconds.

AH-1

Incident □ Aircraft vibrated severely after takeoff from confined area and loud banging noises were heard from rear of aircraft. Aircraft was landed with power. No. 1 hanger bearing disintegrated. No. 2 hanger bearing and No. 2 tail rotor drive shaft were damaged and there was extensive damage to deck below No. 1 hanger bearing support mount.

Precautionary landings □ Master caution and engine fuel pump lights came on. Caused by electrical short resulting from corrosion in cannon plug. □ Master caution light came on and engine oil pressure indicator dropped to 30 psi. Caution panel segment light did not illuminate. Caused by failure of engine oil pressure transmitter.

CH-47

Precautionary landings □ Bottom of copilot's door came loose during hover to set down sling load. Pilot set load on ground and as aircraft was landed, door fell off. Inspection revealed locking lugs and blocks for door were in place. □ Oil leak was noted at No. 1 generator. Caused by defective oil seal.

CH-54

Precautionary landing □ Second stage servo caution light came on during approach.

Caused by failure of hydraulic pressure switch.

OH-6

Precautionary landings □ Oil bypass light came on, oil pressure slowly decreased and temperature increased. Caused by internal failure of engine. □ N2 increased rapidly during takeoff to hover. Throttle was reduced and aircraft landed. Caused by N2 governor failure.

OH-58

Forced landings □ Aircraft yawed left during takeoff and engine-out audio sounded. Pilot noted N2 rpm deteriorating and landed aircraft. Engine continued to wind down and quit. Caused by failure of double-check valve. □ Loud noises were heard from engine, oil pressure dropped, and TOT increased to red line. Pilot reduced power to keep TOT below red line and landed with partial power. Engine was also spewing smoke. Caused by internal failure of engine.

Precautionary landings □ Generator failed during flight. Caused by burnt brushes on generator. □ Aircraft had just landed when left passenger door popped open. Copilot got out of aircraft to secure door and noticed fuel coming from engine deck drain. Inspection revealed that retainer packing in engine-driven fuel pump had failed, allowing fuel to leak from pump. □ Master caution and transmission chip detector lights came on. Caused by internal component failure of main transmission. □ Master caution and d.c. generator caution lights came on. Generator was reset but did not come back on line. Caused by starter/generator malfunction. □ Control problems were noted at hover. Caused by failure of hydraulic double-check valve.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-3

Precautionary landing □ Oil was seen siphoning from engine after takeoff. Pilot failed to secure oil cap during preflight.

U-21

Precautionary landings □ (A series) Fuel pressure fluctuated and 3 minutes later fuel boost pump failed. □ (A series) Right wing fuel tank began siphoning fuel during takeoff and aircraft was landed. IP reset fuel cap and flight was continued.

U-8

Precautionary landings □ (D series) During climbout, IP noticed 2-inch hole in right center wing aft of engine. Right main landing gear retaining ring failed and went through wing. □ (F series) No. 2 engine was shut down for maintenance check of feathering operation. Engine then failed to restart. Engine was not modified with accumulators.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Incident □ On takeoff, crew chief noticed cargo door retaining pin bending upward and grabbed door just as it came loose from its rear attachment points and retaining pin broke. Crew chief was able to hold to door until aircraft landed, but couldn't prevent it from slapping against side of aircraft. Suspect lower track was worn ►

Selected mishap briefs

excessively and slider retaining bolts were overtorqued.

Precautionary landings □ Battery overheated in flight because of high voltage regulator setting. □ Master caution and hydraulic pressure lights came on after autorotation was completed. Caused by ruptured left lateral servo line due to chafing push-pull tube.

CH-47

Precautionary landings □ Flight engineer discovered leak from No. 2 flight boost pressure line during cruise flight. Caused by improperly placed clamp on No. 1 generator blast tube. □ Crew smelled fuel fumes and landed. Fumes vanished and no leaks were found so aircraft was released for flight. At next stop, flight engineer found slight seep at cabin heater fuel solenoid valve. Caused by loose nut on valve.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 14-20 APRIL 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	5	1	35	41
AH-1	0	1	0	2	3
CH-47	0	0	0	9	9
CH-54	0	0	0	1	1
OH-6	0	0	0	3	3
OH-58	0	0	2	11	13
TH-55	0	0	0	1	1
C-12	0	0	0	1	1
U-3	0	0	0	1	1
U-21	0	0	0	2	2
U-8	0	0	0	2	2
Total	0	6	3	68	77

0 Fatalities, 1 Injury
Estimated costs: $22,776

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High summer temperatures set the stage for nicad battery malfunction mishaps

During the months of December and January, USAAAVS received no mishap reports that listed nicad-battery-related cause factors. But in February, units submitted four such reports. In March, the number rose to 11; and we can be certain these numbers will continue to climb as hot weather becomes the norm—unless we take preventive measures now.

What happens to a battery while it is in the shop will determine, in great measure, whether it will perform as intended or whether it is likely to fail at some future time.

Steps to take

The initial steps include a thorough cleaning and inspection of the housing, cover, individual cells and all connectors. Any item deemed unserviceable is replaced, making certain that all connectors are torqued by the book. Next, the capacity of the battery is restored in strict accordance with specified procedures. Since the state of charge of each cell cannot be determined beforehand, an electrical load is placed on the battery until all cells are completely discharged. This action insures every cell will be restored to its maximum capacity when charged and that none will be at a higher (or lower) state of charge than others. To know when full capacity of the battery has been restored, the charging input is monitored in current and time until the ampere hour capacity has been reached. This procedure balances the cells and brings the battery to full capacity. One final step remains—that of adjusting the electrolyte level.

The plates in the nicad are porous and extremely absorbent. As cells are discharged electrolyte is absorbed into the plates and the level decreases. Charging of the battery has the opposite effect, driving the electrolyte out of the plates back into the cells. If water is added when the battery is not fully charged, the cells may be overfilled. Consequently, the level ➤

CAI off to good start

On the first of April a new concept called Centralized Accident Investigation, or CAI, came into being, with USAAAVS investigating on a trial basis all major and selected minor accidents worldwide. A month has now passed and our teams have investigated six accidents. Support from the field has been SUPER! Everyone has cooperated to the fullest during these investigations, making our job easier and insuring the success of CAI. We would like to emphasize the importance of IMMEDIATELY notifying our CAI operations center when an accident occurs. This office is manned 24 hours a day, 7 days a week, and immediate notification will allow us to get a team in motion. With continued field support, we're optimistic that the payoff from CAI will be what all of us in the Army are working for—increased operational readiness and greater combat effectiveness.

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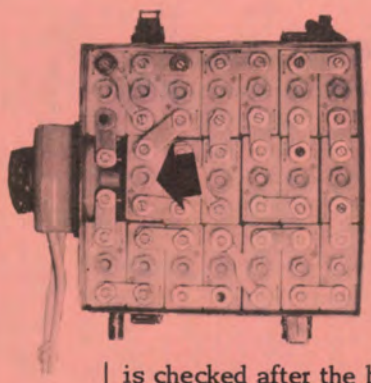


The Aviation Center is now testing 20-cell Permion batteries. If the 20-cell battery is approved, conversion would be made by adding a single cell (arrow) to present battery, with no modification to housing.

is checked after the battery has had time to rest and cool off following charging. If the cells should be overfilled, excess electrolyte may spew out the vents. Potassium hydroxide (KOH) electrolyte used in the nicad battery has a high affinity for carbon dioxide present in the air and will combine with it to form potassium carbonate which can clog the vents. Should this happen to a battery installed on an aircraft, the result could be ruptured cells and fire or explosion during flight. Even if vents do not become clogged, formation of potassium carbonate within a cell will degrade both battery capacity and performance.

Further, battery shop technicians must constantly guard against battery contamination. Since the KOH electrolyte of the nicad is a strong alkali, it becomes imperative that no tools or equipment used to service or test lead-acid batteries should ever be used on nicads. This is an extremely critical point as the KOH electrolyte contaminates easily whether in battery cells or containers unless it is kept covered at all times. Even the fumes emitted by lead-acid batteries into the atmosphere can contaminate the nicad.

Mechanics and pilots

Although an efficiently operated battery shop is an absolute necessity for longevity and reliability of nicad batteries, the best efforts of shop technicians can be negated by the actions of mechanics and pilots. In addition to routine duties such as insuring the battery is properly installed and secured, and making certain the vents are clean and unobstructed, the mechanic has a most important responsibility—that of seeing the voltage regulator is precisely adjusted and the electrical system is operating properly. If the voltage regulator is set too high, battery overheating and loss of electrolyte may occur as well as thermal runaway that can lead to battery failure and aircraft damage. This means BY-THE-BOOK procedures must be followed. Recently one battery failure was traced to an improperly adjusted voltage regulator. The mechanic who performed the work relied on the voltmeter installed on the aircraft to make adjustments instead of using a precision instrument. Let's follow the recipe found in our TMs and not substitute ingredients.

Finally, assuming battery shop and maintenance personnel have done their jobs properly, the fate of the battery now rests in the hands of the pilot. If he subjects the battery to frequent and unnecessary loads, such as repeated or prolonged ground starts and checking of electrical components when external power sources are authorized and available, then he is placing the battery on the road to destruction. Heat generated by battery drain is

Revised nicad battery inspection checklist

USAAAVS recently mailed units a revised nickel cadmium battery maintenance inspection checklist to replace the one published in the 7th edition of the "Guide to Aviation Resources Management for Aircraft Mishap Prevention." This new checklist will be incorporated in the 8th edition of the "Guide" when it is printed. If you did not receive a copy of the new checklist, write Commander, USAAAVS, ATTN: IGAR-PG, Fort Rucker, AL 36362, or call AUTOVON 558-4479, commercial (205) 255-4479.

reinforced by heat generated during the charging cycle. Results can vary from battery overheating and spewing of electrolyte to clogged vents, thermal runaway, and even to rupture of cells and explosion.

If he must use the battery for these purposes, the pilot should follow certain precautions such as performing a touch test before each start (if possible). This is done by touching the battery in a manner similar to that used by a housewife to check the temperature of her iron. If the battery case is too hot to hold a hand against, then the battery should be allowed to cool before another engine start is attempted.

In addition, the pilot should monitor the loadmeter periodically during flight. If it begins to read 10 to 20 percent or more above the normal stabilized indication, he should suspect a battery problem. He should then turn off the battery switch and note any change in loadmeter indication. If the indicator shows a sharp decrease in load, he should leave the switch off and have the battery checked on landing.

To prevent incipient battery failure, all connections must be torqued by the book.

Although the responsibilities of shop technicians, mechanics, and pilots have been presented in capsule form, we can readily see that the integrity of our nicad batteries depends on the multiple actions of a variety of personnel. A breakdown in performance of any of these can lead to premature battery failures.

Technician checks electrolyte level after battery is fully charged. (Note protective gloves; technician is also wearing protective eyeglasses and apron.)

One final bit of information

From TM 55-1520-210-10 we have the following warning: "Do not open battery compartment and attempt to disconnect or remove overheated battery. Battery fluid will cause burns and overheated battery will cause thermal burns and may explode."

This warning applies primarily to us. In short, it tells us to leave an overheated battery alone **when no fire is present.** Along with this warning comes another borrowed from a sister service. While this pertains primarily to firefighting and rescue crews, we should all be aware of it. It reads as follows: **While CO_2 is an acceptable fire extinguishing agent once a fire has developed, in no case should CO_2 be directed into a battery compartment to effect cooling or to displace explosive gases when there is no fire. The static electricity generated by the discharge of the extinguisher(s) could explode hydrogen/oxygen gases trapped in the battery compartment.**

Accident analysis

ANALYSIS 78-5
Type aircraft: UH-1H
Time: 2345
Classification: Major
Injuries: None
Estimated cost: $60,439 (aircraft)
Mission: Service

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	25	959	959
Copilot	CPT	30	1,746	1,746

The accident

A UH-1 pilot, after completing a night range firing service mission, was making a landing to an unlighted area of a tactical LZ. The pilot had just been exposed to large floodlights at the range site, resulting in minimum dark adaptation of vision. The approach was made with cockpit instrument lighting set at high intensity. The pilot told the copilot to turn on the searchlight. The LZ was partially obscured by patchy ground fog and a whiteout condition was created by turning on the searchlight. The light was turned off and the crew continued what they thought was a normal approach. The aircraft hit the ground hard, spreading the skids, and was then picked up to a 75- to 100-foot hover and landed.

The cause

■ The pilot performed a course of action prohibited by TC 1-28 because of inadequate unit training. He impaired his night vision by improper use of searchlight and cockpit instrument lights. Although he was faced with the requirement to land at a minimum lighted LZ partially obscured by patchy ground fog at night, his unwise use of the cockpit instrument lights and searchlight at the expense of retaining his visual dark adaptation clearly indicates his lack of understanding and knowledge of the night vision techniques and principles specified in TC 1-28.

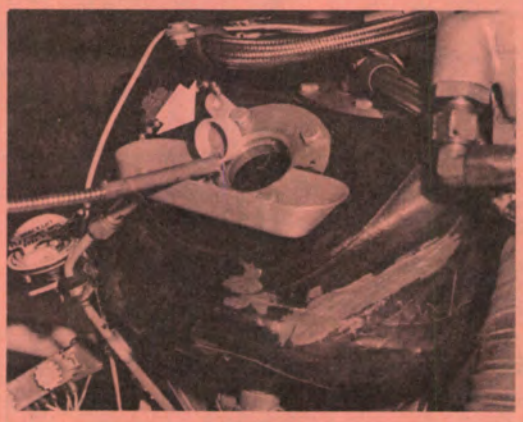
The cure

■ Units upgrade/provide night vision training to place increased emphasis on dark adaptation, protection of night vision, and night vision techniques. A requirement for night flight training as prescribed in TC 1-28 should appear in all ARTEPs for aviation units.

FOD-out of a bottle

We've all heard stories of surgeons leaving forceps or some other instrument inclosed in a patient's abdominal cavity following an operation. Well, if true, the medical profession is not the only party guilty of this practice.

Recently, an OH-58 lost oil pressure during flight and the pilot made a precautionary landing. As the photograph shows, the cause was an oil sample bottle cap that had inadvertently fallen into the oil reservoir, blocking the flow of oil to the engine.



The moral? If you accidently drop some object, whether it is a nut, bolt, tool, shop towel or whatever, or if you can't locate some item you know you had with you while performing maintenance, FIND IT—before you button up the aircraft. As you can see, anything—even a plastic bottle cap—can cause FOD that could result in a serious mishap. ■

Fowl weather

Since spring is likely to have heavy migratory activity, avoid, as much as possible, night and low-level flying during the spring. When you run into fowl weather consider the following:

- Learn about birds in your operating area.
- Keep fields adjacent to runways clear and clean.
- Brief birdstrike emergency strategy before every flight.
- Scan the skies, especially before takeoff, in the pattern, and prior to landing.
- Keep helmet visors down at all times.
- Although strikes are most common below 1,000 feet, don't become complacent at higher altitudes.
- If a flock of birds cannot be avoided, reduce airspeed, if possible.
- Don't fly below a flock of birds as they will dive to evade an aircraft.
- In the event of a birdstrike, monitor engine instruments in case of intake ingestion.
- Keep air traffic controllers advised of flock movements.

—Adapted from TALON SERVICE NEWS

Survival kit tidbits

■ We've been told that chapsticks in the survival kits have melted on the other items in the kits, possibly making them unfit for use.

■ Canned drinking water, NSN 8960-00-243-2103, is a "T" coded item (condemned) and should not be requisitioned. Replacement canned drinking water may be requisitioned by NSN 8960-00-916-4202 at 42¢ each. Reference message R101846Z March 1978, from CDR, USASA, STSAP-MDS. POC is Mr. Weatherby, AUTOVON 444-2963.

Selected mishap briefs

Rotary wing

UH-1

Accidents □ During approach to field site, aircraft encountered downdraft and settled. Pitch was pulled and aircraft hit trees and burned. Three injuries. Investigation in progress. □ While making pinnacle landing, aircraft slid off pinnacle backwards and rolled over. Major damage to all components.

Incidents □ Postflight inspection revealed damage to tail rotor. Suspect access cover separated from aircraft and went into tail rotor. □ As aircraft reached flight idle during start, pilot noticed engine egt rising past 600° and aborted start. Engine inlet cover was left installed during start.

Forced landing □ Engine stalled, followed by loss of power and rpm decay. Hovering autorotation was made. Caused by internal failure of fuel control.

Precautionary landings □ Right rear soundproofing blanket came loose during flight. Copilot noticed the loose blanket and told pilot to land. Blanket was being held in place by the outboard row of snaps and by the edge of the frame of the right rear passenger seat. □ Crew smelled pungent odor similar to burning insulation and landed. Caused by defective landing light. □ Binding was felt in tail rotor pedals during takeoff. Caused by failure of hydraulic servo cylinder. □ Pilot flew into unforecast heavy snow showers and visibility decreased to less than .4 NM. Pilot landed and waited until snow shower passed and visibility increased. □ Master caution light and right boost pump segment light came on. Caused by failure of boost pump. □ Master caution and hydraulic lights came on. Caused by defective hydraulic pressure switch.

AH-1

Incidents □ Aircraft hit unmarked wires during level flight at 50 feet agl and 75 knots. Incident damage to forward cross tube, VHF/UHF antenna, and both tail rotor blades. □ During termination of low-level flat glide autorotation, main rotor blade flexed down and hit tail rotor drive shaft cover, denting cover and No. 4 drive shaft.

Forced landing □ During climb, pilot heard and felt high frequency vibration in collective system. As pilot prepared to land, N_2 began fluctuating between 6200 and 6600 rpm. Pilot terminated approach to hover and engine failed during hover taxi.

Precautionary landings □ Master caution and No. 1 hydraulic segment lights came on during hover, followed by stiffening of antitorque pedals. Postlanding inspection revealed failure of hose assembly. □ Engine oil pressure caution light came on. Caused by defective pressure switch.

CH-47

Incidents □ As aircraft circled a field site for landing, crews on ground noticed open work platform and told pilot. The upper one-third of the platform separated from the main body of the platform, and it cannot be determined if the latch failed. □ As aircraft was on approach, tower told pilot that left work platform was open. Platform was bent and sheetmetal was damaged. Caused by failure of forward latch assembly.

Precautionary landing □ Low side beep

failure occurred after load was dropped off in LZ. D.C. emergency beep was used to restore normal operating conditions to No. 2 engine. Both rotor tach indicators then dropped to zero. Caused by failure of rotor tachometer generator.

OH-58

Incident □ Postflight inspection after NOE flight revealed damage to both main rotor blades.

Precautionary landings □ Engine oil bypass light came on due to low engine oil level. Investigation revealed that direct pressure reading oil line to torque gauge was loose. □ N2 rpm dropped to 90%. Collective was reduced and rpm stabilized. Power was applied at termination of approach and N2 decreased further. Caused by check valve assembly malfunction.

TH-55

Precautionary landing □ Left pedal arm on IP flight controls broke at base through horizontal shaft portion of arm. IP had been required to apply abnormal pressure to override and correct an excessive pedal application by the SP during a hovering autorotation.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landings □ (A series) No. 2 engine fire warning light came on during takeoff. Fire handle was pulled and engine shut down. Caused by moisture on connector. □ (A series) Flaps were extended to 50 percent during approach and then could not be further extended or retracted. Caused by broken fuse on left flaps.

U-21

Precautionary landing □ (A series) Both vertical gyros failed in flight, causing both attitude indicators to spin. Caused by failure of fuse for vertical gyros in copilot's circuit breaker and fuse panel.

O-2

Precautionary landing □ Pilot noticed airframe vibration and identified the source as the front engine. Vibration reduced somewhat after throttle was retarded. Postlanding inspection revealed support spinner became dislodged and stuck against side of spinner at connecting bulkhead, causing out-of-balance condition.

OV-1

Precautionary landing □ (D series) While taxiing, IP was told that fluid was dripping from belly of aircraft. Investigation revealed fuel was siphoning from main fuel tank overflow and vent line. Caused by defective check valve.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landing □ Hydraulics were lost during landing. Left cyclic servo hydraulic pressure hose assembly chafed against left cyclic servo connecting link. The chafing action wore away the steel shielding on the hose assembly, causing ➤

US Army Aviation Training Library
Fort Rucker, Alabama 36360

the hose to rupture and resulting in loss of hydraulic pressure.

Cargo handling mishap □ During cruise flight, shear pin on cargo hook sheared, allowing lower unit of hook to drop. Manual release lever was engaged and load jettisoned. One of the two required thrust washers was not installed on the cargo hook retainer assembly.

AH-1

Precautionary landing □ Roll channel SCAS hardover occurred as aircraft was picked up to hover. Caused by SCAS roll channel card being out of alignment.

OH-58

Precautionary landing □ In cruise flight at 100 knots, forward cyclic stop was contacted and left turn could not be made. Pilot returned to airfield and, during shutdown, heard metallic "clunk" from under his seat. Fore/aft force gradient assembly was improperly installed, causing clevis to chafe against cyclic control torque tube.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Double check valve status?

Maintenance Advisory Message, 162255Z Mar 78, subject: Maintenance Advisory Message **OH-58A/OH-6** Helicopters (OH-58A-78-3 and OH-6A-78-3), required a one-time check valve status report to be submitted to TSARCOM. Those units that have not yet responded to this message are urged to do so ASAP. A safety-of-flight message, 211400Z Mar 78 (78-4) restricted OH-58As and OH-6As from NOE, contour, low level, and night flight if installed with the old style check valve, P/N 685462Z. Units should insure that valid requisitions have been submitted for the number of improved check valves required. ■

TOTAL MISHAPS FOR 21-27 APRIL 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	2	2	1	27	32
AH-1	0	2	1	6	9
CH-47	0	2	0	1	3
OH-58	0	1	0	9	10
TH-55	0	0	0	1	1
C-12	0	0	0	2	2
U-21	0	0	0	2	2
O-2	0	0	0	2	2
OV-1	0	0	0	1	1
T-42	0	0	0	1	1
Total	2	7	2	52	63

0 Fatalities, 3 Injuries
Estimated costs: $1,280,295

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VOL. 6, NO. 3 □ 19 OCT 1977

Improved OH-58 tail rotor drive shaft bearing

TM 55-1520-228-23P, dated 18 July 77, lists an improved tail rotor drive shaft bearing on pages 257 and 259. This bearing (P/N 206-040-339-9, NSN 3110-01-018-6506) replaces the old type bearing (P/N 206-040-339-7) and can be recognized by the eight lubrication points that are provided on each.

Pending publication and revision of TM 55-1520-228-23, instructions from the Bell 206 Jet Ranger commercial manual are provided below:

Each 300 hours, lubricate 206-040-339-9 tail rotor bearings, if installed, as follows:

a. Wipe clean the outboard side of the bearing seal plate to reveal the four 0.08-inch diameter holes. It is not necessary to wipe the inboard seal plate clean.

b. Using a 6-cubic centimeter (CC) medical syringe and 18-gauge hypodermic needle, inject 0.5 CC of MIL-G-81322 grease into each bearing. Inject the 0.5 CC of grease into one of the holes in the bearing seal plate. If hypodermic needle does not fully enter seal and bearing, remove needle and rotate drive shaft to clear bearing ball cage and reinsert and inject grease into bearing.

c. Needle shall be purged prior to each use and external surface of needle lubricated to prevent tearing seal. Wipe excessive grease from exterior of bearing.

NOTE

Maximum recommended operating temperature is 185° F. (85° C.). In the first 15 to 20 hours, after lubrication, it is normal for a bearing to run 90° F. (50° C.) hotter than the maximum recommended operating temperature.

If additional information or clarification is required, contact Mr. T. D. Bell, TSARCOM, AUTOVON 698-5007, commercial (314) 268-5007. ■

Seeping seals?

Having problems with lubricant seeping from your UH-1 main rotor blade grip seals? Check chapter 10, page 10-7, paragraph 10-34 of TM 55-1520-210-10 for a simple procedure that may very well cure your problem. A letter recently received from one field unit states that in several instances this technique has worked for them. So, the next time you are haunted by seeping main rotor grip seals, why not give it a try—and maybe save yourself some down time for seal replacement. ■

Prepared by the U.S. Army Agency for Aviation Safety, Fort Rucker, AL, AUTOVON 558-4479. 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 analyses. Direct communication is authorized by AR 10-29.

USAAAVS

Accident analysis

ANALYSIS 77-4
Type aircraft: AH-1G
Time: 1450
Classification: Major
Injuries: None
Estimated cost: $38,428 (aircraft)
Mission: Training (refresher)

	Grade	Age	RW Hrs	Tot Flt Hrs
IP	CW2	36	3,736	3,751
Pilot	CPT	35	1,438	1,444

The accident

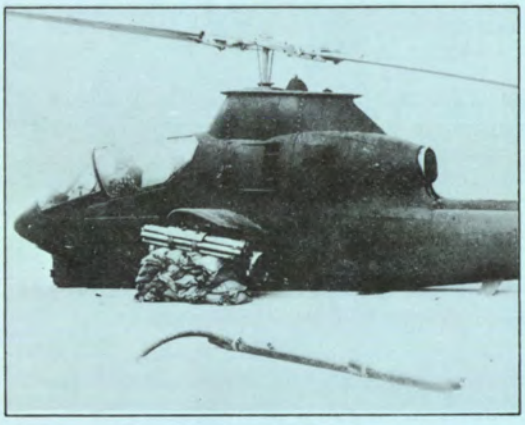
The pilot performed several approaches to regain his familiarity with the gunner's station. The IP then demonstrated a left and right antitorque maneuver, followed by a standard autorotation. The next maneuver was to be a standard autorotation performed by the pilot. After normal descent and deceleration, initial collective pitch was applied, followed by cushioning pitch. The aircraft struck the runway right rear skid low, crushing the right aft portion of the skid. The IP applied collective and began rolling on throttle. The aircraft came off the ground, traveled 49 feet, and struck the runway again. The skids then separated from the aircraft. By this time, the previously applied power became effective and the IP stabilized the aircraft at a low hover and landed on sandbags.

The causes

■ Pilot inaccurately estimated rate of closure. As a result, he failed to adequately correct for a high rate of descent in close proximity to the ground.

■ Pilot was attempting to perform an emergency maneuver from a crew station (gunner's) in which he was not adequately trained. AH-1G pilots receive training in the pilot's station. The techniques and capabilities of the pilot in that seat do not readily transfer to the gunner's station.

■ IP improperly monitored the pilot's performance and was unable to react in a timely manner to correct the high rate of descent. Because of the pilot's performance during a previous flight and his total flight experience, the IP may have been overconfident in the pilot's ability to perform the maneuver.



The cures

■ Reevaluate the practice of requiring pilots/gunners to perform emergency procedures/maneuvers from the gunner's station.

■ Standardization boards should insure that SIPs/IPs conduct training and evaluation flights in a logical sequence, so that the aviator's skill level may be observed during less demanding maneuvers before proceeding to the more complex emergency maneuvers.

(These cures are possible remedies and not necessarily the only appropriate ones.)

TOTAL MISHAPS FOR 30 SEP-6 OCT 77

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1*	5	1	19	26
AH-1	0	0	0	5	5
OH-6	0	0	0	2	2
OH-58	0	0	3	12	15
CH-47	1**	2	0	1	4
U-3	0	0	0	1	1
U-21	0	0	0	1	1
T-42	0	1	0	0	1
C-12	0	0	0	1	1
U-8	0	0	0	1	1
Total	2	8	4	43	57

0 Fatalities, 3 Injuries
Estimated costs: $2,368,955***

*Misappropriated aircraft accident
**Ground accident
***Includes misappropriated and ground accidents

Materiel failure/malfunction mishap analysis

77-2
Type aircraft: JUH-1H
Classification: Major (total)
Injuries: 3 major, 1 minor
Estimated cost: $644,630 (acft, injuries)
Mission: Service

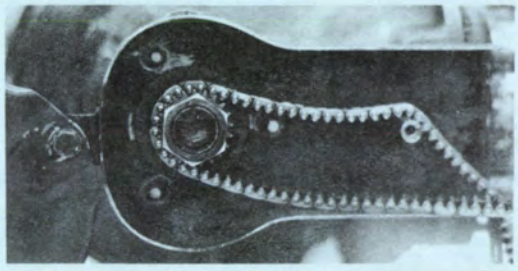
The mishap

During contour flight at 100 feet agl, copilot told pilot there was binding in the tail rotor pedals, and the aircraft began a slow spin to the right. The pilot applied strong pressure to the left pedal, but it could not be moved. The copilot retarded the throttle to control the spin. Although rotation was reduced, the aircraft continued to spin and crashed.

The causes

■ Tail rotor sprocket retaining nut, P/N 240-010-767-1, backed off, jamming tail rotor pedals in full right position. Mechanic failed to install cotter key, P/N MS24665-157, in accordance with TM 55-1520-210-20. Mechanic had recently been relieved from crew chief duties and was **probably** inadequately motivated.

■ TI failed to insure installation of cotter pin. He had been known to sign off, sight unseen, work done on safety-of-flight items.



Exposed view of control quill assembly, depicting nut backed off and absence of cotter key. Also reflects scoring of face of retaining nut.

The cures

■ Improve supervision of unit activities to insure that personnel are not assigned mechanic duties as a disciplinary measure.

■ Improve supervision of TIs to insure proper inspection procedures. This could be done by periodic spot checks.

■ Redesign tail rotor system to prevent jamming. A possible solution would be to eliminate all rotating components within the control system and replace with an antijamming push-pull system incorporating antijam fairleads and self-retaining bolts.

(These cures are possible remedies and not necessarily the only appropriate ones.)

Selected mishap briefs

Rotary wing

UH-1

Accident □ Unauthorized person raised aircraft to a hover and lost control during attempt to set it back down. Aircraft was destroyed.

Incidents □ Postflight inspection revealed incident damage to one main rotor blade. □ Exhaust diffuser cover separated in flight, striking tail rotor blade and tail boom. Suspect cover fractured at attaching bolt. □ Bird strike resulted in 6-inch crack in chin bubble. □ Aircraft was picked up and hovered over takeoff site for 2 minutes. While landing, pilot permitted aircraft to drift sideways about 6 to 8 feet and sit down on top of 50-pound fire extinguisher which had not been placed in its usual standby position after aircraft start. Metal skin at station 205 was punctured. □ Aircraft was landing to a pinnacle with trees on three sides. Rotorwash bent several small trees over, making termination point appear larger than it actually was. After termination of approach, trees regained their original shape and hit underside of both main rotor blades, causing skin damage.

Precautionary landings □ Engine chip detector light came on. Carbon was found on plug. □ Fire warning light came on for about 3 seconds, then went out. After landing, crew chief saw fuel spraying out of area by fuel control. Fuel control unit was leaking at bleed band valve housing. □ Egt fluctuated during hover/taxi. Thermocouple connector was replaced. □ Aircraft yawed approximately 20° to right in cruise flight. Pilot thought a gust of wind had caused the yaw and deactivated force trim. Right antitorque pedal then tried to motor into full forward position. Pilot was able to override antitorque pedals and maintain trimmed flight. Running landing was made at airfield. Caused by internal failure of servo assembly.

AH-1

Precautionary landings □ Master caution and No. 2 hydraulic segment lights came on. Pilot heard noise which sounded like hydraulic pump cavitating. Master arm switch was turned off, armament circuit breaker was pulled, and landing was made. Caused by failure of lateral cyclic SCAS servo actuator. □ Oil bypass light came on. Caused by transmission bypass switch failure. □ Battery overheated during landing.

OH-6

Precautionary landings □ After 30 minutes of flight, instrument lights began to dim, then went out. DC electrical power indicators began dropping to zero. Battery switch terminal shorted out on cyclic torque tube, draining all DC current. □ Transmission oil pressure caution light came on. Suspect magnesium corrosion clogged filter.

OH-58

Forced landings □ Engine lost power without prior indication of failure. Settings at time of failure were TOT 660°, N_1 95 percent, and N_2 103 percent. Caused by failure of fuel pump assembly. □ TOT rose sharply and loud grinding noise was heard from engine/transmission area. Suspect internal engine failure.

Precautionary landings □ Transmission chip detector light came on. Caused by failure of transmission assembly. □ During

Selected mishap briefs

simulated hydraulic failure approach, rotor rpm light, engine-out light, and engine-out audio activated. Cannon plug on rpm sensor was corroded. □ Pilot felt vibration in antitorque pedals and landed. Nos. 1, 2, and 8 tail rotor hanger bearings were worn. □ N2 needle dropped to zero and remained. Caused by tachometer generator failure. □ Whistling noise was heard in flight, followed by popping sound and increased vibration. Caused by bonding separation of rotor blade upper skin near blade tip.

CH-47

Ground accident □ During termination of practice autorotation, No. 2 engine had static beep failure, stabilizing at 62% N1. Engine was stabilized at 70% N1 using emergency trim. During 2-wheel taxi following static beep failure, loud bang was heard from rear of aircraft and No. 2 engine torque went to 800 pounds. Emergency shutdown was performed and discrepancy entered on Form 2408-13. About 2½ hours later, MOC was performed to determine source of difficulty. When No. 2 engine was brought to flight, it operated satisfactorily for a few seconds, followed by loud explosion in rear of aircraft. Aircraft caught fire and was destroyed. Caused by failure of No. 2 engine transmission sprag clutch assembly. Test pilot, copilot, and crew chief received minor injuries.

Incident □ After landing and rolling internal load off aircraft, pilot attempted to roll aircraft forward, to clear rollers and load from ramp. As aircraft came to low hover, ramp extension was driven into sod, forcing floor of ramp upward and ripping ramp at hinge point.

CH-54

Other □ Aircraft was on landing approach to confined area with slingload (salvaged aircraft) when collective bounce occurred. Oscillations increased and crew tried to release load with electrical release. Release would not work so load was jettisoned with emergency cable cutter. Caused by electrical failure of cargo hook.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

TSARCOM message

□ 031845Z Oct 77, subject: Maintenance Advisory Message for AH-1G/Q/S (Mod) Extending the Retirement Schedule of the Canopy Removal System (CRS), AH-1-77-2.

Fixed wing

U-21

Precautionary landing □ (A series) Nose gear light would not indicate down and locked position. Gear was recycled several times with the same results. Tower flyby confirmed all gear down and apparently locked. Postlanding inspection revealed loose wire to terminal board.

Human factor mishap □ (D series) After about 50 minutes of flight, rear position technical operator complained of nausea. Aircraft was flown straight and level for a short period and operator felt he could continue mission. About an hour later, operator again complained of nausea and requested mission be aborted. Operator had logged only 4.5 hours in this type aircraft. Flight surgeon gave medication to reduce motion sickness.

T-42

Incident □ On downwind leg of traffic pattern, bird hit center of windshield,

bending free air temperature probe.

U-8

Precautionary landing □ (D series) Landing gear would not fully retract after takeoff. Gear was lowered manually and aircraft landed. Caused by failure of gear motor assembly.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Forced landing □ Throttle went to full off when IP made routine check during autorotation. Flight idle solenoid retaining bolts were loose, allowing solenoid to drop down. Aircraft had recently been to DIO maintenance for engine change and later for replacement of fuel control. Their records showed no removal or adjustment of solenoid.

Precautionary landings □ Intermittent high frequency vibration occurred in cruise flight. Intensity increased and decreased in direct proportion to the amount of power applied. Left pedal creeped forward with force off and pressure removed from right pedal. Hydraulic lines to tail rotor servo were improperly rigged, resulting in binding of lines when right pedal was applied. This caused left pedal to creep forward. During routine maintenance by crew chief, only one tail rotor blade grip was purged, resulting in an imbalance of the tail rotor.

AH-1

Precautionary landing □ Before initial pitch-pull during demonstration of straight-in autorotation, IP noticed No. 1 hydraulic warning light illuminate and heard squeal from hydraulic pump, followed by stiffness in pedals. Autorotation was continued to touchdown. Fitting of hydraulic line was cross-threaded at SCAS yaw actuator, causing loss of fluid.

OH-58

Precautionary landing □ Loud bang was heard from battery area during run-up. Inspection revealed two battery holddown clamps were in unlatched position and battery case was split. Wrong size screw caused arcing condition.

CH-47

Incident □ Copilot's door blew off in flight. Examination of aircraft revealed no discrepancy. Suspect door was mounted improperly.

Precautionary landing □ No. 1 generator caution light came on. P1 wire was found loose at generator terminal. Retaining nut had backed off.

C-12

Precautionary landing □ Gear failed electrically during retraction. Caused by loose wire on emergency gear extension disconnect switch.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Selected mishap briefs

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Aviation-related

UH-1

□ Aircraft was being moved from a building to the flightline. Individual was guiding aircraft by holding onto tail stinger. A 6-inch drop from hangar floor to ramp surface was unnoticed by ground handling crew, and when ground handling wheels crossed dropoff, aircraft pivoted around front of skids, causing tail boom to pitch downward. This movement of tail boom caused tail stinger to knock the individual guiding aircraft to the ground and pin him there. □ Three aircraft were parked in LZ. Aircraft in middle took off and its rotorwash opened copilot's door of one of the parked aircraft, slamming door against hinge stops. Door was not properly secured after flight. □ Aircraft was being secured as a result of severe storm warning. While aircraft was being towed from washrack to hangar, main rotor hit building. Ground guide was distracted, and towing vehicle had a top on it, restricting the driver's vision. □ Mechanic, exiting tail boom to get more tools, lost his balance and fell backwards. His back struck the lower frame of the workstand.

CH-47

□ Guard vehicle driver blacked out or fell asleep and vehicle hit parked aircraft.

OH-58

□ As tow vehicle started backing up, tow ring on right skid pulled out, causing aircraft to pivot, with tail moving to right. Washer under screw that anchors tow ring failed, allowing ring with screw to be pulled through skid. Tow ring, screw, and washer were the correct size and installed IAW maintenance manual. □ Crew chief was returning to aircraft with crew doors on top of tug. When he reached aircraft and stopped, rotorwash from hovering UH-1 caused doors to be blown off tug. Doors hit crew chief and aircraft.

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Density altitude. . .a critical hot weather consideration

To many aviators density altitude is something periodically mentioned in weather briefings that signifies decreased aircraft performance. While most aviators are aware of this fact, few really understand the disastrous effects that high density altitudes can have on aircraft performance unless they have encountered the problem. Consequently, year after year density altitude is listed as a factor in aircraft accidents.

While technique is important, the only way an aviator can be completely sure his aircraft is capable of performing a mission under high gross weight conditions is to consult the operator's manual performance charts. Often these performance charts, which required a great deal of research, testing, and money to compile, go unused because of the time and effort required to check them. As a result, many aviators proceed with a potentially critical mission in high density altitude conditions based on skill alone. This places the aviator in a precarious position which can result in a costly accident. However, it is only through knowledge and its proper application that we can successfully combat the problems of high density altitude.

Three factors

Air, a mixture of gases, occupies space and has mass; therefore, density. Density, or the concentration of molecules, determines the ability of air to support.

AH-1G crashed because pilot took off without considering the effects of high gross weight and high density altitude.

The thicker, more dense it is, the greater its support capability. Air density is affected by three main factors: temperature, pressure, and humidity. Of these, temperature and pressure have the most adverse effect. When air undergoes a drop in pressure or a rise in temperature, expansion takes place and the air molecules move away from each other. Air density decreases and so does its ability to support. The reverse holds true if pressure rises or temperature decreases. Humidity has a similar effect as moisture displaces air, making humid air lighter or less dense than an equal volume of dry air.

This relationship of pressure, temperature, and humidity of air establishes density altitude. For practical purposes, we can express density altitude as the relative altitude or load-lifting ability of air as it expands and contracts. At times, this expansion and contraction seem unbelievable. At one Army post, for example, the actual elevation ranges from ►

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USAAAVS

After takeoff from confined area, rpm decayed and UH-1H struck trees. Pilot tried to continue low-level flight but aircraft descended and crashed. Five occupants were killed and five sustained major injuries. Aircraft gross weight was 9,200 pounds and temperature was 26 degrees C. Pilot failed to perform or incorrectly performed a go/no-go check and did not assess density altitude, temperature, or wind conditions.

300 to 500 feet above sea level. Depending on weather and time of day, the density altitude may vary from minus 1,000 feet to plus 4,000 feet. Consider that a UH-1H at a gross weight of 9,500 pounds can clear a 50-foot obstacle with a zero ground run (vertical takeoff) under standard (15° C.) sea level conditions. With a temperature rise to 35° C. the aircraft will require a takeoff distance of 255 feet and an airspeed of 20 knots to clear the same obstacle.

Since lift is not only dependent on the shape of an airfoil and angle of attack but also on the mass of air causing the lifting force, as density altitude becomes greater, lift decreases. In helicopters, high density altitude has the same effect as loss of rotor rpm. For example, power trains can be overtorqued, reciprocating engines can be overboosted, and autorotations can become especially critical when pilots attempt otherwise normal maneuvers under high density altitude conditions.

Engine performance affected

Low density air (high density altitude) also affects engine performance. While the volume of air flowing through a gas turbine engine may remain constant at high density altitudes, this thinner air contains less mass, and thrust (power) is lost. A temperature of 100° F., for example, reduces the efficiency of a gas turbine engine by approximately 15 percent from that under standard conditions of 59° F.

During hot weather, density altitude changes are rapid, frequent, and great. The load you take off with at dawn may well be beyond the capability of your aircraft an hour later. Density altitude must not only be computed for takeoffs, but also equally important, for destination landings. This is particularly true if you are taking off from a low altitude and plan to land in high terrain. And, particularly, extra caution is a must for autorotations.

Steps to take

With this in mind, your aircraft will do all it is asked to do and come home safely even on the hottest day if you (1) compute density altitude BEFORE weight and balance, (2) always assume density altitude to be higher than it probably is, (3) study your operator's manual density altitude tables, and (4) act accordingly. ■

Can you complete this mission? Work this weight and balance problem and see.

You are part of a flight of five UH-1H aircraft that have been assigned to pick up 25 combat troops early in the morning and transport them to a 6,000' msl pinnacle for insertion. The ground commander expects this insertion to be carried out in one sortie of your flight of five. The pinnacle is a 30-minute flight from the PZ and you plan your arrival at the PZ to have 960 pounds of fuel. Aboard each aircraft is a pilot, copilot, and crew chief. The operating weight of your aircraft upon arrival at the PZ will be 6,906 pounds. Due to heavy fog in the morning, the mission is delayed until mid-afternoon. Upon landing at the PZ your OAT gauge indicates 30° C. and your elevation is 2,800' msl. The PZ is small and will require a nearly vertical departure. Can you complete this mission? What is your advice to the ground commander? (Answer on back page.)

Accident analysis

ANALYSIS 78-6
Type aircraft: OH-58A
Time: 1445
Classification: Minor
Injuries: None
Estimated cost: $21,427 (aircraft)
Mission: Maintenance test flight

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW3	39	2,653	2,653

The accident

The pilot had completed several maneuvers and was climbing to conduct a turbine engine analysis check when the transmission chip detector light came on. Power was reduced to cruise and a loud snapping noise was heard. The aircraft yawed right, followed by severe vibration and feedback in the cyclic control. The pilot then rolled off the throttle and, with reduction of collective, entered autorotation and initiated a turn to his left toward an open field. On final approach to the field at about 200 feet, the pilot saw unmarked wires in his path. He attempted a cyclic climb and simultaneously rolled the throttle on to try to go over the wires. These actions failed to sufficiently decrease the rate of descent and the aircraft passed through the wires, severing three power cables and two telephone cables. Full power was regained after the wire strike and the aircraft was landed.

The cause

■ The pilot entered autorotation instead of landing at the nearest safe landing area as required by the operator's manual. He did this because he lacked confidence in the durability of the OH-58 flight control system after having read many times of the "failure of the dog legs."

The cure

■ Insure personnel are ready/capable of performing jobs assigned. Pilot confidence in use of equipment must be to the degree that overreaction to situations will not result in exceeding the operational parameters of the equipment. Implementation could be accomplished by unit SIPs stressing the operational capabilities and limitations of the equipment, proper methods of use, and proper control actions in given situations.

Problems with PRAMs

We continue to receive PRAMs which do not give complete or correct information as required by Appendix D, AR 385-40 (draft), effective 1 Jan 1978. This problem can easily be eliminated if each unit will use the worksheet on page 5 of this issue. Simply cut out this form and use it as a guide or reproduce as many copies as you need for worksheets. But don't send us the worksheet. You must still transmit the report by electronic communication facilities.

When you're filling out your report, keep this in mind. Many PRAMs are received with incorrect NSNs for the parts that failed. Parts manuals give the most current NSN. When an old part fails and the NSN is not in the parts manual, the unit inadvertently reports the NSN for the improved part. For instance, six recent PRAMs listed double check valve failure. All six PRAMs gave the part number for the new check valve, but it was the old check valve that failed in five of the six cases. Each unit had to be called to verify this.

Check the part number carefully before you report it. Read it from the part, not the book. If the part is obsolete and the NSN is not in the parts manual, report only the part number. We will come up with a good NSN.

Another problem that can be easily corrected is the lack of supplemental information. Suspected or incorrect data is cranked into the computer and never corrected unless a supplemental PRAM is received. Par. 5-8b of AR 385-40 (draft) states: "When further investigation discloses additional information, changes the original classification of the mishap, or reveals significant information which may affect safety of flight (design/maintenance deficiency or component/system malfunction/failure), a supplemental message will be submitted. This message will reference the original message; provide the date and time of the occurrence, the aircraft mission, type, design, series, and serial number; and include all supplemental information."

By the way, even though you must phone USAAAVS to get centralized accident investigation (CAI) assistance when an accident occurs, this does **not** eliminate the requirement for a PRAM. ■

Cleaning Nomex

It was previously thought that drycleaning would temporarily alter the fire retardancy of Nomex by leaving a residue on the fibers. This was never confirmed, and Natick Research and Development Command says you can now dryclean your Nomex. ■

TOTAL MISHAPS FOR 28 APR-4 MAY 78

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	0	3	31	34
AH-1	0	0	0	6	6
CH-47	0	0	0	3	3
CH-54	0	0	0	2	2
OH-58	2	0	0	8	10
U-21	0	0	0	1	1
C-12	0	0	0	2	2
OV-1	0	0	0	1	1
Total	2	0	3	54	59

0 Fatalities, 2 Injuries
Estimated costs: $178,319

Worksheet for Preparing Preliminary Report of Aircraft Mishap (PRAM)

Addresses as specified in paragraphs 5-8d, e, f, and g of draft AR 385-40

Subject: Preliminary Report of Aircraft Mishap, CSOIG-11 (MIN)

1. Date_____ Time (local) _____ hrs. ☐ Dawn ☐ Day ☐ Dusk ☐ Night

2. Give distance in direct nautical miles and direction from nearest military installation or prominent geographical feature; otherwise, use latitude and longitude.

3. Aircraft type, design, series _____ Complete serial number _____

4. Unit identification _____ Unit identification code (UIC) _____

   Home station of unit operating the aircraft _____

5. Mishap classification _____ Actual or estimated cost and brief description of damage:

6. Operator's duty (IP or Pilot) _____ Name (Last, first, MI) _____

   SSN _____ Grade _____ Unit assigned _____

   Home station _____

7. For all mishaps, list all other CREWMEMBERS (name, SSN, grade, duty, unit) and give details of any ejection or bailout.

   a. No. of MILITARY occupants on board (OTHER THAN CREW) _____

   b. No. of OTHER occupants (OTHER THAN CREW) _____

8. List all injured personnel and give the following information for each: Name, SSN, grade, sex, and degree of injury.

9. Mission _____ Type clearance (IFR or VFR) _____ Destination _____ Time in flight _____

10. Phase of operation (landing, takeoff, etc.) _____

11. Description of how mishap occurred. Begin with first indication of emergency, malfunction, failure, or unusual occurrence. Include crew response and reaction of aircraft to control inputs if other than normal. Include airspeeds and altitudes agl as necessary to aid in description. Include density altitude and gross weight where inadequate aircraft performance is a factor (inadequate power for conditions) and describe termination of problem (landing, further damage, procedures used).

PRAM WORKSHEET

12. Weather ☐ was ☐ was not a cause factor. If so, in what way? _____

13. Describe any known or suspected maintenance or inspection factors. _____

_____

14. Describe any known or suspected materiel deficiencies. _____

_____

EIR control number _____ NSN _____ Part number (obtain from failed part) _____

Nomenclature of suspected or failed part and name of publication from which info obtained _____

_____

If major component failure or malfunction was a factor, additionally submit: Component model _____

Series _____ Serial number _____ Total time _____

Time since overhaul (to nearest hour) _____ Overhaul facility _____

Date of last overhaul _____ Previous storage history _____

Cause of failure _____ Power settings _____

Significant indications _____

15. List other personnel contributing to mishap or injured as a result of mishap _____

_____

Brief description of damage to government or public property other than the aircraft _____

_____

16. a. Date nearest FAA facility was notified, if required (AR 95-30) _____

b. Brief description of any violations to civil or military regulations (if none, so state) _____

_____

c. Classified material ☐ was ☐ was not on board (for missing aircraft).

d. Aircraft ☐ was ☐ was not serviced with fire resistant hydraulic fluid.

e. Dangerous or hazardous material ☐ was ☐ was not being transported at time of mishap. Material ☐ did ☐ did not contribute to mishap. Any other pertinent information:

_____

f. Aircraft ☐ was ☐ was not performing ☐ authorized ☐ unauthorized, ☐ supervised ☐ unsupervised terrain flight, i.e., NOE, low level, or contour.

g. USAAAVS will periodically issue instructions requiring the reporting of other specific data pertaining to mishap prevention problem areas. Such data will be reported in this subparagraph.

17. For additional information, contact: Name _____

Address _____

Duty _____ Telephone number _____

PRAM WORKSHEET

Selected mishap briefs

Rotary wing

UH-1

Forced landing □ During cruise flight at 1,500 feet agl, pilot noticed reduction in N1 and engine and rotor rpm. Pilot entered autorotation and placed governor switch in emergency position as N1 was declining past 30%. Engine power was regained at 300 feet agl. Engine/rotor rpm reached 7000/343 respectively before positive throttle control was regained. Power-on landing was made with governor switch in emergency position. Suspect governor control malfunction.

Precautionary landings □ Left fuel boost pump warning light came on during hover from refueling point to parking area. Boost pump filter screen had collected enough foreign matter to restrict fuel flow. □ Transmission pressure gauge fluctuated from 0 to 100 and clicking noise was heard. Caused by malfunction of gauge. □ Engine oil pressure fluctuated. Caused by failure of oil pressure indicator. □ Hydraulic pressure warning light came on. Caused by failure of hydraulic pressure switch.

Other □ Aircraft was on the ground operating at 5500 rpm, awaiting formation of flight. A child threw a rock from outside the airfield. Rock struck and damaged main rotor blade.

AH-1

Precautionary landings □ Transmission oil pressure warning light came on and pressure gauge fluctuated 2 psi. Caused by defective pressure switch. □ Aircraft yawed violently to left during hover. Second yaw was felt as aircraft was descending and torque dropped 30%. Caused by governor overspeed.

CH-47

Precautionary landings □ Both generator caution lights came on during approach for landing. Caused by failure of relay assembly. □ Aft transmission input seal began leaking in flight and aircraft was landed. Seal was replaced, MOC conducted, and aircraft released for flight.

CH-54

Precautionary landing □ No. 1 engine had high side fuel control malfunction (N2 sensing failure) during cruise flight. N1 lever was pulled back to control engine and landing was made. Caused by sheared N2 sensing cable drive shaft.

OH-58

Accidents □ While in a turn from about 300 feet, aircraft descended and crashed in trees. Pilot and crew chief were injured. Investigation in progress. □ Power was lost over trees. Pilot tried to extend glide to avoid trees and a fence and aircraft landed hard, spreading skids and separating tail boom.

Precautionary landing □ Transmission chip detector light came on. Numerous metal particles were found on mag plug as well as suspected crack on left side of transmission. Transmission was changed.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landing □ (A series) Landing

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gear was lowered and left main gear safe light would not come on. Tower confirmed gear was down and aircraft was landed. Caused by internal failure of gear microswitch.

OV-1

Precautionary landing □ (D series) No. 2 hydraulic pressure gauge dropped to zero during descent. Caused by failure of hydraulic pump.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Forced landing □ Engine failed as IP rolled throttle back to flight idle. Flight idle detent was improperly adjusted, allowing IP to roll throttle full off.

Precautionary landing □ Pilot noticed fluid coming from battery vent during landing. Voltage regulator was set too high.

AH-1

Precautionary landings □ Pilot saw oil on right wing stub and landed. Hairline crack was found in fitting on transmission oil filter pressure line. Caused by overtorqued fitting. □ Master caution and No. 2 hydraulic lights came on. Postflight inspection revealed loose No. 2 hydraulic pressure line at transmission bulkhead. Line was not properly torqued.

OH-58

Precautionary landings □ Master caution and hydraulic pressure lights came on, followed by stiffening of controls. Postflight inspection revealed retainer packing was missing from T fitting of hydraulic line. □ Pilot noticed engine oil temperature reading 120° C. in flight and landed. While washing aircraft on the previous day, crew chief taped over engine oil cooler exhaust as required by the dash 20 and failed to remove tape after washing aircraft. Pilot did not notice tape over oil cooler. □ Crew heard loud squeal, master caution light came on, and hydraulic power was lost. Nut on hydraulic T fitting was found loose.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Answer to weight and balance problem

Takeoff gross weight at PZ: **9,066**
Temperature at LZ: **24° C.**
Landing gross weight at LZ: **8,776**
Can you complete this mission? **No**
Comments: **To depart the PZ the pilot must reduce his takeoff gross weight by approximately 350 pounds, remembering to plan his flight with a 30-minute fuel reserve.**
If you have any questions or comments, call AUTOVON 558-4198.

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Where to set it down? Anywhere you can.

While flying low level, an OH-58 pilot initiated a 20° banking right turn. During the turn, the pilot looked out the left window and became disoriented. The force trim was off, and the cyclic was moved forward and further right, placing the aircraft in a descending right turn with a bank angle of 60° to 80°. Before the pilot could complete recovery, the aircraft struck several trees, breaking the chin bubble and pilot's windshield. Tree branches lodged in the broken windshield, obstructing the pilot's vision to the front and right side. As the aircraft continued through the trees, the right skid cap was lost and the right horizontal stabilizer and lower portion of the vertical fin were severed.

The pilot turned the aircraft further to the right, flew clear of the trees and approached a road at about 10 to 15 feet agl at an airspeed of 10 to 15 knots. Prior to crossing the road, numerous pieces of plexiglass, one piece of the right nose structure, and several small branches fell off the aircraft. Forward flight was continued. The aircraft was climbed to approximately 100 feet agl to clear telephone lines. Immediately afterwards the aircraft was brought to a 3-foot hover, but before setting it down, the pilot realized he was over civil property and elected to climb back over the telephone wires and fly over the trees back onto the military reservation—a distance of nearly 300 meters.

In another case, the crew chief of a UH-1 smelled what he suspected was fuel vapor. He reported this to the PIC, who elected to continue flight to his destination. The fuel odor persisted until it got the full attention of the crew. About five minutes out from the destination airfield, the copilot became extremely nauseated and was approaching unconsciousness. ►

Two views of aircraft that continued flight after tree strike show extent of damage (note bent push-pull tubes and sheared horizontal stabilizer as well as lower portion of vertical fin).

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a precautionary landing can be made to any suitable area—on or off military reservations

The flight was continued to the destination airfield where the copilot was evacuated to the installation hospital. Had the PIC elected to make a precautionary landing when initially alerted by the crew chief, he would have found a leaking fuel line and probably would have decided to abort the mission until the problem was corrected. When questioned about his decision to continue flight to his destination, the pilot responded by saying that he did not know of an authorized landing area along his route except at the destination airfield.

Why are some pilots reluctant to land an aircraft off a military installation?

Maybe the answer can be found by examining a recent precautionary landing. In this instance, the pilot was transporting a general officer when he encountered inclement weather. As the flight continued, weather conditions deteriorated. Finally, the general suggested that they should land until the weather improved. The pilot agreed that a precautionary landing was in order but that he was obligated to set the aircraft down on a military reservation. The general eliminated that problem by assuming full responsibility for any repercussions that might arise from a precautionary landing made off the reservation. A landing was made with no damage and no repercussions.

Somewhere along the line, some Army aviators have acquired the mistaken notion that a precautionary landing must be made either at established airfields or on a military reservation. Maybe these pilots are reading par. 3-15b of AR 95-1, which states that major Army commanders must authorize the use of temporary landing areas off military installations. Reading further, they would find that par. 3-15c authorizes aviators to select landing and takeoff areas when performing lifesaving missions or in the event of an in-flight emergency which makes further flight inadvisable. The proposed revision to AR 95-1 will eliminate references to in-flight emergencies and will authorize aviators to make a landing in any suitable area when further flight is inadvisable—as determined by the PIC. **And we emphasize—the landing can be made anywhere.** When an immediate precautionary landing is deemed advisable **by the pilot**, rotary wing aircraft may be landed **in any suitable landing area.** And while pilots of fixed wing aircraft will normally make a precautionary landing at the nearest available airfield, **they may**, if the situation warrants it, make a precautionary landing in any suitable area, whether prepared or unprepared.

Of course, when aircraft damage is either known or suspected, not only are aircraft to be landed but they are to remain on the ground until released by the maintenance officer.

Although, in the one example cited, a damaged aircraft was flown back to the military reservation without further incident, that is not always the case. Continued flight when a precautionary landing is in order—for any reason—can prove extremely risky. Many a pilot has gotten into trouble by pressing on to his intended destination when he should have aborted his flight.

Don't be misinformed about **when** and **where** to set it down.

When: The PIC deems necessary.
Where: Any suitable landing area.

Accident analysis

ANALYSIS 78-8
Type aircraft: UH-1H
Time: 1010
Classification: Major
Injuries: 2 major
Estimated cost: $114,722 (acft, injuries)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CPT	28	1,048	1,048
Copilot	WO1	29	312	312

The accident

The lead aircraft on a practice airmobile assault mission was approaching an unimproved landing zone. The copilot had been at the controls for the entire flight. The pilot told the copilot to land as close to the trees as possible. During the descent, the copilot saw that the approach would terminate short of the intended touchdown point and made a correction to extend the approach. The pilot also saw what was happening and motioned for the copilot to move up and to the right. As the aircraft moved closer to the tree line, the pilot moved to get on the controls to try to make a right turn. At this time, the main rotor blades hit the branch of one tree and then hit three more trees. The aircraft finally came to rest upright, with major damage.

The causes

■ The pilot improperly monitored the performance of the copilot because of overconfidence in the copilot's flying ability. He allowed the copilot to fly the entire mission while he did the navigating and radio work. During the approach the pilot monitored the instruments and when he noticed the copilot maneuvering too close to the tree line, he failed to take timely corrective action.

■ The copilot inaccurately estimated his clearance during the approach because of excessive self-motivation. The pilot had told the copilot to land as close as possible to the trees. Because the copilot was soon to become a PIC, he was overly anxious to fulfill the expectations of his peers as well as his platoon leader. Therefore, as he got near the trees he failed to allow himself enough margin for a safe landing.

The cures

■ Inform personnel, through unit safety meetings, of problems concerning overconfidence in others.

■ Improve monitoring of personnel and unit activities to detect excessive self-motivation as related to safe aircraft operation. Such monitoring should be increased during field training exercises to insure that common safety practices are not sacrificed in accomplishing the mission. USAAVNC COI 2G-F15, "Aviation Commander's Readiness Course," and COI 2-1-C32, "Aviation Warrant Officer's Advanced Course," should include this as a training objective.

Latest on blade tracking

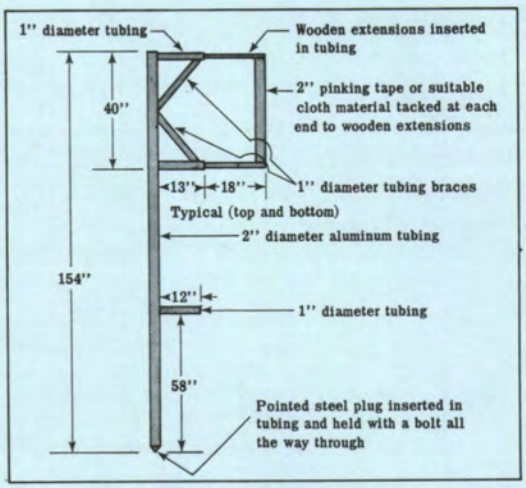
During a recent period, the Army had six OH-58 and two UH-1 blade tracking mishaps, with a damage cost of more than $50,000. Inexperience, inattention, or improper procedures were involved in all eight mishaps. Consider the following:

■ A mechanic was preparing to track the main rotor blades on an OH-58. He was standing below and just outside the main rotor's tip path plane with the tracking flag in his hand, and the rotor was turning at full rpm. He leaned in toward the helicopter to give instructions to the pilot who was assisting him and inadvertently pulled the tracking flag with him. The pole of the tracking flag struck one of the main rotor blades. **Cost: $4,229**

■ A pilot and maintenance personnel were tracking the main rotor blades on an OH-58. An inexperienced tracking flag handler allowed the base of the flag to slip inward and the upper metal arm of the tracking flag hit one rotor blade. **Cost: $4,229**

■ After a maintenance operational check had been completed on an OH-58, the tracking flag was moved into position. The mechanic misjudged the distance between the tracking flag pole and the main rotor blades and the pole hit the blades, damaging the trailing tips of both blades. **Cost: $8,458**

■ A pilot was at the controls of an OH-58 and a power setting of 70% N2 was established. A maintenance NCO was demonstrating main rotor blade tracking procedures to members of the maintenance platoon. When lining up the flag with the tip path plane he had to look directly into the sun. He became disoriented and the mast of the tracking flag hit the rotor blade. **Cost: $9,373**



Dimensions and recommended materials for tracking flag fabrication (from PS magazine).

Particularly noteworthy is the number of mishaps involving the OH-58, because a tracking flag is not a component of the prescribed tracking system for that aircraft. In each case, the UH-1 tracking flag was being used to track the OH-58 main rotor. This can be attributed to the inadequacy of the prescribed tracking light during bright daylight conditions. The light does not have enough candlepower and is not concentrated in a beam toward the target assemblies.

But help is on the way. TSARCOM will soon be announcing the availability of a new Dynamic Balancing and Tracking Kit (P/N B-4591, NSN 4920-01-040-7816) for OH-58 aircraft maintenance. The kit is expected to be available for issue in late June and TSARCOM will have a team available upon request for unit training in user procedures.

With the issue of the new kit, OH-58 blade strikes with tracking flags should be eliminated. Until then, maintenance

personnel must be thoroughly briefed on proper procedures and the hazards associated with rotor tracking operations. Insure that prearranged signals are understood by all personnel involved and that the operation is closely supervised by experienced personnel.

In addition to inexperience, both UH-1 mishaps involved tracking flag inadequacies. There is a plan to replace the UH-1 tracking flag with a kit similar to the OH-58 kit. However, a lot of UH-1 rotor blades will have to be tracked before this change is made. So for the time being at least, we are stuck with the tracking flag and the potential hazard of blade strikes.

Because of the lack of published criteria on the dimensions of a tracking flag, many configurations have been fabricated by using units and many of them are hazardous. PS magazine (Issue 278, January 1976) published a sketch with dimensions and recommended materials for fabrication of a flag that will do the job. Make yourself a new flag and get rid of the hazardous contraption you have been using. Once the new flag is made, make sure only experienced personnel use it.

Blade tracking mishaps can be prevented with the proper tools, experienced personnel with the right attitude toward safety, and close supervision. ■

When all else fails, try common sense

A CH-47 pilot, after a day's sling work, was told to return the accumulation of slings to the PZ. The area the pilot selected was well away from the PZ and immediately adjacent to a POV parking area. To make matters worse, he decided to hover at 50 feet and told his crew to throw the slings from the ramp to the ground.

Needless to say, this is not a normally accepted method of discharging a load of this or any other nature. In the first place, great care should be exercised when hovering around objects which may be damaged by rotor downwash. Secondly, whenever any item is discharged from an aircraft (unless it is designed to be air dropped), especially loose equipment such as slings or nets, the aircraft should be landed. The equipment should be removed and secured in such a manner as to prevent it from being picked up by rotor downwash and brought into the rotor system during ground run or takeoff.

The lack of common sense exhibited in this case endangered an aircraft, its crew, and the people on the ground for no real reason. THINK ABOUT IT! ■

Attention ASO students

If you are planning to attend the Aviation Safety Officer (ASO) Course beginning 9 July 1978, please insure your orders contain the statement specified in DA Cir. 351-77 authorizing additional TDY and travel during this course for participation in a flight mishap prevention survey. Participation in the survey is a requirement for course completion and award of appropriate ASI. ■

Selected mishap briefs

Rotary wing

UH-1

Incidents □ Aircraft, flying off shoreline in straight and level flight at 1,000 feet, hit line to kite. Line wrapped around head of aircraft. Haze and color of kite (blue and white) were factors. □ Aircraft flew through three lines of high voltage cable as pilot was approaching median strip of freeway for medevac pickup, causing incident damage.

Forced landing □ Engine quit during runup. Fuel shutoff valve was frozen in the off position because of moisture corrosion.

Precautionary landings □ Pilot detected odor of overheated battery on final approach. Caused by failure of battery. □ Master caution light came on with no segment light. After 2 minutes, governor emergency segment light came on and N2 and rotor rpm increased. Collective pitch was increased, throttle reduced, and governor switch placed in emergency position. Postlanding inspection revealed failure of internal toggle switch. □ Pilot noticed engine oil pressure was above 100 psi during cruise flight. Caused by failure of oil pressure gauge. □ Ice accumulated on most of airframe structure during climbout through rain and snow. Icing conditions were not forecast.

AH-1

Accident □ After takeoff, aircraft climbed to 75 feet agl and began left turn. Pilot then reported to chase ship that he thought he had a tail rotor failure. Aircraft made four 360° turns before striking the ground, with major damage. One injury.

Incident □ Armament personnel were checking aircraft armament system. Pair of pliers thrown between them hit main rotor blade. A portion of the pliers was thrown by main rotor blade into tail boom of another AH-1 parked nearby.

Precautionary landings □ Binding of anti-torque pedals occurred when left pedal was applied. Caused by internal failure of tail rotor servo. □ Fire light blinked off and on several times and then stayed on. Caused by chafed wiring in fire detection system sensing element.

CH-47

Precautionary landings □ Crew encountered unforecast weather below VFR minimums and lost visual reference before aircraft could be landed. Inadvertent IMC procedures were initiated and aircraft continued to destination with IFR clearance. Crew was unable to establish radio contact for clearance 5-8 minutes after entering IMC. □ Pilot noticed moderate vibration on takeoff. Caused by broken lord mount on forward drive shaft.

CH-54

Precautionary landing □ Second stage servo pressure began fluctuating during landing, accompanied by voice warning and master caution light. Caused by failure of tube assembly.

OH-6

Precautionary landing □ During preflight inspection, pilot was unable to ascertain fluid level in main transmission. Crew chief and maintenance technician were also unable to determine fluid level but suspected a slight overfilled condition. Aircraft was started and maintenance technician checked sight gauge and

determined transmission had acceptable fluid level. Shortly after takeoff, master caution light and transmission chip detector light came on, and landing was made. Maintenance personnel drained about 2 gallons of fluid out of transmission. At least 3 quarts of this fluid was water. This was the first flight for this aircraft after a period of heavy rain. O-ring on lid portion of filler cap and breather was missing. Suspect improper function of transmission seal assembly.

OH-58

Forced landings □ During cruise flight, passenger lowered collective and rolled off throttle. Pilot was tuning radio at this time and when aircraft dropped pilot looked at instruments. N1 was dropping through 80% and audio was on. Pilot entered autorotation and landed. Just before touchdown, pilot noticed N1 was stabilized at 75% but there was not enough time to get full power prior to touchdown. □ Aircraft vibrated during cruise flight and engine chip detector light came on, followed by low rpm warning light and engine-out audio. Autorotation was made without power. Caused by engine failure.

Precautionary landings □ Hissing noise was heard from engine area during NOE flight. Caused by broken Y fitting on elbow tube boss. □ Pilot heard unusual noise which appeared to be coming from transmission area. Inspection revealed disintegrated free-wheeling unit bearing. □ Transmission chip detector light came on. Wire was broken at sending unit. □ Aircraft was flown for 40 minutes and shut down for 1 hour, then run up for 30 minutes and shut down. Postflight inspection revealed excessive engine oil leaking on pavement and engine deck. Caused by unseated generator garlock seal.

TH-55

Forced landing □ Engine quit while aircraft was on downwind leg of traffic pattern. Caused by fuel injector servo malfunction.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

T-42

Precautionary landings □ After takeoff, propeller control lever failed to control speed and power was reduced to 15 inches Hg. Postflight inspection revealed propeller governor cable had fractured at attaching point to governor control. □ No. 2 engine began to run rough in flight with no fluctuation in engine instruments or fuel pressure. Engine then began to go into feather, loaded up, and quit. Emergency restart was unsuccessful. High pressure oil line from propeller governor to accumulator apparently came into contact with propeller control linkage, chafing a hole in the line and causing an oil leak. Oil pressure to governor was insufficient.

U-8

Precautionary landings □ (D series) No. 2 engine backfired several times and carburetor temperature increased to 90°. IP shut down No. 2 engine and landed. Push rod assembly failed at ball end on No. 5 cylinder exhaust valve. This caused rocker assembly valve exhaust to fail at ball socket. □ (G series) No. 2 engine rpm ►

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fluctuated and aircraft was landed. Caused by failure of No. 6 cylinder. Piston rings were broken and piston had two holes. Large metal particles were found in oil.

OV-1

Precautionary landings □ (D series) Pilot noticed hydraulic pressure gauge reading zero and confirmed with test prescribed in operator's manual. Caused by failure of hydraulic hose assembly. □ (C series) No. 1 engine chip detector light came on during takeoff. Metal particles were found on plug.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ During hover check before takeoff with torque at 30 pounds, rpm decreased to 6000 and rpm warning light and audio activated. Aircraft yawed slightly and was landed with power. Inspection revealed air inlet filters were excessively dirty and self-purging sand and dust separator discharge tube was blocked. □ Copilot noticed high frequency vibration in antitorque pedals and asked pilot to check pedals. Pilot verified high frequency vibration and noticed minor stiffness in pedals. Postlanding inspection identified worn tail rotor pitch change links as probable cause of vibration.

CH-47

Precautionary landing □ Dual generator failure was caused by chafed lines in tunnel cover.

OH-58

Incident □ During cruise flight, left crew door retaining pins came out of hinges and door fell from aircraft. Suspect door was improperly installed and pilot did not notice it on preflight.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 12-18 MAY 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	2	1	27	30
AH-1	1	1	0	2	4
CH-47	0	0	0	6	6
CH-54	0	0	0	1	1
OH-6	0	0	0	1	1
OH-58	0	1	2	12	15
TH-55	0	0	1	0	1
U-21	0	0	0	1	1
T-42	0	0	0	3	3
U-8	0	0	0	2	2
OV-1	0	0	0	2	2
Total	1	4	4	57	66

0 Fatalities, 1 Injury
Estimated costs: $132,127

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Density altitude. . .a second look

The term "high gross weight" is often thought of as a weight somewhere near the published maximum (such as 9,500 pounds for the UH-1H). This term can be misleading from a planning point of view since it refers to a structural, rather than a performance, limitation. A UH-1H at or below 9,500 pounds may or may not be able to hover depending on the DA. The allowable load shown in the limitations block of DD Form 365F has little meaning then, except as an absolute maximum. Rarely can that much be carried.

Perhaps a better term is "high mission allowable gross weight" which takes DA into account and is based on performance. In the case of the UH-1H, mission allowable gross weight is based on hovering ability, and is obtained by entering figure 14-22 with calibrated torque, pressure altitude, temperature, and the required skid height for hover. Calibrated torque is obtained from figure 14-21. For a specific mission, this is the maximum (under ideal conditions) gross weight regardless of what the DD 365F says.

Air density, and hence, density altitude, may be greatly affected by changes in humidity. As the temperature of air increases, so does its ability to hold moisture, and thus it becomes less dense. Density altitudes obtained from sources such as Air Force weather stations include the effects of humidity. The standard density altitude formula, the dead reckoning computer and density altitude charts, such as chart 14-1 in the UH-1H Operator's Manual, are based on dry air. If the air is hot and the relative humidity is high, the error can be 1,000 feet or more. Par. 14-10c(1) indicates that 1,000 feet equates to 1 pound of torque or 200 pounds of load. Mission planning that does not consider the ►

AAPMC in jeopardy

More than 1,000 NCOs in the grades of E5 to E9 have been trained in aviation safety by USAAAVS. This training authorizes the award of the additional skill identifier A2. However, units in the field are not insuring this training is recorded on individual personnel records, are not documenting the A2 ASI requirement on their TO&Es/TDAs, and are not indicating the A2 requirement when requisitioning replacements. As a result, MILPERCEN is unable to identify trained personnel and justify or quantify future training requirements for aviation safety NCOs.

It is obvious there is a great demand for the safety-trained NCO, based on phone calls from MACOMs and field units requesting spaces in the Aviation Accident Prevention Management Course (AAPMC). For DA to justify and quantify continued

(Continued on page 5)

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USAAAVS

Density altitude . . . a second look

effects of humidity can thus result in a decision to carry an extra passenger with potentially disastrous results.

The steps to take then are: (1) Check weight and balance. (2) Obtain DA from an Air Force weather station. If impossible, then use a dash-10 chart with an approximate correction for humidity. If the air is cold and dry, the correction is negligible. If it is hot and humid, add 1,000 feet (or reduce allowable gross weight by 200 pounds, or reduce maximum torque available by 1 psi). (3) Use performance charts to determine mission allowable gross weight. (4) Repeat above steps for each point of intended landing (or hovering). (5) If the result is marginal, reduce the load still further since the charts are inaccurate, and other parameters have not been considered, such as load factor due to angle of bank or deceleration, engine condition, winds, and nonstandard lapse rate.

As an example of these principles, consider the problem published in FLIGHT-FAX dated 17 May 1978. The published solution assumes that pressure altitude is the same as ground elevation and that a standard lapse rate exists, and indicates that a reduction in gross weight of 350 pounds makes departure from the PZ possible. Calculations of conditions at the LZ will show that completion of the mission is still not possible. The aircraft will arrive overweight for OGE hover (required for pinnacle operations), and with an unsafe left pedal margin.

The following table summarizes the data for this mission with the assumptions that (1) fuel is available at the PZ since an ultimate destination is required for mission planning, (2) fuel flow rate is 550 lb/hr. Note that weight and balance forms should be checked for an explanation of the high operating weight of 6,906 pounds. Note also that the ability to hover OGE with four troops at the PZ or three troops at the LZ is marginal (at only 70% relative humidity the maximum load at that temperature must be reduced by approximately 150 pounds). Considering the factors mentioned above, the mission must be delayed, or only two troops per aircraft should be carried. ■

	PZ	LZ	Comments
Minimum Fuel	825 lbs	550 lbs	PZ to LZ and return, plus 30 min reserve
DA	5270	8470	Does not include humidity effects.
Maximum Torque	44.4	42.0	Dash 10, Figure 14-21
Allowable GW for Mission	8700	8200	Dash 10, Figure 14-22
Payload	969 (4 trps = 960)	744 (3 trps = 720)	Allowable GW minus fuel and operating weight

Accident analysis

ANALYSIS 78-9
Type aircraft: OH-58A
Time: 2100
Classification: Major
Injuries: None
Estimated cost: $19,654 (aircraft)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW1	23	376	376
Copilot	CW2	30	779	779

The accident

The aircraft was at a stationary 200-foot hover directing gunnery fire when the engine chip detector light came on. The pilot initiated an approach to an area he considered open and clear to his right front. Ground reference was lost on short final because of rocket smoke and blowing ashes from burned trees. The pilot tried to terminate the approach at a 10-foot hover, but the aircraft continued to descend. The tail rotor hit the limbs of a tree just before touchdown and the 90-degree gearbox and tail rotor separated from the aircraft.

The causes

■ The pilot did not use the landing light because of inadequate unit training. He had not received enough training in the execution of emergency procedures at night. The unit had been without an OH-58 IP for about 3 months and involvement in a test program had precluded maintaining night flying proficiency in accordance with unit policy (2 hours of night flying every 14 days).

■ The pilot did not use the landing light to determine the suitability of the precautionary landing site (as required by TC 1-28) because the light is improperly designed. The pilot considered the accompanying glare as unacceptable when close to the ground.

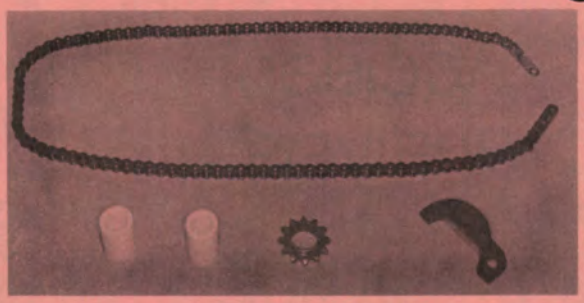
The cures

■ Upgrade unit training to maintain aviators' night flying proficiency by complying with the unit policy of 2 hours of night flying for every 14 days.

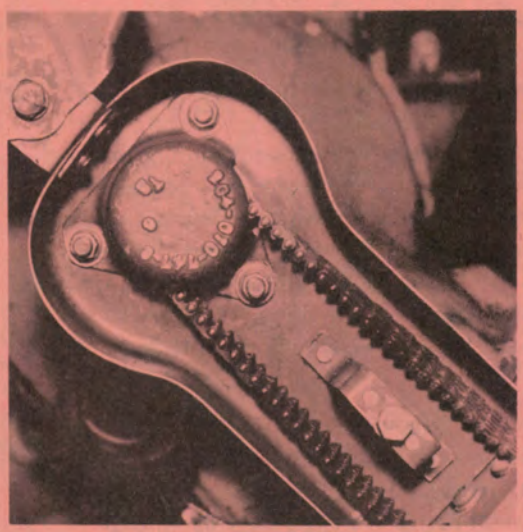
■ Higher command provide the proper personnel to assist the unit command in upgrading training by insuring the unit has an OH-58A IP who can provide sufficient training in the execution of night emergency procedures.

■ Redesign existing equipment to reduce glare from the OH-58A fixed landing light when illumination of a night landing area is required. (The OH-58C will incorporate a movable landing light. Production modification will accommodate those subsequent to the first 50. A field modification kit will change the first 50.)

UH-1 tail rotor chain kits



New UH-1 roller chain kit



Old UH-1 tail rotor silent chain

The new tail rotor chain installation kits, NSN 1615-01-047-8614, are now available to replace the old silent chain, NSN 1615-00-172-4508, on the UH-1 series helicopters. This new chain has several advantages that are beneficial for the user.

- The cost of the kit is only $100 instead of $238 for the old chain.
- There are no special inspections on the new chain.
- Increased MTBF. The test items have exceeded 1,500 hours with no signs of wear or failure.

Sufficient kits are on hand to complete the change-out of the UH-1 fleet. After change-out, tail rotor chain, sprocket, guard, and fairlead supports should be requisitioned as individual components, as required. All kits and components are stock fund items.

Units should establish a phased change-out program consistent with their mission and flying hour program, and requisition the necessary installation kits in phased increments. The old silent chains shall be excessed in accordance with existing regulation. ■

Shortage of AH-1 instruments for production "S" model

Instruments applicable to the AH-1 production aircraft are in critical short supply. Several of these instruments are in zero balance and delivery from new procurement is months in the future. Requisitions are being received from units that possess no production "S" aircraft evidently for shelf stockage. Request units review any outstanding requisitions on these instruments and take action to cancel all which are not applicable to aircraft in the unit or are for shelf stock. Future requisitions should be limited to NORS only. NSNs of subject instruments are as follows:

NSN	NOUN
6610-01-029-6702	Indicator, Attitude
6610-01-030-7226	Indicator, Attitude
6620-01-025-8229	Indicator, Temp
6620-01-028-0504	Indicator, Torq
6620-01-029-6705	Indicator, Elec
6620-01-029-6706	Indicator, Torq
6625-01-033-8745	Multimeter
6680-01-028-8420	Indicator, Liquid
6680-01-029-6704	Indicator, Elec
6695-01-028-1091	Indicator, Oil Temp
6695-01-028-1092	Indicator, Oil Temp

Point of contact: AUTOVON 698-6024.
(From TSARCOM Materiel Readiness Information Bulletin)

Remove those covers

A recent mishap was caused by a metal port cover coming loose during runup of a CH-47. The cover struck the aft rotor blade, which had to be replaced. It could just as easily have hit a crewmember. These covers should be removed before operation of the aircraft, in accordance with par. 3-19 (fig. 3-1), General Inspection a of TM 55-1520-227-10 and TM 55-1520-209-10. ■

Shelf life of water purification tablets extended

The shelf life of certain lot numbers of water purification tablets has been extended. These are listed below with the date of manufacture and the retest date. Each container should meet the inspection criteria listed in Appendix M, DSAM 4155.5, TB 740-10, par. M-203.

Lot Number	Date Manufactured	Retest Date
1311-697	Jan 74	Feb 80
1311-726	Feb 74	Feb 80
4320-195	Jun 66	Feb 80
4320-197	Jun 66	Feb 80
4320-198	Jun 66	Feb 80
2849-564	May 71	Feb 80
120-4723-221	Sep 66	Feb 80
120-4723-304	Mar 67	Feb 80
268	Jun 66	Apr 80
0416-602	Oct 71	Apr 80

Authority for suitability: DPSC messages dated 152320Z Feb 77 and 152321Z Feb 77. Water purification tablets with lot number 4320-196, manufactured June 1966, are not suitable for issue or use.

(Thanks to CW3 Harold Hintze, 3rd ACR, Fort Bliss, for this information.)

(Continued from front page)

AAPMC in jeopardy

training for aviation safety NCOs, units must:

■ Identify unit personnel who have attended the AAPMC in the past and insure their records reflect the A2 ASI. (USAAAVS can provide a list of previous course graduates.)

■ Revise TO&E/TDA to reflect A2 qualification requirements. (Each authorized safety officer should have a minimum of one assistant safety-trained NCO.)

■ Insure requisitions submitted for NCOs whose additional duties require aviation safety training, in the 71 or 67 series, indicate the need for the A2 ASI. ■

Selected mishap briefs

Rotary wing

UH-1

Accidents □ Aircraft crashed and burned. Four fatalities. Investigation in progress. □ Aircraft lost power, settled to ground, and rolled over. Investigation in progress. □ Rotor rpm dissipated during takeoff and aircraft landed hard on sloping terrain, damaging skids, cross tubes, and lower fuselage. One passenger sustained minor injury.

Precautionary landings □ Transmission oil pressure decreased to zero during hover. Master caution and transmission oil pressure warning lights came on. Caused by failure of transmission oil filter gasket. □ Crew smelled JP-4 fumes in cockpit and landed. Main fuel tank float switch failed, allowing transfer pump to overfill main fuel tanks. Main tank filler cap O-ring failed, allowing fuel to seep out. □ Aircraft encountered unforecast ground fog and rainshowers with ceiling and visibility below 500 feet and .4 NM. Pilot landed in field and waited until rainshowers passed and ceiling and visibility increased. □ Master caution and chip detector lights came on. Caused by internal failure of 90° gearbox. □ Engine oil pressure went to zero. Caused by loose cannon plug on engine oil gauge.

AH-1

Incident □ IP was flying in front seat, demonstrating a simulated right fixed pitch antitorque maneuver. As aircraft touched down, IP lost control and aircraft spun to the right while sliding down the runway. Full left pedal application caused tail rotor blades to strike side of vertical fin. Cyclic control inputs to help arrest the spin resulted in the transmission rocking violently back and forth, causing a crack in transmission support case and damage to upper pylon fairing.

Precautionary landings □ TGT fluctuated in flight. Inspection revealed soldered connection on TGT resistance spool in electrical compartment had worked loose and caused fluctuations in TGT readings. □ Unusual odor was detected in flight. Caused by overheated battery.

CH-47

Incident □ Aircraft flying in IMC was struck by lightning. Pilots saw lightning flash but did not know aircraft had been hit until they landed at destination. One aft rotor blade and two forward rotor blades were damaged.

Precautionary landings □ Blade caps broke loose in flight and created an odd sound. Postflight inspection revealed blade cap attaching bolts had corroded and worked loose. □ Crew chief reported leak from No. 1 hydraulic system manifold valve. Caused by failure of elbow tube. □ Cyclic speed trim indicator went to zero and aircraft porpoised. Caused by failure of aft cyclic speed trim actuator. □ Aircraft was landed because of internal hydraulic leak from oil cooler fan. □ No. 1 engine oil pressure fluctuated from 20 to 0 psi. Moisture was found in transmission oil pressure transducer cannon plug.

CH-54

Precautionary landing □ Flight engineer saw excessive oil on aft bubble and told pilot. After landing was made, inspection revealed main transmission oil filter return line had failed.

OH-6

Accident □ Main rotor blades hit trees during hover. Left skid collapsed on landing and aircraft rolled on left side, damaging main rotor blade.

OH-58

Precautionary landings □ Weather deteriorated to minimum conditions and pilot landed. □ Inverter caution light blinked intermittently. Caused by failure of fault function panel. □ Aircraft was in cruise flight at about 95% N_1 when low rpm audio activated. Reduction of collective to 92% N_1 allowed rotor rpm to recover. About 10 minutes later, rpm audio reactivated and landing was made. Suspect internal engine vibration caused failure of tee assembly from scroll to compressor.

TH-55

Forced landings □ Engine rpm was lost at hover and aircraft settled to ground. Pilot was unable to apply throttle. Caused by broken throttle cable. □ Engine quit during hover after 30 minutes of flight because of fuel exhaustion. Aircraft had not been refueled after previous flight of 1 hour and 40 minutes.

OH-58 safety-of-flight

■ 161805Z May 78, subject: Safety-of-Flight Message (Technical) OH-58-78-11 One-Time Inspection to Locate Specific Serial Numbered OH-58A/B/C Swashplate and Support Assemblies, Urgent TB 55-1520-228-20-24. **Summary**: The aircraft manufacturer has shipped to the government approximately 200 swashplate and support assemblies P/N 206-010-450-9 (NSN 1615-00-613-6915) with a new cap P/N 206-010-444-1 installed instead of cap P/N 206-010-456-1 (NSN 1615-00-121-6559). Swashplate assemblies containing the 206-010-444-1 cap must be lubricated differently than assemblies containing cap 206-010-456-1. Swashplates containing cap 206-010-456-1 lubricate the duplex bearing through a grease fitting in the outer ring. The grease is forced up through the duplex bearing and past the mid seal. The grease is then vented outboard through the four holes in the cap. This configuration has three seals. Swashplates containing cap 206-010-444-1 must be lubricated through a grease fitting in the cap. This forces the grease down through the duplex bearing and out through the lower seal which is installed with the lip pointing down. This configuration has only two seals. The purpose of this TB is to instruct users to remove the grease fitting in the outer ring of swashplate assemblies containing the 206-010-444-1 cap and replace the fitting with an MS screw; thereby eliminating the possibility of the duplex bearing being improperly lubricated. It also requires a visual inspection of the lower seal to insure that the lip of the seal points down. A visual inspection of other swashplate assemblies is also required. **Contact**: Tom Bell, TSARCOM, AUTOVON 698-5007, commercial 314-268-5007.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landing □ (A series) On climbout, IP gave simulated single engine on No. 2 engine. As No. 2 power lever

was retarded, IP noticed torque on No. 1 engine was over 110% mark on No. 1 torque gauge. IP took controls, brought No. 2 engine up to 60% torque, and leveled aircraft. No. 1 power lever was retarded to match No. 2 power lever. No. 1 engine was secured and landing was made. Caused by No. 1 engine fuel control unit failure.

T-42

Accident □ Aircraft began to porpoise during landing and nose gear collapsed after the third bounce. Right main tire blew and aircraft slid off runway.

U-8

Precautionary landing □ (D series) Brake locked on landing and tire blew out. No malfunction of brake or wheel was found.

U-21

Precautionary landing □ (A series) Power lever would not come out of reverse after landing. Cup spring retainer failed, causing prop to remain in reverse. Retainer was cracked.

U-10

Accident □ High sink rate developed during final phase of landing. IP tried to bring aircraft back to normal landing attitude, but aircraft landed tail first, causing minor damage to tail section and rudder assembly.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Incident □ Screw driver was left in tail rotor drive shaft area after PMD inspection. Aircraft was flown 2.2 hours and damage to drive shaft area was not found until the following day. Toolbox content accountability was not performed.

Maintenance advisory messages

■ 242038Z May 78, subject: Maintenance Advisory Message, **OH-6A** aircraft, Message No. OH-6A-78-6. A category I EIR indicates that of 19 aircraft inspected 3 had cracks in landing gear struts, P/N 369A6001-903 and 369A6001-904, and 5 had struts with loose rivets. This message increases the inspection frequency for landing gear struts.

■ 182025Z May 78, subject: Maintenance Advisory Message for **AH-1S** Attack Helicopter, Installation of PP-7274 B/A Static Inverter (AH-1-78-7).

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

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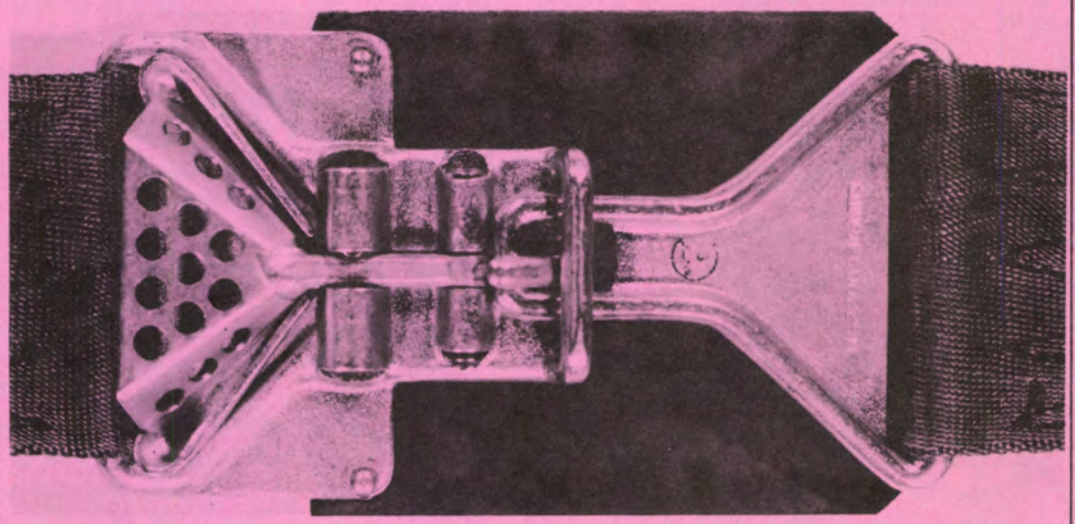
Properly worn seatbelts prevent injuries

Keep 'em tight



A recent mishap pointed up a serious hazard that may be going unnoticed by aircrewmembers. The problem is the incorrect use of seatbelts by crewmembers and passengers in Army aircraft. Why are some individuals injured in low to moderate g crashes while others stroll away as if nothing had happened? The answer could very well lie in how tight the seatbelt is worn.

If you have heard the old saying, "it's not the fall that kills you, but rather the sudden stop," then you are already partly familiar with what causes g loads. The mathematical formula for average g's in a crash is $g = \frac{v^2}{64s}$. The "v" is the velocity of the aircraft (or human body) measured in feet per second and "s" is stopping distance measured in feet. As you can see, g loads increase proportionally as the square of the velocity increases and decrease proportionally as the stopping distance increases. So if you were to double the velocity, the g's experienced would be four times as great, but if, instead, you doubled the stopping distance, the g's experienced would be cut in half. The key, then, to decreasing injuries in a crash is to reduce the velocity of the human body or increase its stopping distance. There is not much we can do about velocity, since it is necessary that ►

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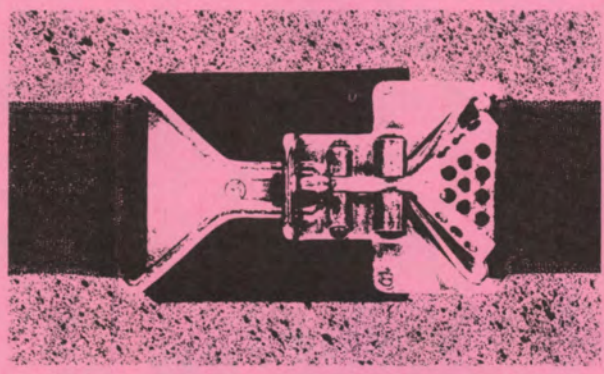
USAAAVS



occupants be traveling at the same velocity as the aircraft. The big payoff comes when we decrease that velocity over as much distance as possible. This is precisely what a good tight seatbelt will do for you.

How does it work?

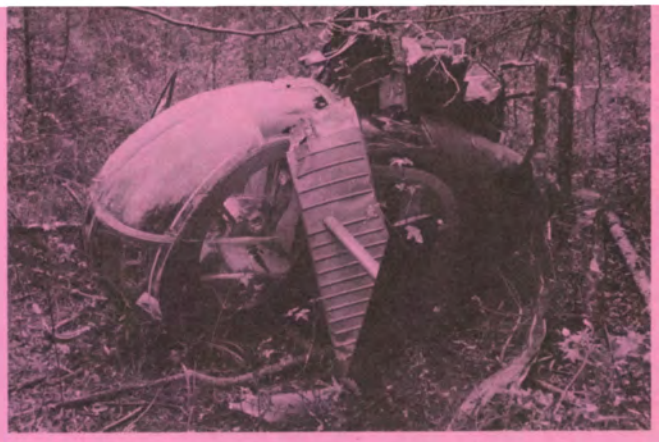
The seatbelt does not actually increase the stopping distance, but it does prevent the loss of that precious little bit that ground gouging and aircraft structure deformation provides. If the occupant is firmly secured to the aircraft during the crash, then the depth of the ground gouge plus the amount of structure crush is the stopping distance of the occupant. If, however, the occupant's seatbelt is loose, that part of the stopping distance that occurs before the body reaches the fully extended position of the seatbelt is lost, just like "altitude above or runway behind." Keep in mind that this stopping distance is traveled in only a few milliseconds, i.e., a few thousandths of a second.

What all this means in simple terms is that the human body will encounter the same or fewer g's than the aircraft if that body is wearing a tight seatbelt (average g's on the CG of the aircraft). If not, the g loading on the human body could be much higher than on the aircraft itself! As the aircraft is deforming and slowing down, the occupant is still moving at a constant velocity. Suddenly the seatbelt tightens, and the occupant must decelerate much faster than the aircraft did, encountering more g's. This explains how it is possible to have fatalities in a survivable accident. By the way, this same hazard exists if soft, spongy cushions are used in the seat. It is known as dynamic overshoot. The higher g loadings not only contribute directly to injuries and fatalities, but also indirectly through seat and seatbelt failures, since the design strength of these items can be easily exceeded by the increased g loading of the occupant. The design strength of seats is almost always less than human tolerance. An average strength of the UH-1 pilot seats is 12 to 15 g's and troop seats is 8 to 11 g's. Human tolerance in the vertical direction has generally been accepted as between 20 to 25 g's. All these figures are general since many variables are involved.

The lesson then is clear.
Keep 'em tight.

Maybe it can't be helped if the crew chief has to clear the tail, but as soon as the aircraft is out of the danger area, tighten up that seatbelt. Brief all passengers on the proper use of the seatbelt and have the crew chief check them. It is important that the seatbelt cross low over the hips and not over canteens, first aid kits, or other items that might contribute to injuries. As the old saying goes, "It's always better to be prepared for a crash and pleasantly surprised when it doesn't happen than to be . . ."

Accident analysis



ANALYSIS 78-10
Type aircraft: OH-6A
Time: 1935
Classification: Major (total)
Injuries: 2 minimal
Estimated cost: $148,289 (acft, injuries)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	53	683	3,961

The accident

The first two aircraft in the flight landed at the LZ. When the pilot of the third aircraft realized he was low and slow and not aligned with the lighted "Y," he initiated a climb, moved to the right, aligned his aircraft with the "Y" and completed the landing. When the pilot of the third aircraft initiated his climb, the pilot of the fourth aircraft had already slowed to an airspeed less than that of translational lift. To stay in formation with the third aircraft, the pilot of the fourth aircraft abruptly applied collective and the aircraft yawed right, causing the pilot to lose his only visual reference, the aircraft ahead of him. Unable to acquire a new reference because of the darkness of the night, his low altitude, and restricted outside visibility caused by glare from his landing and position lights, the pilot became spatially disoriented and the aircraft crashed into a wooded area about one-half mile from the LZ.

The causes

■ The pilot made abrupt control inputs which exceeded either his ability to maintain aircraft control or the aircraft's directional control ability because of inadequate attention. He channelized his attention on the aircraft ahead of him and failed to properly divide his attention among required flight activities.

■ The pilot made abrupt control inputs because the unit's training program did not adequately prepare him for night formation operations to a tactical LZ. This flight was the pilot's first night formation flight in the OH-6A.

The cures

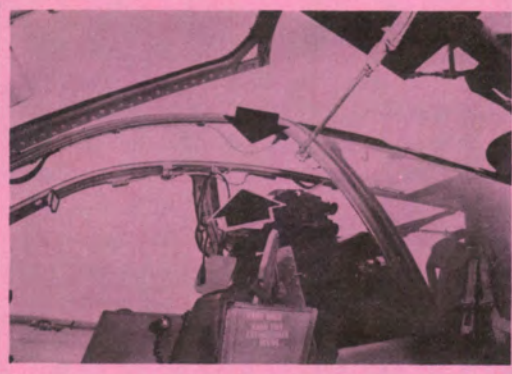
■ Upgrade unit training by providing a comprehensive night training program progressing from basic to advanced tasks and stressing proper division of attention and smooth, coordinated control inputs. Such a program would insure aviator competence in night operations before release as pilots-in-command and could be implemented by writing a night operations SOP (IAW par. 3-1, AR 95-5) requiring this training. The training program could be implemented with assigned IPs.

■ The unit commander should improve monitoring of personnel and unit activities by insuring that aviators receive required training and that they are properly qualified for the missions they are to perform before their release as PICs. The Aviation Commander's Readiness Course (COI 26-F15) should include training on how to monitor subordinate personnel and unit activities.

■ Unit operations officers should implement required training programs and insure missions and aircraft assignments are within aircrews' current capabilities IAW par. 3-1, AR 95-5.

Use handholds

During recent tests of the AH-1 canopy removal system, 9 malfunctions occurred during 107 canopy removal attempts. Two of these were predicted, defects having been revealed by X-ray examination. In the other seven instances, however, no defects had been noted. Investigation revealed all malfunctions occurred because the flexible confined detonating cords in the area between attaching clamps on the canopy frame had been stretched.



Use of interconnecting lines (arrows) for support instead of handholds provided can cause damage to composition of explosive cord and malfunction of the canopy removal system.

Both the pilot's interconnecting line (P/N 209-030-711-13) and the gunner's line (P/N 209-030-711-11) were found stretched as a result of having been used as handholds by persons entering or exiting the aircraft. The tension loads applied to these interconnecting lines were sufficient to cause the supporting Adel clamps to pivot out of position.

The interconnecting lines are made of hexa-nitro-stilbene (HNS) compositions. The density of the HNS must be retained to achieve a required speed of detonation to blow the canopy. However, when these interconnecting lines are stretched, the density of the HNS changes within the line, causing a reduction in the speed of the detonation below that necessary for positive canopy removal.

The solution is simple. Make sure **all** personnel entering or exiting the Cobra use the handholds provided and **not** the interconnecting lines—no matter how readily available and enticing they may appear. A maintenance advisory message is forthcoming which will give detailed instructions for clamping and requisitioning components. ■

TOTAL MISHAPS FOR 26 MAY-1 JUNE 78

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	5	1	0	31	37
AH-1	0	0	0	2	2
CH-47	0	1	0	6	7
OH-6	0	0	1	1	2
OH-58	0	0	1	9	10
U-21	0	0	0	1	1
C-12	0	0	0	1	1
U-1	0	0	1	0	1
U-8	0	0	0	1	1
OV-1	0	0	0	2	2
Total	5	2	3	54	64

0 Fatalities, 9 Injuries
Estimated costs: $852,736

Selected mishap briefs

Rotary wing

UH-1

Accidents □ Aircraft hit on tail stinger, bounced, pivoted around nose, and landed inverted. Two injuries. □ Rotor rpm was lost as aircraft was making low pass over mountain peak. Minor damage was sustained during landing. □ Aircraft was landed after MOC and throttle was reduced to flight idle. N2 stayed at 5700 and main rotor tachometer slowed down. Pilot hit solenoid to close throttle and heard loud bang. Aircraft shuddered and stopped. Entire drive train was damaged, engine displaced, main rotor mast bent, and tail boom damaged. Suspect sprag clutch failure. □ Low rpm warning light came on as pilot was flying at 1,500 feet looking for LZ. Aircraft was autorotated into trees. Seven injuries. Suspect power failure. □ Left skid caught on PSP during takeoff. Skid and cross tubes were broken and skin on underside of aircraft was damaged.

Incident □ Postflight inspection revealed bent right skid tube. Cause unknown.

Precautionary landings □ During training flight at 90 knots and 100 feet agl, low rpm audio and light came on with copilot at the controls. Pilot took controls, recognized low-side governor failure, placed governor switch in emergency position, and flew to safe landing area. □ Loud bangs were heard on final approach to LZ. Rpm dropped, power was reduced, and aircraft was landed. Inspection revealed FOD to No. 1 and No. 2 compressor blades. □ Aircraft yawed to right and master caution light came on. Failure of start fuel manifold gasket caused air leak. □ Transmission oil pressure went to zero during cruise flight. Caused by failure of pressure indicator. □ Aircraft was on the ground, at flight idle, and jumper from sport parachute club was unloading deployment bags. He walked 10 to 15 feet from aircraft and threw bags. One bag was drawn into main rotor and hit blade.

AH-1

Precautionary landing □ Engine rpm needle dropped to zero and warning light came on. Caused by broken engine tachometer generator shaft.

CH-47

Incident □ On short final to LZ, aircraft encountered extreme dust and landed hard. Two main rotor blades hit small tree when aircraft was shut down.

Precautionary landings □ Flight engineer detected high frequency vibration in bulkhead below No. 2 engine. Caused by lack of lubrication in No. 2 engine transmission output shaft. □ No. 1 condition lever would not shut down engine. Caused by failure of engine control box assembly.

OH-58

Precautionary landings □ DC generator light came on. Caused by failure of voltage regulator. □ Engine chip detector light came on. Large metal pieces were taken off magnetic plug. □ Pilot landed after forecast VMC deteriorated to less than VFR.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913. ➤

Selected mishap briefs

More info on main rotor grip assembly cracking problem

Reference TSARCOM maintenance advisory message 222040Z Jul 77 (UH-1-77-14), subject: Main Rotor Grip Assemblies, P/N 204-011-131-1/5, Utilized on UH-1B/D/H Series Helicopters.

As provided for by paragraph 3 of referenced message, the following information is furnished concerning the grip assembly cracking problem identified:

A total of seven suspected cracked grip assemblies have been reported (this is two more than the five addressed in paragraph 1 of referenced message).

Of these seven, five were received for inspection. The findings are as follows:

- Two were inspected and found not to be cracked. What had appeared to be cracks were the indexing lines scribed on the inboard face near the bottom rosan insert.
- One grip with a 2 5/8-inch crack between the drag brace tangs was analyzed and the crack determined to be caused by stress corrosion mechanisms.
- One grip with an identical crack (3½ inches long) was discovered. Analysis is not complete.
- One grip with an internal crack extending from the inboard face under the inboard liner was also discovered. Analysis is not complete. Grip assembly was a P/N 204-011-121-1.
- The two grips not received for inspection are presumed lost and are not expected to be analyzed.

In view of the limited number of cracked grip assemblies reported and the laboratory/engineering examination results of those which have been examined, this is considered to be an isolated problem which most likely resulted from a stress concentration introduced during hub overhaul. For this reason, no further engineering action is considered warranted at this time. However, we continue to recommend that particular attention be directed toward the area between the drag brace tangs and the inboard leading edge of the assembly during the normal daily inspection, reference TM 55-1520-210-PMS Sequence 4.1 and TM 55-1520-219-PMS Sequence 4.1.

—From TSARCOM

Fixed wing

U-21

Precautionary landing □ (H series) Fuel started siphoning from right wing fuel cap as aircraft was passing through 8,000 feet. Fuel cap failed to seat properly because of slippage of O-ring.

C-12

Precautionary landing □ (A series) Shrill noise was heard from No. 2 engine during climb. TGT began rising and No. 2 ignition light came on. No. 2 engine was secured and aircraft landed. Caused by engine malfunction.

U-8

Precautionary landing □ (F series) No. 2 engine ran rough during cruise flight. Caused by failure of No. 2 cylinder exhaust valve.

OV-1

Precautionary landing □ (D series) No. 1 hydraulic pressure dropped to zero during

cruise flight. En route to home base, No. 2 hydraulic pressure dropped to zero. Pilot blew emergency blowdown bottle to lower gear and aircraft was landed. Internal failure of left main gear actuator forced fluid through pneumatic system, bypassing dump valve, to an overboard drain, resulting in loss of hydraulic fluid and pressure.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

AH-1

Precautionary landing □ Transmission oil pressure fluctuated between 43 and 46 psi and temperature increased. Postlanding inspection revealed transmission oil line coupling attaching to transmission oil cooler was loose.

CH-47

Precautionary landing □ No. 2 engine failed in flight. Caused by loose main fuel line quick disconnect. Suspect disconnect was not properly seated during engine installation 2 days before this mishap.

OH-6

Forced landing □ Pilot heard loud bang as he picked aircraft up to hover and began left pedal turn. Aircraft yawed left and engine-out audio came on. Hovering autorotation was made. Caused by intake air blockage. Bird nest was found under filter on top of compressor inlet screen. Suspect alternate air door had been left open on PMD.

Precautionary landing □ TOT rose slowly from 670° to 720° in flight. Bypass air control was pulled, but this had no effect on TOT. Power was reduced and landing was made. Inspection of engine revealed broken tee fitting on compressor scroll. Suspect maintenance procedures specified in par. 4-17k of TM 55-1520-214-23 were not followed. Tube nut on end at compressor scroll was apparently tightened before installing engine, resulting in misalignment of tube at firewall fitting. The tube was evidently forced into alignment, placing sideload on tee fitting, eventually resulting in fatigue fracture.

OH-58

Precautionary landings □ N_1 decreased during shutdown and engine flamed out. Caused by improper adjustment of N_1 rpm. □ Pilot noticed cyclic feedback vibration in flight. Swashplate friction was out of adjustment.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

CH-47

□ Aircraft picked up 105mm Howitzer and departed airfield. About 3 minutes later, cargo hook opened and load dropped. Pilots and crew stated that cargo release buttons had not been actuated.

OH-58

□ Three crew chiefs were ground handling aircraft inside hangar. As aircraft was being pushed into parking place, tail rotor hit nose of OH-58 parked next to it.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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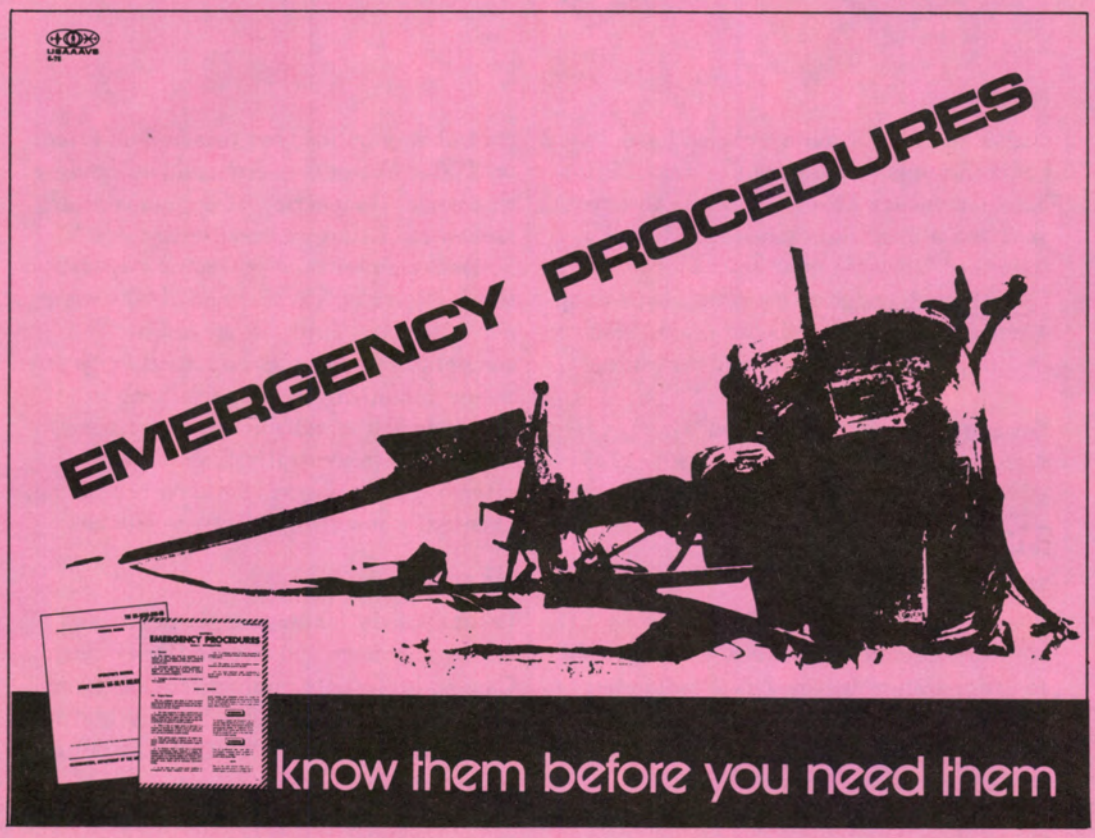

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Now you see them... now you don't

Unlike trees, hills, bridges, or other similar obstructions, wires pose a special set of safety problems. They are found everywhere—even in the most unlikely places; they are difficult, if not impossible, to see; they spread rapidly to new areas; and they are deadly.

Nearly half of all wire strikes result in major accidents, with the remaining portion in incidents. Right now, the only protection we have against this threat is avoidance.

Let's take a look at a recent wire strike mishap. This one terminated in an incident.

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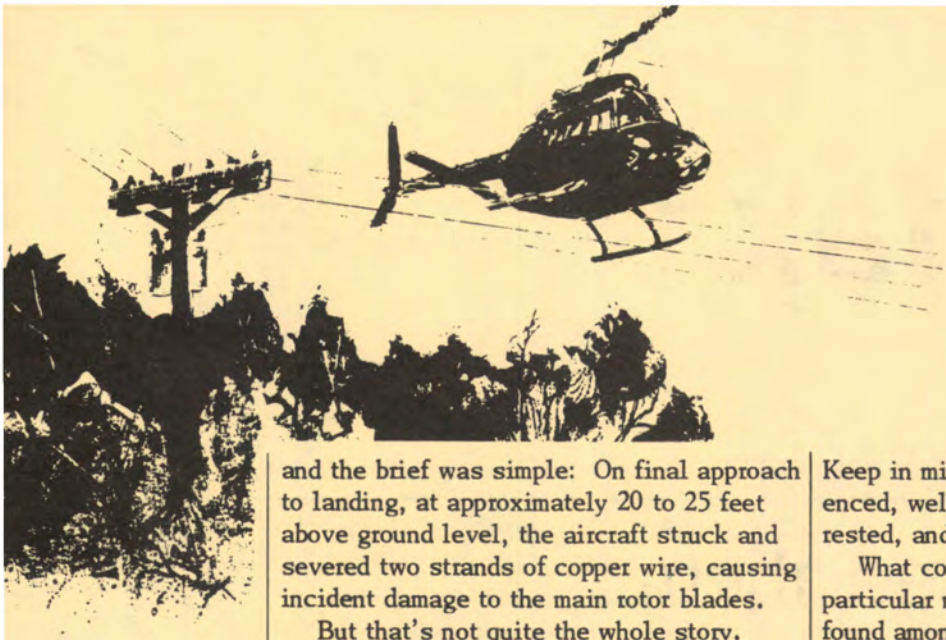

and the brief was simple: On final approach to landing, at approximately 20 to 25 feet above ground level, the aircraft struck and severed two strands of copper wire, causing incident damage to the main rotor blades.

But that's not quite the whole story. The two pilots aboard the OH-58 involved in the mishap were on an authorized NOE flight to update the hazards map of an Army installation. During reconnaissance, they spotted newly erected wires and decided to land to more accurately plot the location of these wires. While landing, they lost sight of the wires and inadvertently struck them.

Copper wires supported by 20-foot poles snapped on contact with aircraft and severed one tail rotor blade, causing loss of entire tail rotor assembly and aircraft control.

Final resting place of aircraft which struck and broke powerline suspended over canyon. Three fatalities.

Keep in mind that both pilots were experienced, well qualified, in good health, rested, and had no psychological hangups.

What could have prevented this particular mishap? The answer can be found among the recommendations made by investigating officials. In part, these include the following:

- That Department of Facilities Engineers on all military installations where terrain flight activities are conducted plot all known electrical overhead distribution systems and make this information available to aviation elements conducting terrain flight operations.
- That locations for proposed new construction of electrical overhead distribution systems be made available to Post Safety Councils for assessment as to the impact such construction would have on future terrain flight activities.
- That highly visible wires, e.g., international orange, be used during new wire construction projects.
- That, where possible, reconnaissance for updating terrain flight hazard maps be conducted by ground personnel using vehicles.

In the case of the OH-58, the crewmembers can feel fortunate their mishap fell into the slightly more than 50 percent of wire strike mishaps classified as incidents. However, you may not be as fortunate. So, don't become complacent. Instead, remain constantly aware of all the hazards associated with NOE flight, especially wires, and make sure you take the proper precautions.

For additional information, see "Wire Strikes on the Rise," published in the March issue of the AVIATION DIGEST.

Accident analysis

ANALYSIS 78-11
Type aircraft: OH-58A
Time: 1950
Classification: Minor
Injuries: None
Estimated cost: $14,957 (aircraft)
Mission: Tactical training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	MAJ	35	389	1,643
Copilot	WO1	24	403	403

The accident

The copilot made the initial approach into the LZ on a heading of 040° with the aid of the aircraft landing light. The crew chief was told to place a marshalling wand in the LZ and to secure it to keep it from blowing over. The wand did not burn continuously, so a flashlight was used. The beam was aimed about 030° right of the approach path so it would not create a blinding condition. Once the crew chief was on board, a hovering 360° turn was made and an approach heading of 030° was selected for the remainder of the approaches into the LZ. This heading was selected to conform with the long axis of the LZ. The copilot made the first takeoff and approach. The pilot then took the controls and executed two approaches. The light clay surface of the LZ in contrast with the dark jungle did not permit the use of the landing light except on short final. On the third approach, the pilot decided not to use the landing light. When he was about 100 feet out on short final he realized he was overshooting his touchdown point. He began to slow the forward movement of the aircraft and apply power, but could not terminate at the preselected spot. As the pilot passed the flashlight marking his landing point, he

lost all ground references and tried to stop the aircraft at a hover. This was not successful and the aircraft hit the ground in a near-level attitude.

The causes

- The pilot exercised poor judgment in neglecting to turn on his landing light when he lost ground reference. He realized he was overshooting his landing spot when he was 100 feet from it but he elected to recover the aircraft without the benefit of the landing light.

- A single flashlight was placed among some rocks for use as a landing reference instead of using the approved method of a lighted "T" or inverted "Y" as prescribed in paragraph 5-14b of TC 1-28. This was done because of inadequate written procedures. The unit SOP permits landings to only one light during tactical night operations or training.

The cures

- Inform personnel, through safety meetings, of proper procedures and techniques for night flight as prescribed in TC 1-28.

- Revise unit SOP so it will be compatible with TC 1-28 concerning the use and arrangement of lights for landing references during night tactical training.

Selected mishap briefs

Rotary wing

UH-1

Incidents □ After autorotation was completed, throttle was rolled on, engine rpm went to 5500, and rotor went to 150 rpm. Loud noises were heard and throttle was closed. Postflight inspection revealed damage to drive shaft and tail boom. Caused by internal transmission failure. □ Aircraft landed hard during simulated antitorque maneuver, sustaining incident damage.

Precautionary landings □ Master caution light and hydraulic segment light came on, accompanied by moderate control feedback. Factory-installed screw in irreversible valve was overtorqued, allowing fluid to leak out of system. □ Unusual odor was noticed during landing. Caused by failure of fixed paper capacitor. □ Engine chip detector light came on. Metal particles were found on plug. □ Egt, torquemeter, engine tachometer, and N_1 dropped simultaneously. Caused by internal fuel control failure. □ IP noticed smoke coming from battery vent. Caused by overheated battery.

Human factor mishap □ During paradrop training mission, the parachute of the fifth man out of the aircraft snagged the ground handling wheel attachment fitting on the left skid. The skid fitting was covered with protective tape. Aircraft was flying at 1,500 feet agl and 55 knots. Individual then became tangled in streaming parachute bags and lost consciousness during descent. Upon landing, individual was separated from skid and regained consciousness en route to hospital.

AH-1

Accident □ Power was lost during contour flight at 40 knots and aircraft was autorotated into trees.

Precautionary landing □ Master caution and d.c. generator segment lights came on, and d.c. generator power was lost. Caused by failure of d.c. generator.

OH-58

Forced landing □ Engine quit during landing. N_2 bearing pack disintegrated and turbine wheels shifted in compressor.

Precautionary landings □ Loud popping sound was heard and fluctuation of TOT and N_1 gauges was noted when throttle was advanced from flight idle following touchdown autorotation. Caused by compressor bleed valve stuck in open position. □ N_2 would not beep up to 103%. Caused by overspeed governor malfunction. □ Engine oil bypass light and master caution light came on. Loss of engine oil was caused by failure of garloc seal on starter generator. □ N_2 deteriorated to 99% and aircraft was autorotated. Caused by broken bleed air line elbow assembly.

OH-58 safety-of-flight

■ 061300Z Jun 78, subject: Safety-of-Flight Advisory Operational Message, OH-58-78-13, for **OH-58C** Helicopters. Summary: Message contains information to be inserted in the front of TM 55-1520-235-10 pending receipt of the TAG printed change. Contact: Richard Smith, TSARCOM, AUTOVON 698-5007, commercial 314-268-5007.

■ 081650Z Jun 78, subject: Safety-of-Flight Advisory Message No. OH-58-78-14 Amending Safety-of-Flight Advisory Operational Message No. OH-58-78-13 for **OH-58C** Helicopters. Summary: Changes paragraph 2g(2) of message OH-58-78-13. Contact: Same as above.

CH-47

Precautionary landings □ Loud noise was heard and severe vibrations noted from utility hydraulic oil cooler. Utility hydraulic oil cooler fan assembly blades separated at base, and severe hydraulic leak developed when jam nut backed off hydraulic pressure line to oil cooler motor. □ Engine torque needles could not be matched when power was reduced from climb to cruise, and emergency beep was used to trim engines. Caused by failure of normal beep on No. 2 engine. □ Leak was noted in combining transmission area. Caused by materiel failure of "O" ring at debris detecting system in No. 1 engine nose box.

CH-54

Precautionary landing □ Voice warning system activated, first stage tail rotor servo caution light came on, and utility hydraulic pressure decreased to zero. Caused by cracked first stage tail rotor servo return line.

For more information on rotary wing mishaps, call AUTOVON 558-3913/3901.

Fixed wing

U-21

Incident □ (D series) While taxiing to clear runway after landing, aircraft kept trying to turn left. After clearing runway, crew heard thumping noise, stopped on taxiway, and discovered left main wheel assembly broken due to bearing assembly disintegration.

Precautionary landing □ Right main gear gave unsafe indication after takeoff. Caused by internal failure of main actuator assembly.

T-42

Precautionary landing □ Nose wheel tire blew on landing.

OV-1

Human factor mishap □ Pilot had sinus block during climb to cruise altitude. Sinus block temporarily cleared until level-off at cruise. Pilot then had another block and nose bleed. Mission was aborted.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

C-12

Precautionary landing □ (A series) While making after-takeoff check, pilot noticed fuel cap clip up on left main fuel tank. Aircraft was landed and fuel cap reseated. Crew chief did not properly seat fuel cap

Selected mishap briefs

after refueling aircraft and pilot failed to detect improperly seated cap.

OH-58

Precautionary landings □ N2 decreased from 102% to 98%. Caused by loose fitting on double check valve. □ Pilot felt slight bump in airframe, then high frequency vibration in pedals. KY28 control indicator (C-8157/ARC) cannon plug was not secured to avionics wire bundle and was vibrating against tail rotor control cross tube.

CH-47

Precautionary landing □ Smoke was noted coming from area around generators. Pilot turned off generators and landed aircraft. Smoke was caused by hydraulic fluid spraying on generators. Improperly installed packing, NSN 5330-00-S285-9842, and washer, NSN 5310-00-186-1381, figure 129, page 753, items 75D and 75E, TM 55-1520-209-23P, part 2, resulted in hydraulic leak.

CH-54

Precautionary landing □ Right front door of universal military pod blew open during takeoff. Door was improperly installed. Hinge on pod door was broken and cargo strap was used to secure door.

Maintenance advisory messages

■ 062044Z Jun 78, subject: Maintenance Advisory Message Concerning All Aircraft Which Are Not Flown Within Time Intervals Specified for Flyable Storage (GEN-78-05). This message emphasizes the requirement that all installed engines must be operated within the time intervals specified for flyable storage. Contact: Robert Fetch, TSARCOM, AUTOVON 698-6868, commercial 314-268-6868.

■ 091900Z Jun 78, subject: Maintenance Advisory Message Concerning Aircraft Restraint Harness, NSN 1680-00-189-0656, P/N 1680EG033 (GEN-78-06). This message is intended to eliminate the slippage of the shoulder strap ends of subject harness through the adjuster hardware, P/N 22040-1. Contact James C. Dittmer, TSARCOM, AUTOVON 693-3715.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 2-8 JUNE 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	2	0	26	28
AH-1	1	0	0	2	3
CH-47	0	0	0	7	7
CH-54	0	0	0	2	2
OH-58	0	0	1	14	15
U-21	0	1	0	1	2
T-42	0	0	0	1	1
C-12	0	0	0	2	2
OV-1	0	0	0	1	1
Total	1	3	1	56	61

0 Fatalities, 0 Injuries
Estimated costs: $130,677

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Wire strikes – 90 percent unnecessary

"Unauthorized Low-Level Flights Kill Five". . . "Wire Strikes on the Rise"

Hey! What's going on here? We thought we were over the hump. After all, hasn't the big "killer," inadvertent IMC, finally been brought under control? Why then these lead stories in Vol. 6, Nos. 16 and 17 of FLIGHTFAX and the article in the March 1978 issue of AVIATION DIGEST? Could it be that, just as we had not taken precautions against the deadly hazard of inadvertent IMC flight, Army aviation must now focus increasing emphasis toward combating the dangers of indiscriminate low-level flight outside approved training areas? This article is directed at those aviators who have been involved in wire strikes while conducting unauthorized low-level flight. Showing how to avoid wires in such instances is to attack the symptom and not the cause. The more important consideration is the wanton **disobedience of rules, regulations, and SOPs.** The aviators involved in these unnecessary wire strike accidents may have been using the Army's tactical terrain flight doctrine as an excuse for displaying hair raising low level flying skill outside their authorized tactical terrain training area. You can be sure that individuals who violate this established doctrine oftentimes perform before a captive audience that swears "never again," if they should survive the ordeal.

Accidents caused by aviators engaged in unauthorized low level flights generate questions concerning the level of discipline and professionalism within the responsible organizations. Without a doubt, aviators who perform in this unprofessional manner must be controlled. Disciplinary action may be necessary. However, the aviators who were involved in the two fatal wire strikes described in FLIGHTFAX, Vol. 6, No. 16, dated 8 Feb 78, are beyond disciplinary action. Timely supervisory actions and education directed at professional development might have prevented these losses.

When mishaps such as these occur, we tend to assess the responsibility to the commander and supervisor. However, the ultimate responsibility rests with the aviator to accomplish his flight in a safe and professional manner. This fact cannot be overstressed. Professional and personal pride in one's performance "Above the Best" are the desired qualities of the Army aviator. This is especially true when he is away from the direct supervision of "home base."

According to the article "Wire Strikes on the Rise," there were 124 wire strikes during the FY 1973-1977 period. Approximately 90 percent (which computes to about 111 wire strikes) happened outside authorized NOE areas. These unauthorized low level flights were responsible for 33 fatalities. This is an average of 22 wire strikes and more than 6 lives lost annually. Add to these averages the miserable record of the first quarter FY 78 and one can see that Army aviation must reverse this unsatisfactory trend.

The Army's terrain flight doctrine is a valid approach to the problem of survivability in the environment of the modem battlefield but it should not be used as an excuse for reckless and irresponsible operations. Professional Army aviators and supervisors should indicate in no uncertain terms that such unprofessional performers will not be allowed the opportunity for an encore. ■

Position reports, questions and answers

■ According to the UH-1H –10 and –CL we are required to drain the fuel pumps and sumps for all through-flights. Since a morning sample of fuel is obtained from the fuel truck, is it necessary to take an additional sample from the aircraft before subsequent flights that day when refueled from the same truck?

You betcha! If the dash 10 and the –CL say do it, you better do it! Stop and think about it a minute. You can never be absolutely sure how many times the tanker has been refueled, whether or not the same facility refueled it, or with what type fuel it has been refilled. Take the fuel sample; you'll be much better off doing it for safety's sake and self-protection.

■ The air traffic controller gives the aircraft's position, final vector heading, and clearance for the approach. After turning to the heading given, the pilot realizes the heading will not intercept the final approach course prior to FAF. Can the pilot turn to a different heading to intercept course without advising ATC?

Definitely not. Such action would be in contravention of procedures outlined in AIM 1-79, Radar Vectors. "The pilot will comply with headings and altitudes assigned by the controller." In this situation the pilot should advise ATC that a heading change is needed, then turn to the new heading given by ATC. Radar vectors given by ATC should provide the pilot with proper centerline interception. Any vector that does not should be questioned in accordance with the AIM 1-79, Radar Vectors. "The pilot should question any assigned heading or altitude believed to be incorrect."

■ Our unit has recently installed the 300-gallon crashworthy auxiliary fuel system in our UH-1s. According to AR 95-1, par. 3-19d(2)(c), smoking is permitted during transfer operations only in aircraft equipped with "integral" fuel transfer systems. Does the new crashworthy auxiliary fuel system fall into the "integral" category for this purpose?

The fact that the auxiliary fuel tanks are crashworthy does not change the basic design characteristics of that system. The crashworthy auxiliary fuel system that is referred to is **not** an integral fuel transfer system and smoking during transfer operations is prohibited.

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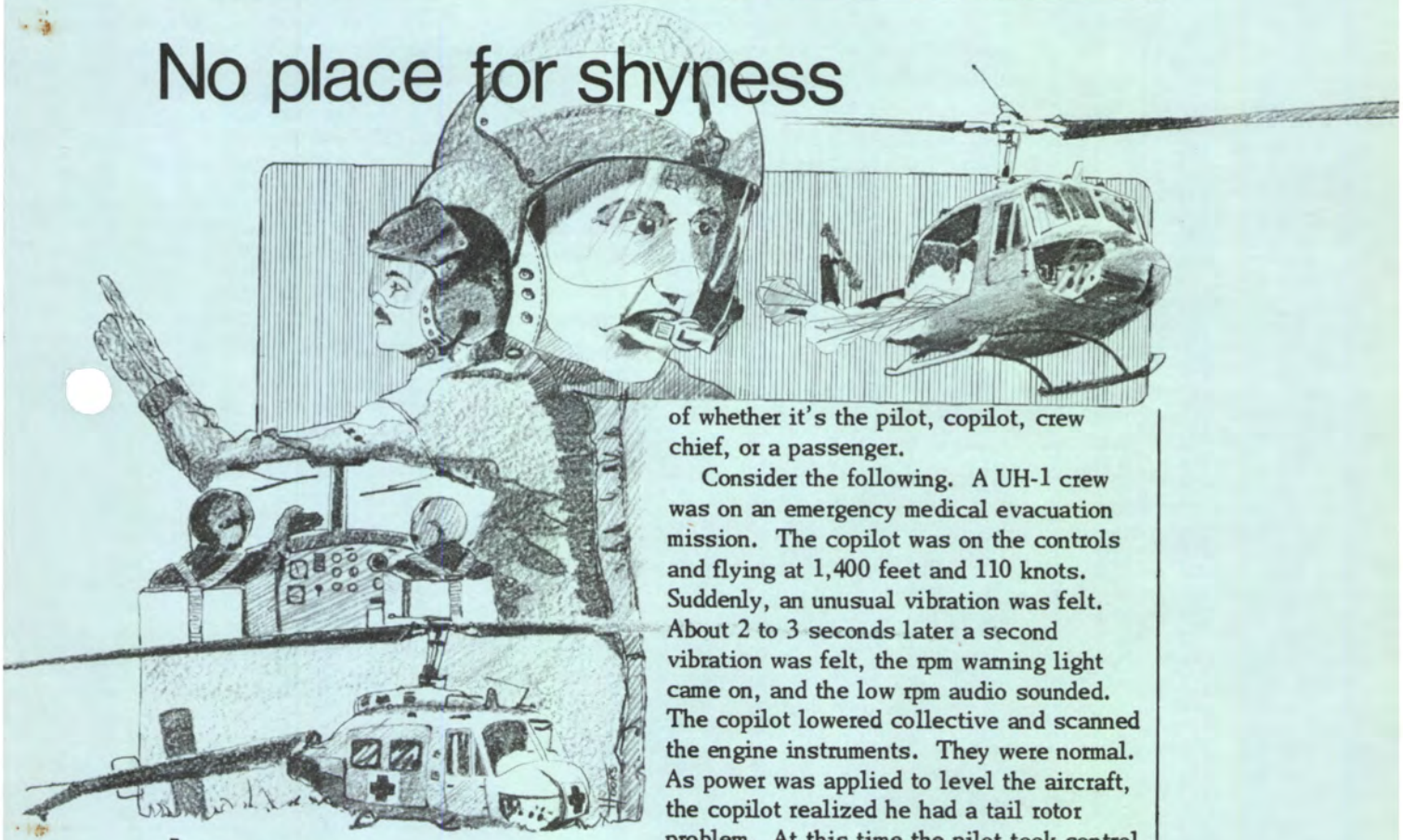
No place for shyness



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 ➤

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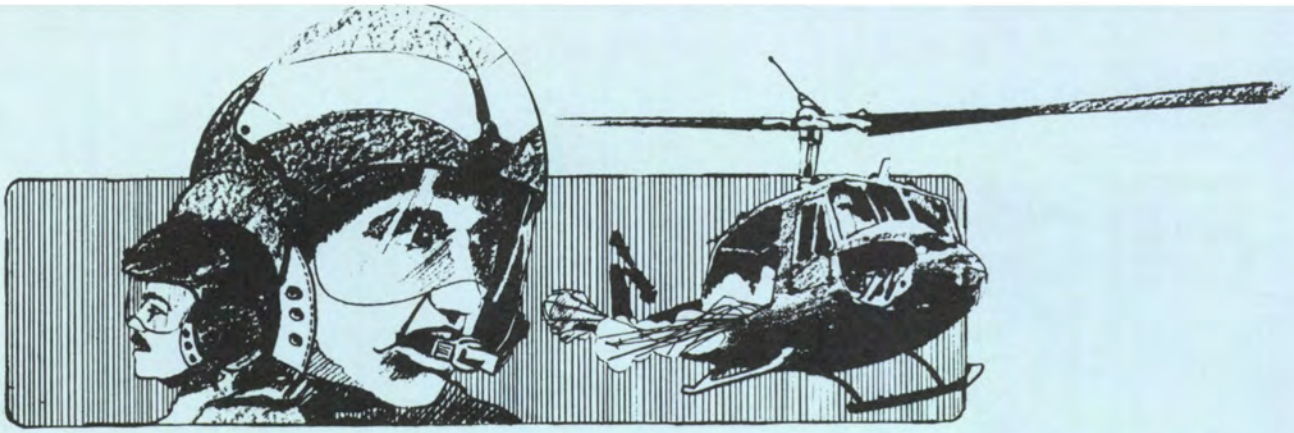


decelerated to about 50 knots. To maintain the approach angle, he applied power and the aircraft yawed to the right. Application of left pedal failed to correct the yaw and the pilot realized he had lost all tail rotor thrust. The aircraft then spun right, hit some trees, and crashed.

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. ■

Accident analysis

ANALYSIS 78-12
Type aircraft: OH-58A
Time: 0655
Classification: Major (total)
Injuries: 2 (major)
Estimated cost: $445,810 (acft, injuries)
Mission: Tactical recon

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW3	32	2,876	2,876

The accident

Due to communications problems, the pilot decided to return to his field site after about 1½ hours of flight. During a terrain flight approach to the parking area, while in a left turn at 80 knots and 5-10 feet agl, the main rotor blade hit the ground and the aircraft crashed.

The cause

■ The pilot inaccurately estimated the clearance available between the main rotor and the ground. He failed to maintain terrain clearance because of poor judgment. Even though the tactical situation did not dictate high-speed, low-level terrain flight and the pilot was in close proximity to his field site, he continued flight at a speed and altitude which did not allow for any error in judgment concerning terrain clearance.

The cure

■ Unit commander take positive action to discourage poor judgment when a pilot selects unnecessary high-speed, low-level terrain flight when the mission or situation does not require such flight.

TOTAL MISHAPS FOR 9-15 JUNE 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	2	2	0	30	34
AH-1	0	0	2	6	8
CH-47	0	0	0	8	8
CH-54	0	0	1	1	2
OH-58	1	1	1	7	10
TH-55	0	0	0	1	1
C-12	0	0	0	1	1
T-42	1	0	0	1	2
U-8	0	0	0	2	2
OV-1	0	0	0	2	2
U-21	0	0	0	2	2
Total	4	3	4	61	72

0 Fatalities, 1 Injury
Estimated costs: $169,761*
*Includes 1 ground accident

More on lubricating tail rotor bearings

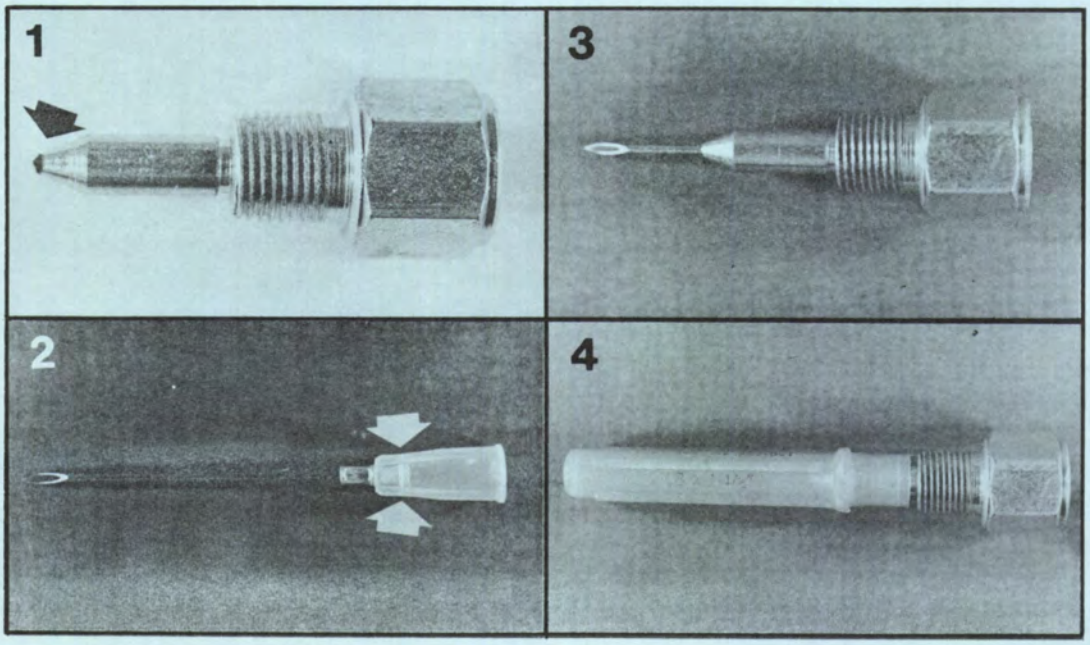
In the 3 May 1978 issue of FLIGHTFAX, we warned against the use of glass hypodermic syringes for lubricating tail rotor drive shaft hanger bearings, recommending the use of plastic ones. As an alternative, we suggest units locally manufacture a tip using an 18-gauge needle to fit a regular grease gun, eliminating the need for a hypodermic syringe.

First, obtain a standard male needle grease fitting and an 18-gauge needle, saving the plastic container it comes in. Then follow these procedures:

1. Enlarge the hole of the needle grease fitting by drilling to a size that will accommodate an 18-gauge needle.
2. File or grind off protrusions on needle plastic shank so that needle can be inserted inside grease fitting.
3. Insert needle into grease fitting and screw fitting onto grease gun to fully seat and seal needle assembly.
4. Slip the long end of the plastic housing that contained the needle over the grease fitting as a protective cap.

Should you choose to use the grease gun method for lubricating tail rotor hanger bearings, it is further recommended that you obtain a new or thoroughly cleaned grease gun, fill it with the proper lubricant, paint it some solid color to identify it, and stencil on it the type of lubricant it contains.

Our thanks for this detailed procedure and suggestions go to SSG Joseph R. Fultz, 13th Co., 1st Bn, Ft. Rucker, AL, who provided us this information and who has, for some time, been successfully using this procedure in units to which he has been assigned. ■



Selected mishap briefs

Rotary wing

UH-1

Accidents □ Crew heard loud noise from transmission area while aircraft was at 8- to 10-foot hover and aircraft pitched nose down approximately 20 degrees. IP noted loss of hydraulics and applied aft cyclic to regain aircraft control. Tail skid struck ground, causing major damage to tail boom, tail rotor drive shaft, and skid. Cause of hydraulic failure not reported. □ Engine lost power during cruise flight at about 2,800 feet msl, and pilot autorotated. Aircraft landed hard, causing one injury and damage to tail boom, fuselage, and skids. Investigation is in progress.

Incident □ Pilot heard loud thump while starting engine and aborted start. Inspection revealed main rotor tiedown had not been removed and was struck by tail rotor blades.

Precautionary landings □ Master caution and segmented hydraulic lights came on. Controls became stiff and pilot made hydraulics-off landing. Caused by failure of irreversible valve. □ Needles would not split during autorotation for practice forced landing and IP made power recovery. Caused by failure of sprag clutch to disengage. □ During repositioning of aircraft to maintenance pad, mechanic on ramp noted fuel coming from bottom of aircraft. Aircraft landed and inspection revealed fuel control return line had failed at lower fitting at tank entry. □ Engine needle of N2 tachometer indicator went to zero, low rpm audio sounded, and rpm warning light came on during level flight at approximately 1,500 feet agl. Caused by sheared tachometer generator shaft. □ Transmission oil pressure fluctuated and temperature rose during cruise flight. Caused by malfunctioning oil flow control thermostat. □ N1 fluctuated 2 percent; torque, 5 psi; and egt, 20 degrees. Aircraft yawed with each fluctuation. When governor switch was placed in emergency position, fluctuating N1 stopped. Suspect malfunction of fuel control unit. □ Pilots heard loud whine through headsets and smelled fumes in cockpit during hover for takeoff. Low rpm audio system and warning light activated, and master caution and main generator caution lights came on. Caused by failure of starter relay unit. □ Master caution and transmission oil pressure lights came on during hover, and transmission oil pressure decreased to zero. Caused by failure of transmission internal oil filter gasket.

AH-1

Forced landing □ Antitorque control was lost while aircraft was in left turn following takeoff. Pilot declared emergency and made running landing, using throttle/collective for yaw control. Caused by failure of tail rotor silent chain.

Precautionary landings □ Copilot noted fuel running down left side of aircraft after hot refueling was completed. Engine was shut down. Fuel leak caused by deteriorated fuel vent line between fore and aft fuel cell. □ Tower operator notified pilot that left ammunition bay door was open. Pilot failed to insure all panels, hatches, etc., were closed in accordance with dash 10 checklist.

CH-47

Precautionary landings □ No. 2 engine beep

Selected mishap briefs

failure occurred during cruise flight and pilot used emergency engine trim. Caused by failure of N1 actuator. □ External load oscillated and struck left rear portion of fuselage. □ Pilot felt unusual lateral inputs in cyclic. No. 2 roll SAS was out of balance.

Human factors mishap □ Pilot became irritated at his continued poor performance during flight and hit the windshield with his fist, cracking windshield.

CH-54

Precautionary landing □ No. 1 engine fire warning light came on. Inspection after landing revealed no fire. Warning light would not reset. Caused by malfunction of aircraft fire surveillance warning system.

OH-58

Incident □ Aircraft struck wires during flight over river while at approximately 50 feet and 40 knots, causing incident damage to pitch change tubes, mast, and one main rotor blade.

Precautionary landings □ During training flight, aircraft began rotating to right while at hover 4-6 feet above ridge line. Application of left pedal had no effect. Pilot assumed tail rotor failure as aircraft continued rapid rotation to right. No suitable forced landing area was available and pilot lowered collective and attempted to gain airspeed by applying cyclic in direction of rotation while trying to maneuver aircraft to lower but level ground. Aircraft spun 8-10 times. At about 10-15 feet above ground, pilot retarded throttle to flight idle to stop spin and cushioned aircraft onto unlevel ground. Aircraft struck ground hard with left skid, and pilot increased collective pitch to lift and move aircraft to more level ground approximately 25 yards downslope. Suspect density altitude was a factor. □ Oil temperature rose to 130° C. Caused by loose wire in cannon plug to temperature sensing probe in bottom of oil tank. □ Following takeoff, copilot noticed engine oil temperature gauge indicated 100° C., and pilot returned to airfield. Prior to landing, engine oil temperature rose to 145° C. and oil pressure registered 45 psi. Inspection revealed oil bypass switch in auto position.
□ Transmission chip detector light came on during cruise flight. Small metal sliver found on plug. Sliver and oil sample from transmission submitted for analysis.
□ When engine was shut down, pilot heard unusual noise from transmission area and felt vibrations. Suspect internal failure of main transmission.

TH-55

Precautionary landing □ Engine ran rough during hover and pilot noted electrical odor and fumes. Sparkplugs were replaced to correct engine problem and radio was replaced to correct electrical problem.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

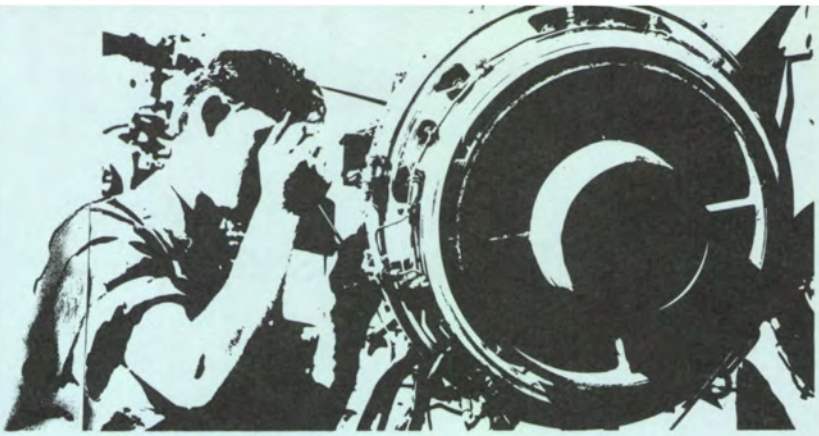
Fixed wing

C-12

Precautionary landing □ (A series) Propeller rpm went to 2000, then decreased to 1900. Control of rpm below 1900 was normal. Caused by failure of overspeed propeller governor (test) solenoid.

T-42

Accident □ Nose and main gear collapsed



on landing and aircraft skidded to stop on runway. Cause under investigation.

U-8

Precautionary landing □ (F series) During test flight following installation of No. 1 propeller, engine was shut down and propeller feathered. After engine shutdown was completed, propeller could not be unfeathered. Caused by defective propeller accumulator valve core.

OV-1

Precautionary landings □ (D series) Pilot engaged the autopilot and released the controls while at assigned altitude of 12,000 feet msl on IFR flight plan. The control stick moved full right and the aircraft rolled approximately 120° right, descending approximately 200 feet into a cloud layer. Pilot released autopilot, recovered aircraft control, and returned to home base. Caused by failure of autopilot gyro. □ (C series) Following takeoff, hydraulic pressure decreased to zero and gear would not retract. Caused by hydraulic pump failure.

U-21

Precautionary landings □ (A series) Engine failed during auto-feather check on pretakeoff runup. Caused by failure of fuel control unit. □ (H series) No. 1 engine fire warning system activated during climb after takeoff. Caused by accumulation of moisture from rain before and during flight.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

AH-1

Precautionary landing □ Following HIT check, maximum power obtainable was 91.8 percent N1. Pin, straight headed, item 5, figure 93, page 228, TM 55-2840-229-23P, 30 Sep 76, was incorrectly installed and came loose due to vibration, releasing inlet guide vane.

CH-54

Forced landing □ Crew heard explosion and aircraft shuddered and yawed to left during hover. No. 2 engine fire warning light flashed momentarily and crew smelled strong "burnt" odor. Fiberglass patch installed on No. 2 engine compressor inlet guide vane broke loose and was ingested by engine, causing internal failure.

OH-58

Forced landing □ Engine quit when throttle was rolled to flight idle at 3 feet agl for hovering autorotation. After maintenance released aircraft to hover to ramp, transmission chip detector light came on. Inadvertent engine shutdown was caused by improper throttle rigging. Cause of transmission chip detector light illumination is under investigation.

Precautionary landings □ Transmission oil pressure light flickered on and off during approach. At about 50 feet agl, oil pressure light burned steadily. Caused by loose transmission oil line which had been disconnected for oil sample, then reconnected but not tightened. □ Transmission oil hot light came on. Inspection revealed loose wire to temperature sensor and grass in oil cooler duct.

CH-47

Precautionary landing □ No. 1 SAS roll link developed a hydraulic leak at the pressure elbow, causing a fine mist spray in the ►

Selected mishap briefs

control closet. Jam nut was not sufficiently tightened.

Maintenance advisory messages

■ 121403Z Jun 78, subject: T55 Lycoming Engine "L" Stand and Adapter, NSN 4920-00-991-0440, Breakage (CH-47-1978-2). The purpose of this message is to prohibit the use of subject adapter for engine maintenance work. It may be used only for transporting the engine in a horizontal position.

■ 062044Z Jun 78, subject: Maintenance Advisory Message Concerning All Aircraft Which are Not Flown Within Time Intervals Specified for Flyable Storage. The purpose of this message is to emphasize the requirement that all installed engines must be operated within the time intervals specified for flyable storage.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

AH-1

□ Crew chief was positioning tracking flag into main rotor to establish low track when main rotor blade struck tracking flag, slinging upper portion approximately 500 feet against another aircraft (OH-58), damaging right lower fuselage.

OH-58

□ In an effort to isolate source of high frequency vibration, pilot and platoon sergeant disconnected the tail rotor drive shaft at the 90° gearbox before starting engine. As engine rpm increased, the unsupported section of the drive shaft aft of the rear hanger bearing twisted off, damaging vertical fin, gearbox, input spline, tail boom, tail rotor drive shaft hanger bearing, and one Thomas coupling.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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Check your parts manual

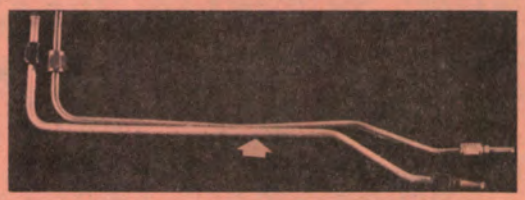
While the aircraft was over trees, N_1 decreased to 25-30%. The pilot extended his glide in an effort to reach a clear area, and the aircraft landed hard, severing the tail boom. Cause of loss of power was failure of an air sensing line in the fuel system. (See Accident Analysis, page 2.)

Investigation revealed the stainless steel tubing assembly that failed had been locally manufactured without the use of drawings by a field maintenance shop. The result was a product that did not meet exact specifications, and the mechanic who installed it had to force the tubing into position; preloading it. The line failed after approximately 2 hours of flight operation.

Parts manuals contain Source, Maintenance and Recoverability (SMR) Codes for all items listed. The source code for this particular tubing assembly shows it should have been requisitioned instead of locally manufactured. At the time of the accident, about 210 of these assemblies were available for issue through normal supply channels.

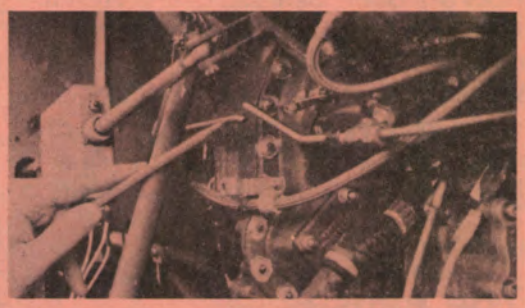
Granted, in unusual cases, TSARCOM may approve local manufacture of a part. However, before approval is granted, assurance must be had that specifications, expertise, and equipment necessary to make the part correctly are available. In short, units are NOT to manufacture parts normally requisitioned without authorization to do so from TSARCOM.

One final note: TM 55-2840-231-24, paragraph 5-5, rigid tube installation, provides valuable information for the T63 engine repairman working with stainless steel tubing assemblies. ■



Locally manufactured stainless steel tubing assembly (arrow), similar to the one that failed, comes close to matching original—but not close enough.

OH-58 rests, sans tail, after engine lost power.



Broken air sensing line caused in-flight power loss, necessitating forced landing.

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USAAAVS

Accident analysis

ANALYSIS 78-13
Type aircraft: OH-58A
Time: 1945
Classification: Major (substantial)
Injuries: 1 minor, 1 minimal
Estimated cost: $30,034 (acft, injuries)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW3	30	3,467	3,467
Copilot	CW2	26	1,022	1,022

The accident

The OH-58 was flying at 4,500 feet agl when the engine lost power about 50 minutes into the flight. The pilot entered autorotation and, to reach an open field, established maximum glide airspeed. He had to apply collective pitch to clear some trees beside the field and then to clear a fence in the middle of the field. After clearing the fence, the pilot used the remaining collective for cushion, but, due to low rotor rpm, the aircraft lost lift at approximately 2-3 feet and touched down hard, causing the main rotor to sever the tail boom.

The causes

■ The maintenance supervisor, acting as an engine mechanic, improperly installed the Pc airline. The line should have been hand-bent to final fit or machine rebent to fit without any preload. When the line failed to line up, the maintenance supervisor (mechanic) forced the nut in place, setting up a preload condition. This caused a stress concentration at one bend, resulting in the ultimate in-flight failure. The line was installed improperly because of inadequate coordination by higher command. The GS maintenance unit is being filled with inexperienced personnel. The unit is authorized E-4s and E-5s, but E-1s and E-2s are filling the slots. Because the unit is critically short of experienced personnel, this supervisor performed the duties he would normally supervise.

■ The maintenance supervisor improperly installed the Pc airline because of inadequate recent experience. His past experience was with hydraulic lines, which are aluminum and not as critical to preloading. He used the same skills to install the steel Pc line which caused a preload condition with associated stress concentration and ultimate failure.

■ A general mechanic improperly manufactured the Pc airline. He used an old line as a sample and "eyeball" aligned the bends and twists to match the sample line. This resulted in the finished line being one-half inch to three-fourths inch off at one end. To be installed, the line required preload which set up a stress concentration at one bend. The line was improperly manufactured because of inadequate written procedures. Specifications on bend angles and roll rates for this line were not given when the line was

approved for manufacture by field maintenance units.

■ Suspect overhaul and repair facility improperly installed the spur gear shaft retaining nut, P/N 6823169. Teardown analysis disclosed that the nut was loose. This loose nut could have allowed the spur gear shaft to vibrate excessively. This vibration, combined with the improperly installed and manufactured line, could have contributed to the stress concentration at one bend which resulted in the ultimate failure.

The cures

■ Higher command provide enough qualified personnel to GS maintenance unit to insure unit can properly perform its mission.

■ Unit commander improve monitoring of personnel and unit activities to detect inadequate experience in critical areas. Insure individual experience is used to enhance unit mission.

■ Give specifications for local manufacture of special case lines when such authorization is given.

■ Improve quality control procedures at all overhaul and repair facilities to insure repairs to T63 series compressor rotor assemblies comply with appropriate technical manuals (TM 55-2840-231-24, page 8-2, paragraph 8-4).

Unauthorized maintenance procedures

Maintenance TMs are primarily positive in nature—they tell us what **to do** instead of what **not to do**. And when we refuse to follow these procedures, we're asking for trouble. A case in point concerns a recent OH-58 mishap that resulted from good intentions but wrong procedures.

The aircraft developed a high frequency vibration, the source of which could not be readily identified. In an attempt to isolate the cause, the mechanic disconnected the tail rotor drive shaft at the 90° gearbox. The pilot then started the engine. As he increased rpm, the portion of the disconnected drive shaft that extended beyond the aft bearing twisted off, damaging the vertical fin, gearbox, tail boom, and other aircraft components. The cause of the high frequency vibration remained undetected.

While the intentions of the personnel involved were good, their method was not. Yet, these individuals can consider themselves fortunate—only their pride was hurt. Others have not been as lucky. Some have been seriously injured or killed from following unauthorized procedures.

The point is clear. Don't take chances with your equipment or your life. Stick to the book! ■

Selected mishap briefs

Rotary wing

UH-1

Forced landing □ Engine quit during cruise flight at 2,000 feet msl. Caused by blockage in fuel control unit.

Precautionary landings □ Master caution light came on. Caused by defective hydraulic pressure switch. □ Transmission oil temperature warning light came on. Temperature transmitter replaced. □ Transmission chip detector light came on. Water collected in plug boot and caused electrical short circuit.

AH-1

Incident □ During practice autorotation, aircraft entered high sink rate. Tail skid struck ground and aircraft landed hard. High density altitude (3,090 feet) considered a factor.

Precautionary landing □ Master caution and transmission oil pressure warning lights came on and transmission oil pressure fluctuated between 25 and 30 psi. On landing, transmission oil pressure decreased to zero and crew noted oil leak. Fitting on locally manufactured transmission oil pressure outlet line found cracked.

AH-1 safety-of-flight message

■ 151430Z Jun 78, subject: Safety-of-Flight Message (Operational/Maintenance) for all Production AH-1S Aircraft (S/N 76-22567 and Subsequent) (AH-1-78-8). Summary: Message supersedes message date time group 082125Z Jun 78. Recent flight tests revealed forward and inboard leg of engine mount tripod are subjected to excessive loads at high aircraft airspeeds. Subject aircraft are to be put on a circle red X status. Contact: Mr. Barhorst, TSARCOM, AUTOVON 698-3646, commercial 314-268-3646.

CH-47

Incident □ No. 2 tunnel cover separated from aircraft, damaging high frequency antenna and mounts. Dzus fasteners were not properly secured.

Precautionary landings □ Crew heard loud squeal coming from forward transmission area. Suspect air in hydraulic system. □ Crew heard loud noise and noted rapid rise of egt (No. 1 engine). Caused by failure of No. 2 power turbine and nozzle.

OH-58

Precautionary landings □ Master warning and tail rotor chip detector segment lights came on. EIR pending AOAP lab report. □ Engine flamed out during start after it had been shut down for approximately 40 minutes. Caused by vapor lock in fuel line to combustor.

TH-55

Precautionary landings □ Aircraft landed hard during straight-in autorotation, bending aft cross beam. □ IP had to apply abnormally heavy left pedal pressure to override excessive right pedal applied by student during hover. Left pedal arm on IP flight controls broke at base through the horizontal shaft portion of the arm.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landing □ (A series) Crew

noted smoke in cockpit coming from area of speaker and warning horn speaker cover. Landing gear warning and stall warning systems found inoperative on postflight inspection. Printed cricuit board resistor for warning system was burned out. Suspect warning horn speaker shorted out.

U-8

Precautionary landing □ (F series) No. 1 engine surged 200 rpm during climb and pilot noted sparks from No. 1 nacelle vent. Alternator on No. 1 engine was switched off and sparks stopped.

T-42

Precautionary landing □ (A series) Left alternator became inoperative, crew smelled smoke and electrical system failed.

OV-1

Incidents □ (D series) No. 1 propeller failed to reverse during landing and aircraft pitched forward and veered off runway. Right wing tip, auxiliary tank, and forward portion of SLAR antenna scraped ground. Pilot applied full power to stop swerve and regain control. Aircraft became airborne and pilot continued takeoff, circled the field, making two passes by tower to confirm gear and tires intact before landing. Suspect intermittent malfunction of reverse microswitch in throttle quadrant.
□ (C series) Pilot felt control stick shudder and noted vibration of glare shield during test flight. Caused by separation of top and right cowlings from No. 2 engine. Inspection revealed high frequency antenna broken loose at aft end of vertical stabilizer, left engine cowling bent, dent and scrapes on fuselage, and damage to right horizontal stabilizer.

Precautionary landings □ (D series) No. 1 engine would not go beyond 20 percent for approximately 20 seconds during start, then seemed normal as it reached 40 percent. No. 1 generator and No. 1 inverter caution lights remained on, and engine was shut down. As engine stopped, black smoke and oil were noted coming out of tail pipe. Caused by internal failure of engine (No. 3 and No. 4 bearings). □ Forward boost pump was found inoperative during runup, but pilot elected to continue mission. During takeoff roll at about 100 knots, boost pump light came on, indicating aft boost pump had also failed. Takeoff was aborted.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Incident □ Following landing, tail rotor drive shaft cover was noted open. Inspection revealed cover assembly was bent and stressed. Crew chief failed to properly secure door.

Precautionary landings □ Fuel was noted leaking on engine deck following rapid refueling. Preformed packing on output line from fuel pressure switch was damaged during installation. □ Battery fumes were noted in cockpit and visible vapor appeared on copilot's windshield. Voltage regulator was set 2.5 volts too high, causing battery to overheat. □ Crew heard three loud bangs and pilot felt slight feedback in pedals when aircraft was lifted to hover. Bleed band was out of adjustment.

AH-1

Precautionary landing □ Crew smelled fuel

Selected mishap briefs

during cruise flight at about 4,500 feet msl. Fuel vent line from forward to aft tank had recently been replaced but not properly torqued, allowing fuel to leak.

Maintenance advisory message

■ 191953Z June 78, subject: Installation of Clamps on Flexible Confined Detonating Cord of All AH-1 Series Aircraft Except the AH-1S (Prod) (AH-1-78-9). Purpose of this message is the modification of certain components in the canopy removal system and extension of their retirement interval. Contact: Mr. Frank Barhorst, TSARCOM, AUTOVON 698-3646, commercial 314-268-3646.

CH-47

Precautionary landing □ Pilot's intercom failed. Caused by improper installation of wire splice at intercom junction box.

OH-58

Precautionary landings □ Transmission temperature warning light came on during takeoff. Transmission was overfilled. □ Rotor rpm bled to 330 and N2 to 95 percent on takeoff. Input line to double check valve was loose, causing air leak.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 16-22 JUNE 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	1	1	27	29
AH-1	0	1	0	5	6
CH-47	0	1	0	4	5
OH-58	0	0	0	9	9
TH-55	0	0	0	3	3
U-8	0	0	0	1	1
T-42	0	0	0	1	1
C-12	0	0	0	1	1
OV-1	0	2	0	4	6
Total	0	5	1	55	61

0 Fatalities, 0 Injuries
Estimated costs: $16,859*
*Includes 1 ground mishap

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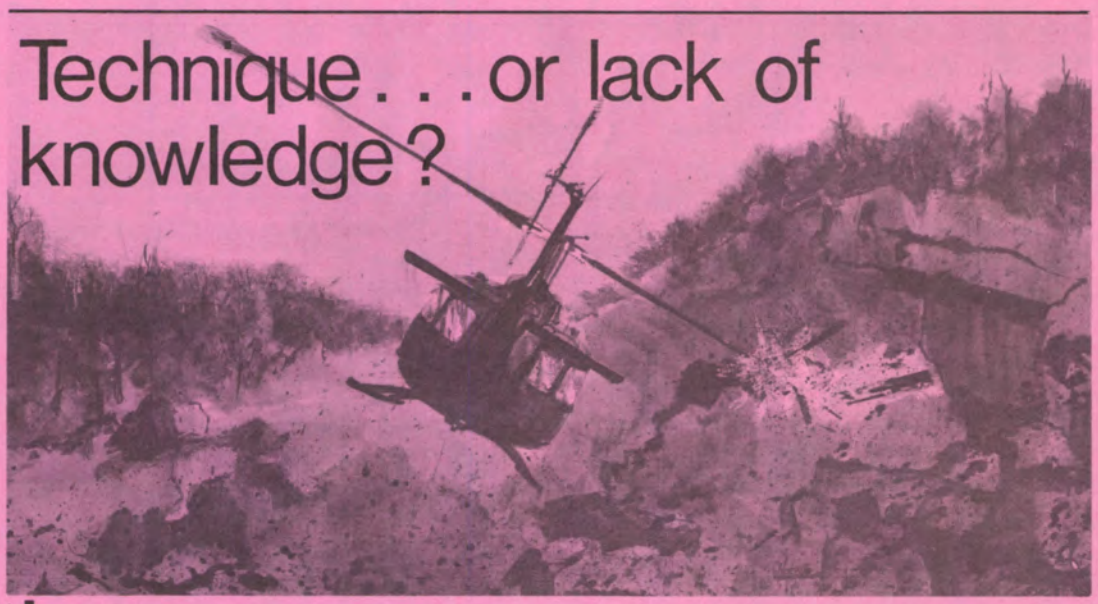
Technique . . . or lack of knowledge?



IN THE EARLY morning haze the flight crew was going through its daily routine, getting ready to fly a support mission. The PIC arrived at the helicopter and told his crew that their mission would be a snap—an ash and trash resupply. Shortly after the crew completed the preflight, a truck drove up with the load they were to carry. The PIC looked at the load and said, "This looks like a three-load mission but if we stack the cases right, we can probably make it in two trips."

While the UH-1 was being loaded, the PIC left the flight line to have a last cigarette before the flight. On his return, he signaled the copilot to strap in and get ready for takeoff. During the engine start and runup procedures, he looked back to see if the crew chief was ready. The cases were all he could see.

With the runup completed, the pilot picked up to a hover. The rpm promptly bled to 5900 and the helicopter settled back to the ground. Again he picked it up, this time with a little more care. The rpm bled to 6000 and the Huey again settled to the ground. The copilot said, "Maybe we have too many cases aboard." The pilot smiled and replied, "Relax. This is where technique comes in. I've handled loads like this a hundred times!"

After several tries, the pilot finally repositioned the helicopter on the runway. On takeoff, the helicopter resembled a frog trying to make it back to the pond. The Huey skipped along the runway, becoming airborne, then settling back to the ground. Finally, just before reaching the end of the runway, it lurched into the air.

The pilot adjusted cruise power and began to explain to the copilot the fine ►

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USAAAVS

points of the maneuver he had just performed. "At first it's a little hairy, but it's easy once you learn the technique."

The en route portion of the trip was uneventful, though it took a very high power setting to maintain straight and level flight. Laughing and joking, the pilot navigated toward the LZ. The sun had burned away the haze and the outside air temperature had increased from 26° to 30° C. It was becoming another hot day.

The pilot pointed to a small ridgeline. "That's the LZ down there at 10 o'clock." It was at the edge of what appeared to be remnants of an old worn-out mountain. Visibility was excellent and there was no sweat about dust. With these factors in his favor, the pilot briefed the copilot on the type of approach he would use to make the pad without overshooting or having to come to a hover and reposition.

Although the pilot planned and explained his approach, he failed to consider the problems he'd had during takeoff. The approach appeared to be a beautifully executed steep one. As he entered the final phase, the pilot flared and applied collective to slow his rate of descent. The helicopter began to shudder and vibrate. The pilot sensed an emergency and attempted to make a go-around. As he added a little more collective, the copilot cried, "We're losing rpm! It's down to 5800!" At this point, the pilot lost control and the helicopter crashed into the ridgeline, killing the crew chief and seriously injuring the pilot and copilot.

This is one example of many similar mishaps reported each year—all due to **overgross conditions.** Close analyses of mishaps initially attributed to main or tail rotor blade strikes reveal many of the blade strikes resulted from uncontrollable conditions caused by loss of rpm.

Pilots involved in mishaps of this type usually complain to maintenance that their engines gave them poor performance at the moment of truth. When maintenance personnel ask, "What was the percent N1, OAT, egt, and torque?" the pilot usually answers, "I was too busy with the emergency to look."

A rotor system will produce only so much lift. Once the system attains this lift, any demand for additional lift will result instead in loss of lift.

To maintain flight, a helicopter must maintain rpm. The helicopter, like all other mechanical devices, obeys the laws of physics religiously. Judging from the number of mishaps we are experiencing from operating in overgross conditions, it appears many aviators don't understand rotary wing performance. Those who attempt to develop what they call "techniques" to cope with impossible situations are asking for trouble.

The best insurance against an overgross condition is to know the factors that affect rotary wing performance. They are load/weight, type aircraft, prevailing atmospheric conditions, and terrain. Once an aviator has a basic knowledge of his helicopter's performance, he can adequately plan the loads that he can carry in existing atmospheric conditions. There is no excuse for getting caught in a power deficiency range as a result of an overgross condition. But as long as we have aviators who try to accomplish their missions by substituting technique for available lift, statistics will continue to show a high number of overgross mishaps. Are **you** asking **your** helicopter to defy the laws of physics? ■

Accident analysis

ANALYSIS 78-14
Type aircraft: UH-1H
Time: 1625
Classification: Major (total)
Injuries: 3 minor, 3 minimal
Estimated cost: $618,675 (acft, injuries)
Mission: Service

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	37	1,692	1,692
Copilot	CW2	31	918	918

The accident

The aircraft, loaded with the crew, three passengers, 21 mermite cans, 18 cases of soft drinks, and other food items, was making an approach to a tactical landing site in mountainous terrain. On final approach, at about 150 feet agl and 20 knots, an excessive rate of descent developed. A go-around was initiated with application of power and a right turn. During the turn, the fore and aft sections struck trees. The main rotor hit the ground and separated, and the aircraft came to rest in an inverted position and was destroyed by fire.

The causes

■ The pilot did not make a weight and balance computation for an abnormally loaded aircraft and did not consult the performance charts in the operator's manual because of inadequate monitoring by IP/SIP. As a result, the aircraft was overgross and exceeding center-of-gravity limitations. When it fell through, there was insufficient power available to make a successful go-around. Although training provided by IPs from other units was satisfactory from a regulatory standpoint, supervision and monitoring of pilots by standardization personnel was nonexistent.

■ The pilot performed inadequate preflight planning because of poor judgment. Although 21 mermite cans and 18 cases of soda, plus three passengers, were added to an aircraft equipped with a command console, the pilot did not suspect it might be overgross and out of center-of-gravity limitations.

■ The pilot failed to compute weight and ►

balance and performance requirements because of chronic fatigue. Conditions at the pilot's duty station (limited recreational facilities, long duty hours, prolonged stand-by, and isolation) are conducive to long-term fatigue and the acceptance of lowered standards, narrowed span of attention, and the tendency to cut corners.

■ The pilot attempted a downwind go-around into climbing terrain and did not use maximum power available to prevent the tree strike because of poor judgment and overconfidence in the performance capabilities of the UH-1H. He did not plan an alternate course of action for an aborted approach nor did he perceive that he was in trouble until after the first tree strike. Although the pilot was aware of wind direction and the nature of the surrounding terrain and knew that his aircraft was "heavy," he did not doubt the ability of the aircraft to perform the maneuver.

The cures

■ Major command provide authorization for standardization IP required by the unit's modified table of organization and equipment. This authorization would permit continuous monitoring and training of unit aviators by an IP.

■ Upgrade unit training to provide more emphasis on all aspects of preflight planning, especially weight and balance computation and use of performance charts.

■ Inform personnel, through unit safety meetings, of problems encountered as a result of poor judgment and overconfidence in equipment, and remedies to these problems.

■ Unit commander improve monitoring of personnel and unit activities to detect and resolve psychological/physiological problems before they can adversely affect aviator performance and compromise mission accomplishment. The Aviation Commander's Readiness Course and related courses should include monitoring techniques for personnel and unit activities as a training objective.

■ Major command provide required facilities and services to reduce the effects of fatigue.

TOTAL MISHAPS FOR 23-29 JUNE 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	2	4	32	39
AH-1	0	0	0	6	6
CH-47	0	0	0	2	2
OH-6	0	0	0	1	1
OH-58	1	1	1	13	16
TH-55	0	0	0	4	4
C-12	0	0	0	2	2
T-42	0	0	0	1	1
U-21	0	0	1	3	4
T-28	0	0	1	0	1
U-8	0	0	0	2	2
OV-1	0	0	0	1	1
Total	2	3	7	67	79

9 Fatalities, 1 Injury
Estimated costs: $669,525

Changes in the oil analysis program

TB 55-6650-300-15, which covers the oil analysis program, has been revised. This change should reach the field during July. Major revisions are:

- TB number changes from 55-6650-300-15 to 43-0106.
- DA Form 3253 (accompanies oil sample) is replaced by DD Form 2026. (This is a standard tri-service form and is available through normal publication supply channels.)
- Routine samples are taken from **most** components after 25 hours of operation **or 30 days, whichever comes first.** (The 12½-hour interval for sampling turbine engine oil remains unchanged.)

Samples should be taken as near the prescribed interval as possible, taking care not to exceed the 30-calendar-day limit. Because of difficulty in scheduling and taking samples at precise intervals, the following guidelines have been established:

Sampling Interval (or 30 days)	Allowable Range
5 hours	4-6 hours
10 hours	8-12 hours
12½ hours	10-15 hours
25 hours	22-28 hours
100 hours	90-110 hours

The effectiveness of the Army oil analysis program depends on timely testing and analysis of reliable oil samples. Individuals responsible for the samples must insure that they are taken at the specified time intervals and are properly identified, that they are not contaminated, and that they are sent to the laboratory without delay. ■

Aviation life support equipment

There are several new and pending developments in the important but often neglected field of Aviation Life Support Equipment (ALSE). In October, the Aviation Center, Fort Rucker, AL, was designated as the TRADOC proponent for ALSE. The central points of contact are MAJ McWherter or Mr. Barringer of Systems Branch, Materiel Developments Division, Directorate of Combat Developments, USAAVNC-ATZQ-D-MS, AUTOVON 558-5272/2704. Proposals for establishment of a DA-level management program manager and also a new MOS for ALSE technicians to work at unit level are still pending. These two priority actions were highlighted in the recent TSG/FORSCOM/DARCOM/TRADOC/NGB ALSE Management Steering Council meeting 22-23 February 1978, hosted by TSARCOM (DRCPO-ALSE) in St. Louis, MO. *—From USATSARCOM Materiel Readiness Information Bulletin*

Selected mishap briefs

Rotary wing

UH-1

Accident □ Aircraft crashed during IFR flight. Nine fatalities. Cause is being investigated.

Incident □ Tail skid and tail rotor blades hit ground during autorotation.

Forced landings □ As troops were offloading, noncrewmember threw entrenching tool through main rotor blade. □ Aircraft was run up for test flight and engine failed when pitch was applied for hover.

Precautionary landings □ Vapor was seen coming from battery vent. Battery was shut off and aircraft landed. Caused by thermal runaway. □ Hydraulic pressure segment light and master caution light came on and hydraulic system failed. Caused by failure of hydraulic pump gasket. □ Compressor stall occurred as pilot applied power to accelerate to cruise speed. Caused by corrosion of compressor section. □ Rotor tachometer failed. Caused by broken wire from cannon plug to tachometer. □ Crew noticed 10 psi fluctuation of transmission oil pressure just before caution light illuminated. Aircraft was landed and crew discovered oil leaking from transmission oil line, which was chafing against hydraulic line. Maintenance officer checked lines for security and proper routing and found no discrepancies. Lines may have been squeezed together by hand inadvertently.

AH-1

Precautionary landings □ Pilot noticed odor and smoke from ECU duct. Leaking transmission output seal allowed fumes and smoke to enter cockpit. □ Master caution, oil bypass, and transmission oil pressure lights came on. Inspection revealed oil leak in transmission area. Crack was found in oil line fitting. □ Crew chief saw oil coming from oil cooler area. Caused by 3-inch crack in oil cooler tubing in radiator. □ N_2 dropped and N_1 had 2% fluctuation. Caused by loose bleed air line from fuel control into bleed band actuator.

CH-47

Ground accident □ Tracking crew allowed tracking flag to hit main rotor blade, damaging blade.

Human factor mishap □ During HIT check, flight engineer noticed excessive grease around a drive shaft bearing. As he tried to wipe the grease with a rag, the rag became entangled in the drive shaft and pulled his hand into it. The severe pull and twist on the hand caused compound fractures of the ring finger and little finger and fracture of the middle finger.

Precautionary landing □ No. 2 generator caution light came on. Caused by failure of generator protection panel.

OH-6

Precautionary landing □ Engine-out audio and light came on as N_1 needle dropped to zero. Caused by N_1 tachometer failure.

OH-58

Accident □ Master caution light and engine chip detector light came on during cruise flight. During approach to open field, loud banging noise was heard from rear of aircraft. N_2 needles split and autorotation was initiated. Hard landing caused major damage. Suspect internal failure of engine.

Incident □ Aircraft was sitting on ground at flight idle. AH-1 passed nearby on approach to rearming point and rotorwash caused open pilot's door to slam forward, breaking hinges.

Precautionary landings □ Pilot saw smoke coming from battery compartment during hot refueling operation. Caused by internal failure of battery. □ Engine oil bypass light came on. Caused by failure of oil pressure switch. □ Engine chip detector light came on. Excessive metal was found on plug. Engine was replaced.

Ground accident □ After door was sealed with tape, the roll of tape was thrown out of rotor disc, striking main rotor. One blade and tip cap were damaged.

TH-55

Precautionary landings □ Low engine oil pressure was noted during landing. Caused by failure of engine oil pressure sending unit. □ Engine overspeed occurred during start. Engine was replaced.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

T-42

Precautionary landing □ Fuel was seen siphoning from right fuel tank. Gas cap was replaced.

U-21

Forced landing □ (A series) At 80 knots and 1,000 feet down runway during takeoff, aircraft shuddered violently, left main wheel locked, and left side of aircraft dropped. Aircraft began to skid and veered hard left. IP reduced power to idle on both engines, applied full right rudder in an attempt to keep aircraft down center line, and applied aileron to lessen drag on left side. IP scanned instrument panel to insure engines were operating properly and reversed props to decelerate aircraft and keep it from skidding off runway onto soft ground. Aircraft skidded 930 feet from point of lockup and came to rest 4 inches from edge of runway. Wheel assembly and brake assembly were broken in several pieces, and tire and tube were destroyed. Inspection of wheel assembly pieces revealed discoloration of an area 5 inches long with bench marks and stop marks. Suspect metal fatigue. WELL DONE to CW3 Thomas Caples for an excellent job of landing the aircraft without major damage.

Precautionary landings □ (D series) During climbout, oil was seen leaking from underneath No. 2 engine cowling. Oil cap was not properly secured during preflight inspection. □ (B series) Immediately after takeoff, No. 2 engine fuel pressure gauge fluctuated and No. 1 engine oil pressure was above 100 psi. Fuel boost pump was replaced and oil pressure relief valve adjusted.

T-28

Forced landing □ Aircraft backfired four times in cruise flight, followed by reduction of rpm, which immediately returned to normal. Pilot reduced throttle to minimum rpm and established a glide. About 30 seconds later, sump light came on. Pilot declared an emergency and landed. Suspect No. 9 cylinder swallowed a valve. WELL DONE to CW3 Robert Williams for landing his aircraft without further mishap.

U-8

Precautionary landing □ (F series) Pilot smelled fuel during taxi. Fuel was leaking from elbow fitting on back of No. 1 engine-driven fuel pump. Fitting was broken.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Selected mishap briefs

Maintenance

UH-1

Incident □ Airspeed built up to 110 knots and aircraft appeared nose low with some aft cyclic. Aircraft was landed and crew thought fuel burn-off had caused CG shift. Passengers and cargo were relocated aft and flight was continued. Postflight inspection revealed synchronized elevator bellcrank bracket attaching fitting was broken.

U-21

Precautionary landing □ (A series) Fuel started siphoning from right wing tank on takeoff. Fuel tank cap adjustment screw was loose.

For more information on maintenance mishaps, call AUTOVON 558-3913/3901.

Nicad battery safety-of-flight message

■ 292041Z Jun 78, subject: Aircraft Mishaps Involving Nicad Batteries (USAAAVS GEN 78-7). Improved nicad cells containing permion separation material have been issued to selected aviation units. The limited free issue was completed in June 1978. Currently many units are operating aircraft equipped with one of two types of batteries. One contains cells utilizing cellophane separation material (old type), while the other uses permion separation material (improved cell). The latter is expected to give superior service and should significantly reduce the number of nicad battery-related mishaps. In order to determine the effectiveness of these cells in reducing battery-related mishaps, it is particularly important that their mishap experience be monitored closely.

Paragraph 14 of the Preliminary Report of Aircraft Mishap (PRAM) requires a description of any known or suspected materiel deficiencies involved in the mishaps. Personnel submitting PRAMs on mishaps involving nicad batteries should confirm battery cell type by physically examining the battery and/or liaison with the unit battery shop. Request that the word PERMION or CELLOPHANE (as appropriate) be added to this paragraph of the PRAM for all mishaps involving nicad batteries and/or cells.

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A routine matter

No mission is so routine that it doesn't deserve planning. But inadequate mission planning continues to cause aircraft accidents. Too many pilots simply jump in and go, ignoring their responsibility to properly plan the flight. They fail to realize that preflight ►

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A routine matter

planning is just as important to safe accomplishment of a mission as is the actual flight itself. Even pilots who would not consider beginning a mission without a thorough preflight inspection sometimes skip the planning portion of a routine mission. But planning should also be routine—the first phase of **every** mission.

By-the-book performance must begin long before the crew reaches the flight line. AR 95-1, par. 4-1, requires that "Before beginning a flight, the aircrew will familiarize themselves with all procedures and rules appropriate to the mission. Preflight action for **all flights will** include . . . ." The paragraph goes on to list **required** preflight actions. The word "will" establishes mandatory compliance, and "all" means just what it says—**all** flights.

Mission planning is not just a good idea, it is a **requirement.** When this requirement is ignored, it often shows up as an accident cause factor. The following are typical:

■ An OH-58 pilot flew low level during a field training exercise without first making a thorough map reconnaissance of his intended flight route. He also failed to brief his copilot on the details of the mission—planned route, altitude, time in flight, even the location of the first landing zone. As a result, the copilot only went through the motions of checking the map for hazards along the general flight route. The aircraft struck powerlines at 50 feet, severing the tail boom, and crashed. Both pilots escaped with minor injuries, but a passenger, who had received no briefing on the use of seatbelts and shoulder harness, was thrown from the aircraft and killed. Another passenger sustained major injuries. The aircraft was destroyed.

■ The PIC of a UH-1 took off on a standby medevac mission in support of a training exercise without discussing with his copilot which duties each would be responsible for during the flight. Although he knew they would be required to orbit a drop zone, he failed to establish ahead of time the altitude they would maintain during the orbit. After reaching the mission site, the PIC turned the controls over to his noninstrument-rated copilot. The flight was conducted at night with no moonlight, limited ground lights for VFR reference, and horizon partially obstructed by mountains. The PIC became preoccupied with trying to correct a problem with the UHF radio and paid no attention to the operation of the aircraft. The copilot answered an FM radio call from the drop zone safety officer asking how long they could remain on station. He was preoccupied with the aircraft clock, trying to verify flying time remaining before they would have to return to home base. Neither crewmember noticed the aircraft passing through that phase of the orbit facing the

It is the routine flights that become the most dangerous when complacent pilots start taking shortcuts and deviating from established procedures

mountains where there was a very limited horizon and no ground lights. The copilot finally spotted ground lights but they immediately disappeared. The lights reappeared momentarily just before the Huey crashed. The crew escaped with minor injuries. The aircraft was destroyed.

■ Even though a current wire hazards map was posted, the pilot of an OH-58 did not bother to plot the wires on his tactical map. He also did not take time to brief and perform a map reconnaissance with his observer (who was undergoing training) before a mission that would include NOE flight. The pilot failed to determine his observer's map-reading capabilities before the flight, and elected to continue the NOE portion of the mission even after realizing that the observer was not proficient enough at map-reading to navigate. The pilot divided his attention between a general view of the flight path and helping the observer read the map. The tail rotor struck three ¾-inch high-tension wires and crashed. Both crewmembers escaped injury, but the aircraft was a total loss.

■ In a hurry to complete a routine service mission, a Huey pilot decided to fly the mission single-pilot with a civilian passenger acting as crewmember. During preflight, the pilot saw that the fuel level was low. He checked the fuel gauge and mentally calculated time, distance, and fuel on board. He figured he'd have enough fuel to complete the mission. He figured wrong. The aircraft ran out of fuel and the engine failed at 700 feet. During autorotation the pilot spotted wires and applied collective pitch to avoid them. Loss of rpm occurred and the aircraft fell 20 feet to the ground, sustaining major damage.

In each of these mishaps, **required** preflight planning actions were ignored by experienced pilots because they were flying only **routine** missions. But it is the routine flights that become the most dangerous when complacent pilots start taking short-cuts and deviating from established procedures.

Only when pre-mission planning becomes as routine as the mission will these types of mishaps be eliminated. ■

Accident analysis

ANALYSIS 78-15
Type aircraft: OH-58A
Time: 1010
Classification: Major (substantial)
Injuries: None
Estimated cost: $5,628 (aircraft)
Mission: Ferry flight

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	WO1	26	520	520

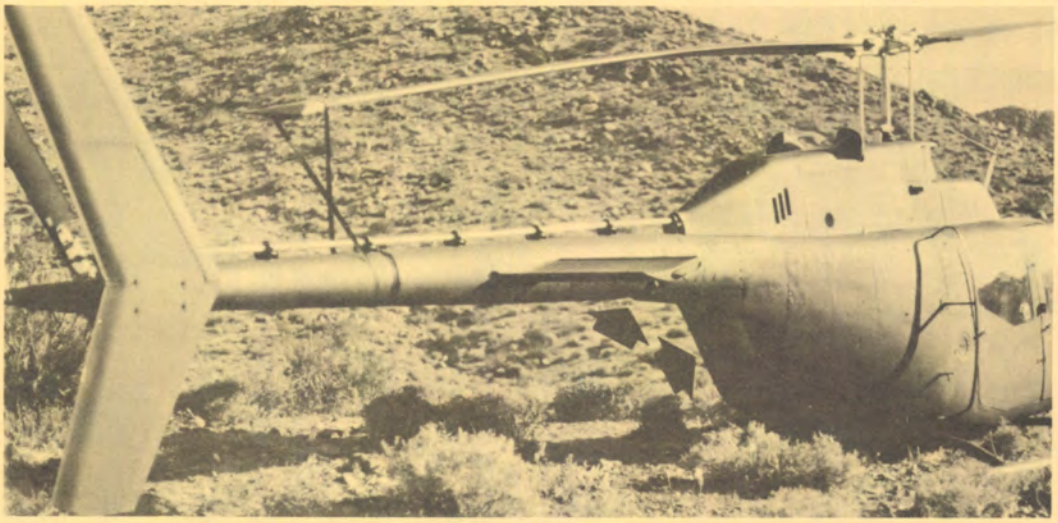
The accident

The trail pilot in a flight of aircraft being ferried to a tactical LZ was the first to locate the LZ and called the other pilots. The leader of the flight told the pilot of the trail aircraft to take over the lead so the other pilots could follow. Refraining from assuming the lead, the trail pilot brought his aircraft to a 50- to 60-foot downwind hover out of ground effect, near gross weight, and turned to the right about 80° to "keep the others in sight" as they maneuvered around him. The aircraft continued to turn through 1½ to 2 revolutions. The pilot, thinking he had a tail rotor failure, closed the throttle and entered autorotation. The autorotation was attempted from an altitude and airspeed within the avoid area of the aircraft's height/velocity diagram and a hard landing with major damage occurred.

The causes

- The pilot attempted to hover and turn his aircraft at near gross weight, out of ground effect, in a tailwind because of poor judgment and overconfidence in the performance capabilities of the OH-58. Once the pilot had identified the destination LZ and told the other members of the flight of its location, neither the flight mission nor the circumstances dictated that he bring the aircraft to an OGE hover. When questioned about his previous experience in hovering at 50 feet, the pilot indicated he had done it several times and did not consider it a dangerous maneuver.

- The pilot lacked confidence in himself.



When the flight leader told him to take over the lead, he stated that he would keep the LZ in sight and directed the others to go around him.

■ The pilot misinterpreted a self-induced condition causing loss of left pedal tail rotor authority as failure of the tail rotor system because of inadequate attention. The pilot stated that when he stopped the aircraft to wait for the others to reposition, he was showing the crew chief where they were on the map and was "trying to give him a little bit of training" so he had more than just the aircraft on his mind.

■ The pilot misinterpreted a self-induced condition as tail rotor failure because procedures in the operator's manual are inadequate concerning conditions of flight that can result in loss of tail rotor authority.

The cures

■ Inform personnel, through unit safety meetings, of problems encountered as a result of inadequate attention, overconfidence in aircraft performance, and lack of self-confidence. Specially trained personnel such as a flight surgeon should be solicited to address the roles psychological/physiological factors play in accident causes.

■ Revise operator's manual. Chapter 4 should address steps to take if inadequate tail rotor authority is encountered while hovering below or above 10 feet. The information contained in figures 14-4, 14-7, 14-8, and 14-9 should be combined and a caution area added to show when left pedal authority can be exceeded in relation to 0- to 35-knot wind conditions.

Forced and precautionary landing survey reminder

As part of an overall effort to improve operational readiness, USAAAVS is currently collecting data from selected units to determine costs of forced and precautionary landings. About 4 months ago, report forms were sent to 14 units selected to participate in this survey by FORSCOM. In addition, other units were invited to participate on a voluntary basis.

Initial response from the field was gratifying. However, enthusiasm seems to have waned and the number of reports being received has dwindled. USAAAVS has received completed forms on only 285 of the 950 precautionary and forced landings that could have been included in the survey. This means that a lot of vital information needed to justify improvement of equipment to reduce the possibility of in-flight failures has not been made available.

Consequently, we urge you to renew your efforts in this program and submit requested information on a timely basis. Your help is essential. If you need additional information, call USAAAVS, AUTOVON 558-4510/4812. ■

Selected mishap briefs

Rotary wing

UH-1

Incidents □ Passenger wearing SPH-4 helmet approached aircraft with his head down. Helmet struck and broke window assembly. □ Main rotor blade struck tail boom during shutdown, damaging tail rotor drive shaft cover and one section of drive shaft.

Precautionary landings □ Severe 1 to 1 vibration occurred during cruise flight. Inspection revealed nose block weight in white main rotor blade came loose from bonding and broke tip cap. □ Crew smelled fuel odor and then noticed fuel on floor of cargo compartment. Caused by broken O-ring on auxiliary fuel cell. □ About 2 minutes after right auxiliary fuel transfer pump was actuated, crew smelled strong fuel odors and landed. Frequent installation and removal of auxiliary fuel cells caused a gradual loosening of the fuel pressure line retaining nut beneath the aircraft floor. This resulted in sufficient separation of the flare fitting and fuel discharge line to allow fuel to be pumped between the retaining nut and fuel line into the belly of the aircraft. □ Cyclic binding occurred during flight. Caused by left lateral servo malfunction.

AH-1

Precautionary landing □ Engine oil pressure caution light came on. Caused by failure of oil pressure switch.

CH-47

Precautionary landing □ Pilot noticed loss of pressure on utility hydraulics system and landed. Caused by failure of O-ring on No. 2 engine starter.

OH-6

Precautionary landing □ Fuel filter caution light came on. Jelly-like substance was found in fuel cells. The internal fuel pump had been painted and the paint had come off in the JP-4.

OH-58

Precautionary landings □ Transmission hot oil light came on. Caused by faulty thermostatic switch. □ As throttle was being advanced from flight idle during engine runup, power turbine tachometer dropped to zero. Caused by failure of engine tachometer generator.

TH-55

Precautionary landings □ Engine oil pressure dropped below minimum operational pressure. Caused by failure of oil pressure sending unit. □ IP smelled fumes from engine area. Postlanding inspection revealed alternator pulley bearing had failed and frozen. □ Clutch would not engage. Caused by failure of linear actuator.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

T-42

Precautionary landing □ Left brake began to grab after touchdown, causing aircraft to move off center line. Pilot applied additional right brake to maintain heading and tire blew out. Caused by malfunction of brake cylinder.

U-8

Precautionary landing □ (F series) Pilot saw smoke coming from battery compartment during taxi. Caused by overheated nicad battery.

OV-1

Precautionary landing □ (D series) No. 1 engine fire light came on. Caused by water in fire detection system cannon plug.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

AH-1

Precautionary landing □ Engine surged during response check at 35 psi torque, followed by six loud bangs. N2 rapidly decreased and egt increased. Inspection revealed foreign object damage to first stage of stator vanes.

OH-58

Ground accident □ During tracking operation, crew chief/mechanic allowed tracking flag to enter rotor path, damaging both main rotor blades. Maintenance crew did not use proper tracking procedures.

Precautionary landing □ Pilot noticed N2 at 94%, adjusted collective, and autorotated. Caused by air line leak in connector to double check valve.

C-12

Precautionary landing □ (A series) When landing gear was lowered, nose gear indicator light did not come on. Gear was manually extended and 3 to 5 minutes later, gear light illuminated. Nose gear down switch was found to be intermittently sticking. Problem was solved by spraying with penetrating oil similar to WD-40 which removed foreign material from switch.

U-8

Precautionary landing □ (F series) Left main gear indicator, warning light, and gear horn indicated gear was not down and locked. Tower confirmed gear appeared down and in position. Manual clutch was disengaged and attempt was made to recycle gear. Retract motor made loud grinding noise and gear did not start up. Gear handle was put back down and noise stopped. Right engine started misfiring and running rough. Gear indicators went to down and locked position on touchdown. Inspection revealed landing gear and manual clutch were slightly out of rig and plugs on right engine were fouled.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ When crew chief closed aircraft door, top latch did not catch. Rotorwash from another helicopter blew door open with such force that it dislodged from its hinges and smashed into chin bubble. □ Aircraft had been placed on jacks for removal of skid tube assembly. As aircraft was being lowered onto new assembly, it fell off left rear jack and came to rest on passenger step, cross tube, synchronized elevator, and tail stinger. Suspect left rear jack was lowered prematurely. □ As truck driver was backing to turn around, he backed truck into nose of helicopter.

AH-1

□ Mechanic was removing ground handling wheels. When he released hydraulic pressure, the pin retaining the ground handling wheels to the skids slipped out of the skid retainer bracket. The wheels came up and hit the mechanic in the face, ►

Selected mishap briefs

knocking him unconscious. Mechanic did not insure the support pin was fully engaged in the skid tube mount.

OH-58

□ Aircraft was parked on maintenance ramp. Avionics maintenance was being done in cockpit, requiring both doors to remain open. UH-1 parked next to OH-58 was picked up to a hover before doors could be secured. Rotorwash blew door into windshield, punching hole in windshield.

U-21

□ Individual, after changing batteries in forklift, was checking to see if he had put a good battery in. He accidentally hit the selector and the forklift started to move in reverse. Individual did not know how to stop forklift and it continued backwards until it hit U-21. □ As aircraft was being towed along edge of ramp, right wing tip hit oxygen bottle cart parked next to ramp. Wing walker was used only on left side of aircraft.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 30 JUN-6 JUL 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	2	0	18	20
AH-1	0	0	0	3	3
CH-47	0	0	0	1	1
OH-6	0	0	0	2	2
OH-58	0	0	0	6	6
TH-55	0	0	0	10	10
U-3	0	0	0	1	1
C-12	0	0	0	1	1
U-21	0	0	0	1	1
T-42	0	0	0	1	1
U-8	0	0	0	2	2
OV-1	0	0	0	2	2
Total	0	2	0	48	50

0 Fatalities, 0 Injuries
Estimated costs: $10,061

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VOL. 6, NO. 4 □ 26 OCT 1977

There is a difference

A&B model CH-47 lower engine cowling.

The old saying "What's good for the goose is good for the gander" just ain't necessarily so—as was recently verified by means of a CH-47 incident. The aircraft in question—a "C" model—was on a test flight when the No. 1 engine lower cowling came loose and did a little flying on its own. Needless to say, this type of action is not conducive to the safety of the aircraft, its occupants, or to some unwary soul below. Fortunately, in this instance, only negligible damage to the aircraft resulted.

Investigation to determine why the cowling blatantly violated regulations by refusing to conform to maintenance standards and stay put revealed the fault did not lie with the cowling but with *us*, the human factor. This particular cowling was designed for use *only* on CH-47A and B model aircraft—not "C." And herein lies the difference. The cowling designed for the CH-47C sports two vent screens instead of one, and has longer turnlock stud fasteners than those used on A and B models.

When the more powerful engine of the CH-47C is "burped" as the bleed band opens, it puts forth a "belch" like you wouldn't believe. The single vent screen which is adequate for cooling and venting the A and B models just won't hack the pressure buildup of the C. Couple this increased pressure with inadequate cowling retention, and it's little wonder the curved panel takes a sudden unauthorized leave of absence.

The problem concerning retention of the *wrong* cowling on the C model is twofold—the shorter studs either may not fully engage or, if they are forced into a "locked" position, undue wear and strain will occur to the components. In time, proper retention will be lost—and so will the cowling.

But that's not all. The plot becomes more complicated as it thickens. When we, the human factor, goof up, we do it up right. While we list the correct part number for the proper cowling to be installed on the CH-47C in TM 55-1520-

(Continued on back page)

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USAAAVS

Accident analysis

ANALYSIS 77-5
Type aircraft: OH-58A
Time: 1605
Classification: Major (total)
Injuries: None
Estimated cost: $145,060 (aircraft)
Mission: Ferry flight

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	WO1	30	228	293

The accident

As the No. 2 aircraft in a flight of two OH-58As was being hovered from the ramp area for takeoff, it became enveloped in blowing snow caused by the rotorwash from both aircraft. The pilot added power and climbed above the blowing snow. Concerned that he was too high and fast, he reduced power and descended to about 5 feet above the ground. Again he entered white-out conditions and became disoriented. The main rotor blade struck the ground, the mast separated, and the tail boom was severed behind the horizontal stabilizer. The aircraft crashed on its left side.

The causes

■ Pilot hovered at low altitude over loose snow. He was a recent flight school graduate and transitioned into the OH-58A at the unit level. During transition, he was not given instructions about white-out conditions that can result from hovering too low and slow over loose snow.

■ Operator's manual fails to note the hazard of hovering over loose and blowing snow which results in white-out conditions.

■ Flight leader violated paragraph 5-4 of AR 95-5 and the unit SOP by assigning an inexperienced pilot to a mission for which he had not been properly trained. In addition, he continued the flight even though visibility was one-half mile with fog and falling snow.

The cures

■ Unit commanders:

□ Upgrade unit training to insure pilots are aware of specific hazards associated with seasonal environmental conditions common to the geographical area of operation. As a remedial measure, written training guides which explain different operational characteristics that must be considered for specific geographical environments should be provided to the units. For example, TC 1-12, "Cold Weather Flying Sense," dated July 1977, is an excellent training circular to aid commanders in upgrading unit training for cold weather operations.

□ Insure personnel are ready and capable of performing the assigned mission based on their training, experience, and psychophysiological state. To assist unit commanders in gaining this expertise, the Aviation Commander's Readiness Course (COI 2G-F15) should include instruction on crew selection and assignment.

■ Higher commands should improve monitoring of unit activities to insure aviation units are providing training on hazards associated with seasonal operational environments. As a remedial action, unit aviator training should be an item of special interest during annual general inspections.

■ ASOs should inform personnel, through safety meetings, of hazards associated with hovering or landing in snow and their cures.

■ Revise operator's manuals to include the hazards of white-out conditions while operating in loose and falling snow.

(These cures are possible remedies and not necessarily the only appropriate ones.)

Materiel failure/malfunction mishap analysis

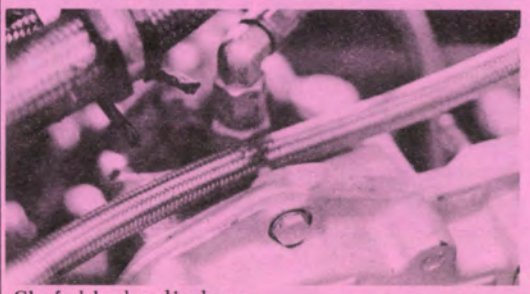
77-3
Type aircraft: AH-1G
Classification: Major (total)
Injuries: 1 minimal
Estimated cost: $509,908 (aircraft, injury)
Mission: Ferry flight

The mishap

Flight began after RON at civilian airfield with no crew chief available. Approximately 15 minutes after takeoff, a master caution light and No. 1 hydraulic segment light came on. The pilot decided to return to his takeoff point to make a running landing. On short final, the pilot attempted to comply with instructions from the tower to divert to another runway, but found he had inadequate control of the aircraft. He tried a running landing to the sod area. The aircraft crashed when the right skid struck a drain cover and collapsed.

The causes

- Hydraulic hose, NSN 4720-00-982-0648, was incorrectly routed, allowing it to chafe against the No. 2 hydraulic boost pump and rupture.
- Pilot performed inadequate maintenance inspection (PMD) and failed to discover the misrouted line.



Chafed hydraulic hose.

Enlargement of hydraulic hose.

The cures

- Insure maintenance supervisors place emphasis on by-the-book maintenance, with special emphasis on daily inspections.
- During unit training, require all AH-1 aviators to receive instruction on how to properly perform a PMD inspection. Require pilots to demonstrate proficiency in this inspection.

(These cures are possible remedies and not necessarily the only appropriate ones.)

Selected mishap briefs

Rotary wing

UH-1

Accident □ Landing lights were used during approach to minimum lighted LZ. Glare and loss of vision caused pilot to make hard landing, resulting in structural damage.

Precautionary landings □ Pilot smelled fuel fumes in flight and landed. Fuel was found on engine deck. Suspect fuel leak from fuel manifold. □ Hydraulic caution and master caution lights came on. Caused by failure of hydraulic switch.
□ Compressor stall occurred in flight. Caused by failure of bleed band actuator.

OH-58

Incident □ Aircraft was en route to field site at approximately 200 feet agl. Pilot entered emergency descent to avoid rapidly converging flight of four F-104s. Left chin bubble struck top limbs of tree and was cracked.

Precautionary landings □ Transmission chip detector light came on. Fine metal filings were found on plug. Specific cause unknown pending oil analysis. □ As throttle was increased to 97%, engine oil pressure exceeded 130 psi. Caused by malfunction of oil pressure gauge.

CH-47

Incident □ Copilot's jettisonable door separated in flight. Cause undetermined.

Precautionary landings □ During cruise flight, No. 2 engine oil temperature exceeded 138°. Caused by defective cable assembly. □ Master caution and transmission pressure segment lights came on. Caused by failure of transmission pressure transducer in combining transmission.
□ While cruising at 200 feet and 130 knots, pilots felt lateral vibrations that continued to increase in intensity. Caused by failure of horizontal hinge pin and bearing on forward rotor head.

UH-1/AH-1 Safety-of-Flight

□ 111345Z Oct 77, subject: Safety-of-Flight One-Time Inspection of Oil Cooler Blower Assemblies (TB 55-1500-200-20-18), UH-1-77-18/AH-1-77-23. Summary: Torin Corporation has informed TSARCOM of a sporadic malfunction on their dynamic balancing equipment. This manufacturing defect involves a block of 159 serial numbered assemblies shipped on 30 Jun 77. The purpose of this message is to inspect and identify those oil cooler blower assemblies which are defective and remove them from service. Contact: Mr. Dick Mooy, TSARCOM, AUTOVON 698-3149, commercial (314) 268-3149.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

U-3

Precautionary landing □ Landing gear light indicated unsafe on base leg. Gear was recycled without success. Tower fly-by indicated gear was down and landing was made. Wire on gear down switch had intermittent short.

U-21

Precautionary landings □ When IP retarded condition lever to fuel cutoff on No. 1 engine, engine would not fully feather as SP executed emergency procedure for engine failure. Caused by inoperative prop governor toggle switch. □ (D series) When power was reduced for approach, it would not go below 450 pounds torque. Left engine was shut down and landing made. High-idle pickup arm on fuel control unit was chafing and hanging up on flexible fuel outlet hose from oil to fuel heater to engine-driven fuel pump. Hose assembly was secured away from arm.

C-12

Precautionary landing □ On takeoff, all three landing gear stopped retracting at halfway point. Gear control handle was recycled and gear retracted. Caused by slipping main landing gear clutch assembly.

OV-1

Precautionary landing □ Thirty minutes into flight, No. 1 hydraulic gauge indicated zero. Five minutes later, No. 1 engine chip detector light came on. Caused by western gearbox failure.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Pilot got no response from antitorque pedals during approach. Running landing was made. Tail rotor control tube backed out of proper position. After tail rotor was rigged during last phase II inspection, sprocket guard and three nuts were not installed. TI failed to note error. □ Fire light came on during climb. Cannon plug on fire detection system was not secured and safetied properly and plug worked loose.

CH-47

Precautionary landing □ No. 2 engine chip detector light came on during test flight. Following shutdown, No. 6 main drive shaft bearing froze due to overheating, causing blades to lock in place. Suspect failure of drive shaft bearing was caused by corrosion because of lack of proper lubrication. Engine chip detector light illumination was caused by sliver of ferrous metal on plug.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Inspection criteria for helmet shell

During a recent unit inspection, two SPH-4 helmet shells were found cracked. TMs 10-8415-202-13 and 10-8415-206-13 and the Gentex Corporation SPH-4 Instruction Manual do not reveal the exact criteria covering maximum length of cracks or scratches in the helmet shell, and whether or not cracks can be repaired. However, the U.S. Army Aeromedical Research Laboratory, Fort Rucker, and the U.S. Army Troop Support and Aviation Materiel Readiness Command, St. Louis, both state that any crack through the helmet shell renders it unfit for use. As for the length and depth of scratches, this is left to the judgment of the user and his supply personnel. ■

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STACOM 22 ■ 26 OCTOBER 1977 COL CHARLES S. WINGATE ■ 558-2603/3514

Restricted flying duties

One of the more troublesome paragraphs contained in AR 95-1 is 1-13, Restricted Flying Duties. The questions of most concern to officers affected by this paragraph center on two issues.

(1) Do senior officer aviators (O6 and GO) not in operational flying positions have to maintain a current flight physical?

(2) Do officers who are in a limited flying duty status have to maintain aircraft currency and instrument qualification? These issues were formally addressed to USAAVNC by message from CDR, Eighth Army, dated 030740Z May 1977. The USAAVNC response to this message as reprinted below was coordinated with the HQDA, DCSOPS, the Office of the Surgeon General and the Aviation Management Branch, MILPERCEN.

* * * All officers and warrant officers, regardless of grade or position, who have received the aeronautical designation of Army Aviator are required to maintain the medical fitness standards for flying duty as prescribed by Chapter 4, AR 40-501, so long as this designation remains in effect. To further clarify paragraph 1-13a, AR 95-1, officers who perform aircrew duties as authorized therein also are required to comply with the provisions of paragraph 1-16b and paragraph 2-8, AR 95-63. * * * ■

Get in the habit

Following is a list of six common habits. Three of these habits are considered good. Three are considered bad or socially defective. See if you can tell the difference.

- □ FASTENING SEATBELTS
- □ PICKING ONE'S NOSE
- □ BRUSHING ONE'S TEETH
- □ SMOKING
- □ WEARING DOG TAGS
- □ BELCHING IN PUBLIC

If your list of good habits included Wearing Dog Tags, you're a winner. So the question is now, "Why aren't you doing it?" The purpose of these little metal plates is so obvious that no explanation of need should be required, yet time after time our evaluators are treated to the same blank look after asking a crewmember to produce them. "ID tags, sir?" We didn't seem to have this problem in 'Nam but then perhaps the need was so clearly demonstrated that the habit was easy to acquire.

The need is still there—believe it folks—and besides we have no less than two ARs which say the things WILL be worn on all flights. So let's reacquire one of the really good habits we had in 'Nam. Think of dog tags and Nomex as inseparable, something like ham and eggs, Amos and Andy or—NO TAGS, NO FLY! ■

Position reports, questions and answers

■ According to paragraph 1-17, AR 95-63, an aviator failing a flight evaluation must be given a reevaluation by an IP/SIP/IFE other than the one failing him. Now what about the instrument flight examination required by chapter 2, AR 95-63? Do we

have to dig up a different examiner for the people who fail their annual rides?

Although it's generally considered a pretty good idea to have a different examiner conduct the recheck, it's not required. There just aren't that many examiners normally available. Paragraph 1-17 applies only to the periodic flight evaluations described in paragraph 1-16.

■ What is the current status of the CRF program? Do we still have to meet the CRF hour requirements stated in chapter 2 of AR 95-1, or do we go with the ATMs exclusively?

Go with the ATMs. The annual minimums specified in chapter 2, AR 95-1, are no longer valid. The reference on this is Message HQDA 051342Z Oct 77, paragraph 2 which reads as follows:

"2. The purpose of the ATMs is to train aviators to proficiency in selected tasks and to maintain that proficiency. Flying hours associated with this training will be widely variant, dependent primarily on individual aviators' experience and the unit mission. Therefore, the annual minimums specified in chapter 2 of AR 95-1 are no longer valid."

■ Both the AH-1 dash 10s and TC 1-36 specify a touchdown speed of 50 knots during actual or simulated hydraulics-off landings. I understand the reason for this, but it's sure tough on skid shoes. Would there be any objection to making a simulated hydraulics-off landing as a touch-and-go rather than a full stop?

We can see no significant training benefit deriving from bringing the aircraft to a shuddering, smoking halt at the completion of each simulated hydraulics-off landing in the AH-1. Therefore, not only do we not have an objection to a touch-and-go, it is the procedure recommended by the USAAVNC. TC 1-36 will also be revised to state that a touch-and-go landing is the approved procedure for terminating this maneuver.

■ I have heard that the Army has published a nonstandard aircraft training and evaluation policy. We operate a couple of these odd-ball aircraft but are totally in the dark about any POLICIES other than those we have established here in the unit.

You are apparently referring to a change to ARs 95-1 and 63 which was published in message form back in April 1977. This message (DTG 271545Z Apr 1977) establishes the DA policy and procedures for nonstandard aircraft training and standardization. If you can't get a copy of this message through your own Standardization Board or AG, give us a call and we'll be happy to send one out to you.

OOPS!

We ran into a transposition problem in one of our answers in STACOM 21. The question concerned the logging of IP hood time. The first two sentences of our answer should read as follows:

There is nothing in the ARs which would prevent you from logging IP H time. But, *except possibly for IP/IFE evaluations, what reason would you have for putting the hood on in the first place?* Sort of changes the meaning, doesn't it? Sorry about that. ■

(Continued from front page)

209-23P-1 (fig. 33, item 54, page 202) we *don't* show the stud assembly to be used with this cowling—and, of course, when you requisition a new panel, you will get it without the stud fasteners. Should you naturally assume, since no special fasteners are listed, that the same ones used on the A and B model are applicable, you're in for trouble. What's the answer?

The solution consists of three distinct parts or phases:

1. Make certain you are installing the correct cowling for the model aircraft in question.

2. Be sure the panel has the correct stud fasteners installed. Those for A and B models are listed in TM 55-1520-209-23P-1. For original installation or replacement of fasteners on the C model cowling, **use stud, turnlock fastener, NSN 5325-00-703-9346; P/N 23S8-4 listed as figure 32, item 21, page 190, of above TM.**

NOTE: The next change to TM 55-1520-209-23P-1 will show the proper stud assembly to be used with C model cowling.

3. Regardless of aircraft type, inspect fastener assemblies often to make certain components are not loose or damaged, and that they provide proper retention.

Remember, there is a difference between cowlings. And that difference may be the determining factor as to whether or not your aircraft will land like it took off—all in one piece. ■

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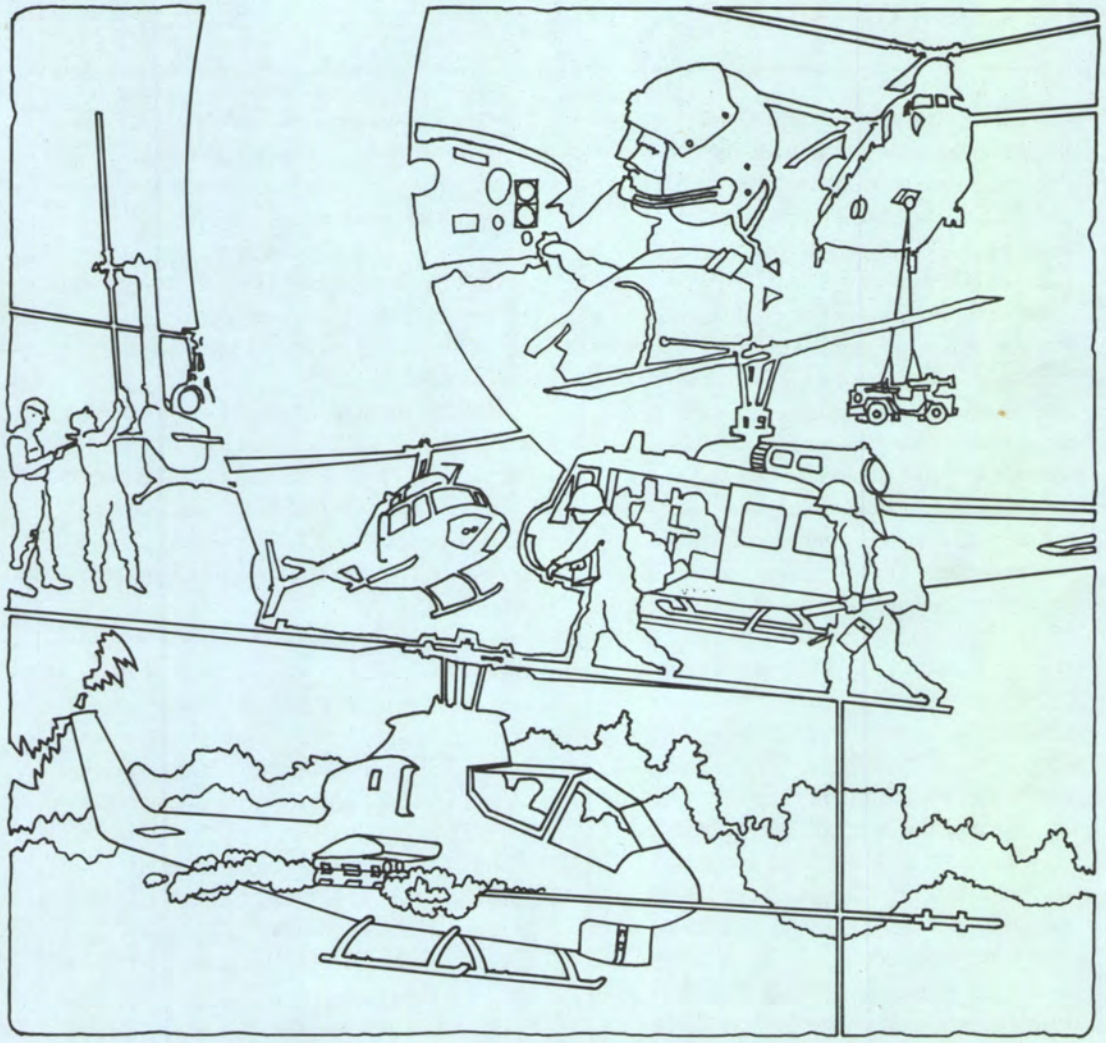
The ATM connection



There is no getting around the direct connection between the ATM program and accident prevention. It's simply a matter of priorities. ►

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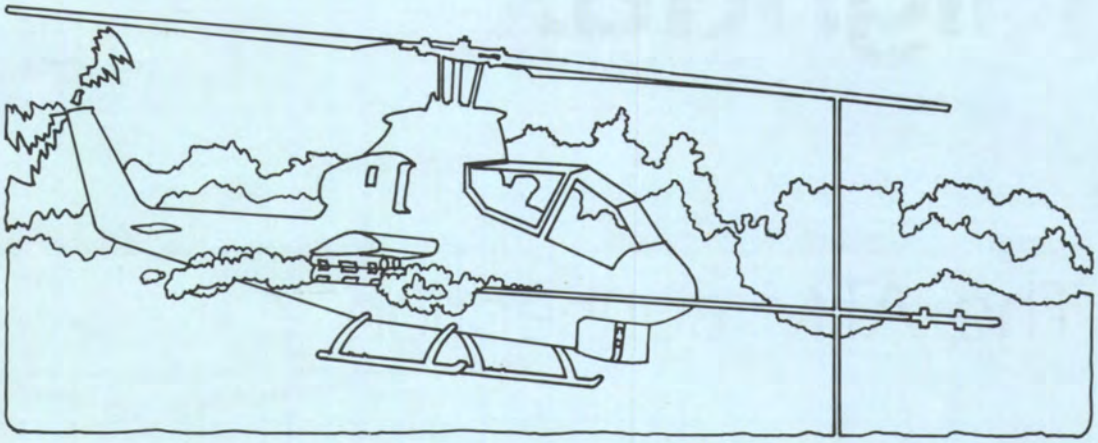
The ATM connection



■ A UH-1 with pilot, copilot, and passenger on board took off with instructions to "get some instrument training." During flight at altitude, the copilot and passenger exchanged seats. The pilot allowed the passenger to manipulate the controls even though the passenger was not a rotary wing pilot and the pilot was not an IP. The pilot took over the controls after a few minutes and returned to the airport to perform hovering practice. During hover, the pilot demonstrated to the passenger the effects of power increases and decreases. He then demonstrated a hovering turn, verbally describing the necessary control movements. At or near completion of the turn the pilot lost control of the aircraft. It is suspected that the passenger riding as copilot inadvertently moved the controls and hampered the pilot's recovery efforts. The aircraft touched down hard, the main rotor hit the ground, and the aircraft was destroyed.

This crew had not been given any specific training tasks to accomplish and was just out boring holes and doing whatever they pleased.

■ A pilot and copilot, both with limited flying experience, were assigned total responsibility to lead a flight of six helicopters on a troop insertion mission. The lead pilot selected a relatively flat LZ surrounded by 20- to 30-foot trees. The ground was covered with about 3 feet of snow topped by 1 inch of freshly fallen snow. When the pilot made a steep approach at slow speed, blowing snow created a whiteout condition, severely restricting his vision. Instead of making a go-around the pilot continued his approach and the aircraft crashed and was destroyed.

Neither crewmember had been given a local area orientation or snow operations checkride. No one in the unit's chain of command monitored flight assignments to prevent pairing two low-time pilots on a mission for which they were not properly trained.

■ Four Hueys were on a troop extraction mission. It was supposed to be a first-light mission but the flight actually took off in darkness before sunrise. The lead pilot climbed to 200 feet, made a left turn toward the PZ, and reduced airspeed from 90 to 70 knots so that the other pilots could catch up for a staggered trail formation. At this time, the aircraft began to lose altitude—which neither pilot noticed—and within a few minutes crashed and was destroyed.

The unit commander had authorized a night low-level mission which was beyond the crew's capabilities. Neither crewmember was proficient in night tactical flight. Although the unit had a detailed

written night training program, it had not been implemented because the majority of the flying hours for individual pilot training were being used for support missions.

IS THERE A CONNECTION?

There's definitely a connection between these accidents and the lack of a well-documented ATM program when you consider that the basic philosophy of the ATM is to train an individual to perform the unit's mission under actual operating conditions and to sustain him at this proficiency level.

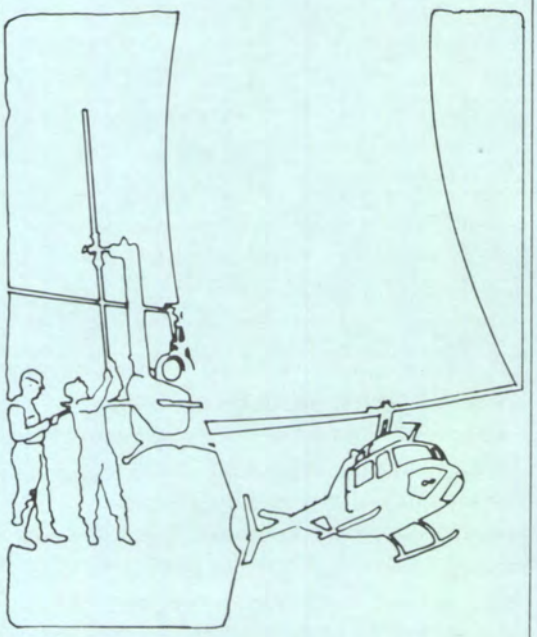
In reality, safety—or accident prevention—is a direct spinoff of this program. If the units having the accidents discussed earlier had implemented sound ATM programs, the crews would have received the required training for the missions they were assigned and the commanders would have been aware of the crews' ability—or lack of it—to accomplish the missions.

If properly implemented and documented, the ATM program automatically contributes to the accident prevention program and the safety benefits are considerable.

DOCUMENTED AVIATOR PERFORMANCE

Documenting individual aviator ATM task performance along with basic information such as flight hours, date of last flight physical, last checkride, last instrument check, and instrument ticket expiration gives commanders a tremendous capability to compare aviators and make accurate assessments of their abilities and limitations.

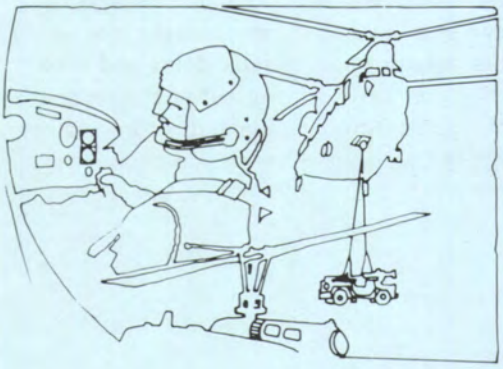
The ATM program requires the aviator to grade himself on the accomplishment of each task and these grades should be recorded. However, the unit commander can gain a much greater insight into what his aviators are actually doing and what they are really getting out of the program by riding with them himself—or having his SIP fly with them—on an unannounced basis and grading their performance. If



on previous flights a pilot had been expected to sharpen his skills in a particular maneuver and was unable to handle that maneuver when flying with the SIP, the SIP—and the commander—are then able to ask some very searching questions.

By riding with his people on a regular basis, the commander can put the ATM accomplishments of each aviator in perspective and can translate grades into actual observed cockpit performance. This way, crew selection is based on demonstrated capabilities and most recent ►

The ATM connection



recorded experience rather than "gut" feeling. Also, the commander can better pair aviators for a mission, with the most qualified pilot insuring that the mission is accomplished successfully and the less qualified pilot learning something.

AVIATOR SELF-ANALYSIS

The ATM gives the aviator the tools he needs to measure his own proficiency. By grading his own performance, he is provided an adequate means of gauging and evaluating his capabilities and limitations. Also, he will climb into the cockpit with a great deal more enthusiasm, confidence, and sense of purpose because he knows what he has to do—it is spelled out for him in the ATM. He is no longer just boring holes in the sky, in which case he might wind up flying over Molly's house just to have something to do.

BETTER PREFLIGHT PLANNING

In knowing what he has to do, the pilot is given an added incentive and requirement to do some thorough preflight planning. If he knows he has to go out and do a route reconnaissance but doesn't remember all the intricacies and variations in conducting a route recon, he just may dig out the FM and the operator's manual and do some real homework the night before the flight.

BETTER SUPPORT, GREATER TRAINING BENEFIT

Realistic tactical scenarios, incorporating as many ATM tasks as possible to parallel the unit's ARTEP, and developed in coordination with the supported unit, enable the supported commander and the aviation commander to talk about common problems on a common basis. This kind of communication not only provides better aviation support but allows the aviation unit to get maximum training benefit out of every minute of blade time in support missions.

MISSION ASSESSMENT

A well documented ATM program also gives the aviation commander the strong basis of positive information he needs to accurately assess his capability to accomplish missions laid on by the ground commander. By the same token, the inability to accomplish a mission points up weaknesses in the overall training program and enables the aviation commander to make meaningful training adjustments.

YOUR CHOICE

There is no getting around the direct connection between the ATM program and accident prevention. It's simply a matter of priorities. You either have a dynamic ATM program with its inherent safety benefits or you go on having more of the same old accidents caused by lack of training and proficiency.

The decision is yours. ■

Accident analysis

ANALYSIS 78-16
Type aircraft: OH-6A
Time: 1250
Classification: Major (substantial)
Injuries: None
Estimated cost: $55,000 (aircraft)
Mission: Recon training (ARTEP)

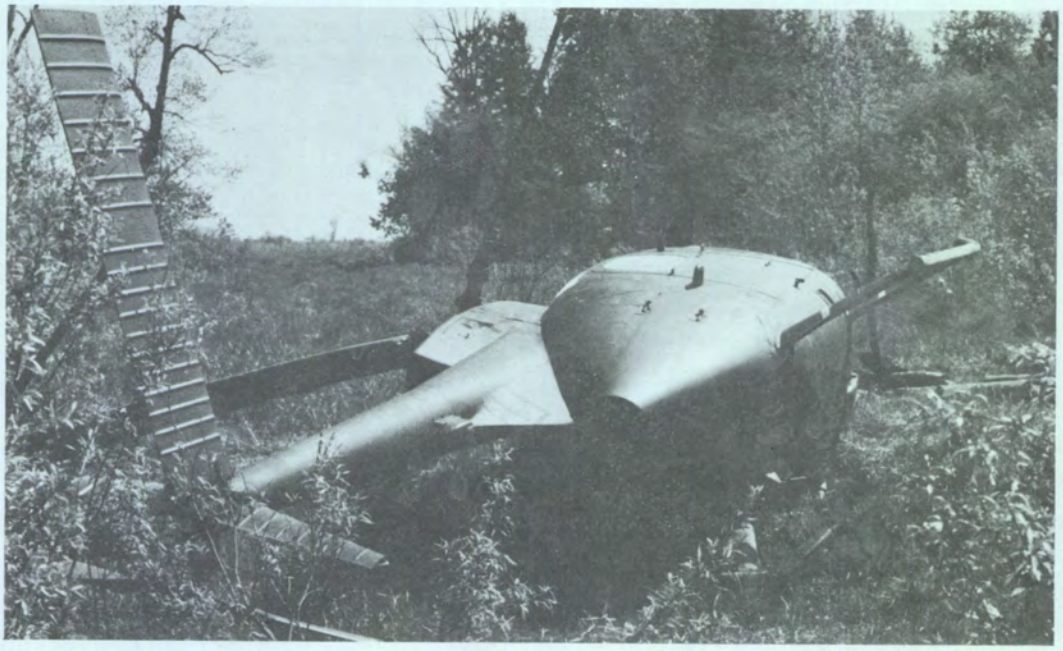
	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW3	33	1,443	1,470

The accident

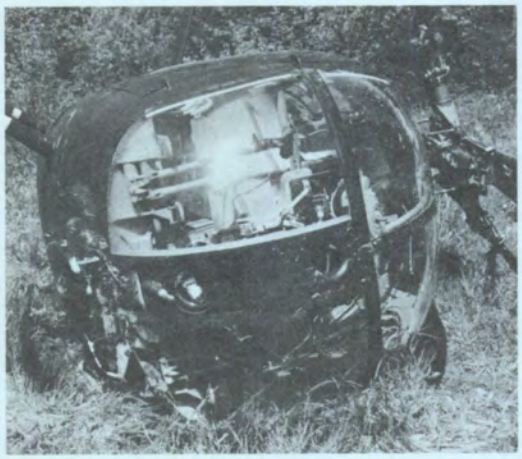
The mission was being conducted by two OH-6s and one UH-1. During a recon of a proposed march route, the aircraft approached a tree line with a large field between the road and tree line south of the march route. The OH-6s proceeded across the open field at a high forward hover, with the lead LOH reconning around the right side of a grove of trees. The pilot of the second LOH began a recon around the left side of the grove. As he flew along the wood line he entered a tank trail leading through the trees. He realized the trail was too narrow to negotiate and had just decided to back out and reverse his course when the main rotor blade hit a tree. The aircraft began to vibrate and the pilot applied forward cyclic and decided to autorotate. The aircraft hit several more small trees before it touched down. The left skid sank into soft ground and the skid toe hit an embedded rock. The aircraft rocked forward, settled back, and rolled on its left side.

The causes

■ The pilot, who was not NOE qualified, flew at NOE altitudes because of excessive self-motivation. He was not ►



Accident analysis



assigned to the unit and was excessively motivated to do well during his temporary attachment.

■ The pilot flew at NOE altitudes because of inadequate supervision by the platoon leader. The assignment of flight crews to missions had been relegated to the platoons. However, the scout platoon leader did not know which of the pilots assigned/attached to his platoon were NOE qualified. Consequently, he did not provide adequate supervision concerning mission assignments.

■ The pilot flew at NOE altitudes because of inadequate supervision by the unit commander. The commander knew that only about 50 percent of the pilots were NOE qualified but failed to provide adequate guidance as to altitude and permitted the pilots to fly NOE without guidance or restriction.

■ The pilot flew at NOE altitudes because of peer pressure. Personnel helping the unit conduct an ARTEP rehearsal the previous week had criticized the aviators for flying too high and emphasized the need to fly at lower altitudes.

■ The pilot initiated an autorotation and landed without power when he should have landed with power because of poor judgment. He elected to enter autorotation to relieve a vibration condition and by doing so sacrificed control of the aircraft during landing.

The cures

■ Improve monitoring of personnel, especially those attached, to assure they specifically know what is expected of them and to control excessive motivation.

■ Become thoroughly familiar with the qualifications of all assigned and attached personnel. Only in this way can crews be assigned to missions with any assurance of mission/crew qualification compatibility.

■ Insure personnel are capable of performing jobs assigned and, if personnel have not been sufficiently trained, provide adequate supervision/guidance so they will know they are not expected to perform in a manner that would exceed their qualifications.

■ Personnel assisting units with their training insure aviators are capable of performing jobs assigned regarding their training before encouraging them to perform in an environment in which the unit is not entirely qualified.

■ Upgrade unit training to emphasize the importance of retaining control of the aircraft with power during all emergencies except those in which power or directional control cannot be maintained. This should be emphasized during all standardization rides.

Selected mishap briefs

Rotary wing

UH-1

Incident □ Aircraft yawed left, engine rpm decayed, master caution and engine chip detector lights came on, N_1 dropped to zero, and rpm warning light and audio came on. Pilot autorotated to slightly rolling pasture. Tail rotor drive shaft and cover were damaged during landing. Inspection revealed internal engine failure.

Precautionary landings □ Engine oil pressure gauge read 91 psi on takeoff. After 10 minutes of flight, pressure started dropping rapidly and pilot landed. Caused by cracked breakaway coupling assembly. □ Master caution and engine chip detector lights came on. Suspect internal engine failure. □ Aircraft yawed right and left during landing, then lost power for about 5 seconds. Caused by malfunction of bleed band actuator.

AH-1

Precautionary landings □ Severe 1:1 vertical vibration occurred during cruise flight. Inspection revealed feather bearing race deteriorated and slipped, causing binding. □ Engine oil pressure fluctuated from 65 psi to 93 psi during hover. Engine, with history of high oil consumption, was changed. □ Master caution and engine oil pressure lights came on. Caused by failure of engine oil pressure switch.

Safety-of-flight messages

■ 301330Z Jun 78, subject: Safety-of-Flight Message, Urgent With Limitations, MWO 55-1500-220-32-2, for **AH-1Q and AH-1S** (Mod) Attack Helicopter M28 Turret Weapons (AH-1-78-10). Summary: A potentially dangerous situation exists with the AH-1Q and AH-1S (mod) helicopter when firing the 40mm grenade launcher using the tow missile system TSU to direct the M28 turret. When the tow missile system is shut down by malfunction, the control of the turret reverts to the helmet sight system. Since the gunner has his head down to view the TSU eye piece, the helmet sight system will direct the turreted weapon into a depressed position for firing. At very low altitudes, the fragmentation pieces from the impacting grenades will strike the aircraft. This message directs the modification of AH-1Q and AH-1S (mod) helicopters. Contact: Mr. Barhorst, TSARCOM, AUTOVON 698-3646, commercial 314-268-3646.

■ 051345Z Jul 78, subject: Safety-of-Flight Message, Urgent With Limitations, One-Time Inspection, TB 55-1500-200-20-21 for all **AH-1G, TH-1G, AH-1Q, UH-1B, UH-1C, UH-1D/H/V, UH-1M** Aircraft (AH-1-78-11 and UH-1-78-5). Summary: Failure analysis of UH-1/AH-1 tail rotor control silent chains has revealed that the dark, dull-colored chains fail more often and with less warning than the bright-colored chains. The dark, dull-colored silent chains shall be removed from service. Contact: Mr. Barhorst, TSARCOM, AUTOVON 698-3646, commercial 314-268-3646.

■ 131803Z Jul 78, subject: Safety-of-Flight Message (One-Time Inspection) for **UH/AH-1** Aircraft, Concerning Tail Rotor Drive Flex Couplings, TB 55-1500-200-20-22 (UH-1-78-7 and AH-1-78-12). Summary: A major accident occurred due to insufficient lubricant or lack of lubricant in the transmission tail rotor flexible ►

Selected mishap briefs

coupling. Component time since overhaul was low. The purpose of this inspection is to determine whether similar conditions of insufficient lubricant exist throughout the fleet and, if so, to correct them. Contact: Mr. Heidenreich, TSARCOM, AUTOVON 698-5914, commercial 314-268-5914.

CH-47

Precautionary landing □ Metal tube assembly in control closet cracked during takeoff, causing loss of hydraulic fluid.

OH-6

Precautionary landing □ Transmission oil pressure warning light came on. Caused by dirty transmission oil.

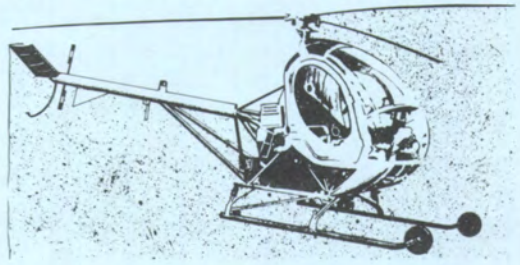
OH-58

Ground accident □ MOC was being performed. Aircraft was sitting on the ground, facing into the wind with 38 psi torque, and controls were frictioned. Main rotor blades hit the ground and aircraft rotated 180° in upright position. Pilot sustained slight laceration on right leg. Aircraft was destroyed.

Incidents □ Main rotor blades hit tree as pilot was repositioning for takeoff from confined area. □ Pilot, flying NOE through valley, did not see guy wire until too late to avoid it. Rapid flare was initiated and wire was severed by lower side of vertical fin and one tail rotor blade.

Forced landing □ Engine-out light came on during cruise flight. When collective was lowered, N_2 surged to 120%. Caused by contaminated fuel.

Precautionary landings □ Pilot saw heavy rainshower crossing flight path. Visibility deteriorated to one-fourth mile or less and pilot landed until storm passed. □ Transmission chip detector light came on. Large metal particles were found in transmission. □ Main transmission chip detector and master caution lights came on. Plug had carbon buildup.



TH-55

Precautionary landings □ Main transmission gearbox warning light came on. Caused by failure of gearbox oil pressure switch. □ Fuel mixture control cable broke during attempted engine start. □ Fuel leak was noted at fuel manifold assembly. Inspection revealed tube assembly to No. 4 cylinder had broken at fuel manifold end.

One-time report on OH-58 TT strap assemblies required

TSARCOM message 121640Z Jul 78, subject: One-Time Report on OH-58 Tension Torsion Strap Assemblies, P/N 206-010-105-3, 206-010-105-5, and 206-011-147-1.

1. This command urgently requires a population survey of subject parts on OH-58 helicopters in order to evaluate a potential change in inspection criteria.

2. Request a consolidated report from each major command providing the following information:

a. Quantity of OH-58 aircraft assigned

b. Total quantity of strap assemblies P/N 206-010-105-3 and -5 installed on assigned aircraft according to operating hours and calendar time since first installed on aircraft in the following format:

(1) With 0-6 months
(a) 0-300 hours
(b) 301-400 hours
(c) 401-500 hours
(d) 501-600 hours
(e) Over 600 hours
(2) With 6-12 months
(a) 0-300 hours
(b) 301-400 hours
(c) 401-500 hours
(d) 501-600 hours
(e) Over 600 hours
(3) With 12-18 months
(a) 0-300 hours
(b) 301-400 hours
(c) 401-500 hours
(d) 501-600 hours
(e) Over 600 hours
(4) With over 18 months
(a) 0-300 hours
(b) 301-400 hours
(c) 401-500 hours
(d) 501-600 hours
(e) Over 600 hours

c. Total quantity of strap assemblies P/N 206-011-147-1 installed on assigned aircraft according to operating hours:

(1) With 0-300 operating hours
(2) With 301-600 operating hours
(3) With over 600 operating hours

d. Total quantity of spare strap assemblies on hand by part number in all supply sources.

e. Total quantity of spare fitting assemblies P/N 206-011-140-1 and/or 206-010-155-15 on hand by part number in all supply sources.

3. Request this report be submitted as soon as possible, but not later than 1 Aug 78, USATSARCOM, ATTN: DRSTS-WO(2).

4. Point of contact for this action is Mr. Marv Gordon, DRSTS-WO(2), AUTOVON 698-2921, commercial 314-268-2921.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landings □ (A series) No. 2 engine oil pressure dropped to zero during taxi. Caused by failure of engine oil pump. □ (A series) Burning odor and smoke were noticed in cockpit during descent. Smoke was then seen coming from cowling vent on top of No. 2 engine. Postflight inspection revealed condenser blower circuit breaker was blown. Suspect overload caused air conditioning compressor clutch to overheat and start disintegrating.

U-21

Precautionary landings □ (A series) Landing gear would not fully retract nor extend. Gear handle was recycled several times before successful extension. Caused by worn relay switch. □ (H series) Left fuel transfer pump fail light came on. Test verified that pump had failed. During return flight to airfield, increasing amounts of right aileron trim were required to maintain level flight. Ten minutes from landing, right fuel transfer light came on. Test of system indicated that right wing tanks were dry (right nacelle was full). During landing, full right aileron, rudder correction, and differential power were ►

Selected mishap briefs

needed to maintain aircraft control. Inspection revealed that the right fuel system contained about 50 gallons and the left fuel system had about 140 gallons. Fuel system was crossfeeding and there was no indication in the cockpit. Crossfeed valve failed in the open position.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

UH-1

Precautionary landings □ Pilot noticed stiffness in tail rotor control pedals during landing. Caused by loose hydraulic fitting. □ As N1 was increased to perform HIT check, transmission oil pressure light came on and oil pressure dropped to zero. Aircraft was shut down and oil was seen flowing from transmission oil internal filter. Filter edge was warped from possible overtorque.

CH-47

Precautionary landings □ Movement of cyclic in roll axis was felt several times in cruise flight. No. 1 hydraulic flight boost system had air entrapped, causing momentary but abrupt movements in No. 1 SAS links. □ Crew chief noticed leak in flex line of No. 1 flight boost system. Caused by overtorque.

OH-58

Ground accident □ As main rotor blades were being tracked, crew chief put tracking flag into blades. Tracking pole was too short and was not covered with sufficient buffer material.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 7-13 JULY 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	2	1	25	28
AH-1	0	0	0	6	6
CH-47	0	0	1	4	5
OH-6	0	0	0	2	2
OH-58	0	2	4	7	13
TH-55	0	0	0	5	5
C-12	0	0	0	4	4
U-21	0	0	0	4	4
Total	0	4	6	57	67

0 Fatalities, 1 Injury*
Estimated cost: $167,210**

**Injured in ground accident*
***Includes 2 ground accidents*

STACOM
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AVIATION STANDARDIZATION
DIRECTORATE OF EVALUATION AND STANDARDIZATION, USAAVNC, FT. RUCKER, AL 36362
STACOM 30 ■ 26 JULY 1978 COL CHARLES S. WINGATE ■ 558-6487/7174
STACOM articles represent the views of the Directorate of Evaluation and Standardization on aviation standardization subject matter and should not be considered as official interpretations of the Department of the Army directives, policies, and regulations. Direct communication for official interpretation is encouraged.

Origin and concept of STACOM

The Deputy for Standardization (now the Directorate of Evaluation and Standardization (DES)), USAAVNC, assumed the expanded mission of worldwide aviation standardization assistance and evaluation as an extension of DCSOPS, DA, early in calendar year 1975. As knowledge was gained of the common problems and deficiencies found in aviation standardization, it was concluded that a lack of understanding or misinterpretation of current aviation policies and procedures was a significant obstacle to effective implementation of the DA Aviation Standardization Program.

Since DES was the focal point of aviation standardization, the decision was made by the Commander, USAAVNC, that DES would establish and maintain direct communication with the field regarding aviation standardization matters. This was to be accomplished by a 24-hour telephone answering service and frequent articles in FLIGHTFAX under the STACOM heading. FLIGHTFAX was chosen as the "parent" publication because of its frequency of publication and wide distribution. STACOM was to serve primarily as a means of directly disseminating necessary information to assist in correcting the deficiencies and misunderstandings noted in aviation unit standardization programs. STACOM would also serve as a forum for response to selected questions, as a method of alerting the field to important changes to operating procedures, policies, etc., and as a means for DES to discuss specific areas of aviation standardization.

Although references to and interpretations of DA- and MACOM-level directives and Federal Aviation Regulations appear in STACOM, the publication is informative only and cannot be used as an official source for interpretation of regulations and policies. The Directorate of Evaluation and Standardization continues to encourage direct communication for official interpretations of your aviation-related problems/questions and will respond by official written communication. Response to the STACOM concept from the field has been excellent. Letters and phone calls are received daily. Let's keep aviation standardization "Above the Best."

Watch the towers

Army aviation tactical doctrine advocates flying lower and lower in order to survive on the modern battlefield. Tactical terrain flight is accomplished in all types of weather, during daylight and darkness. The following information should be of considerable interest to our tactical terrain flyers.

STACOM 27 contained an article on the 300 skeletal structures over 1,000 feet in height. There are untold numbers of structures of lesser heights which can interfere with safe air navigation, especially at night. Contrary to the views of most ►

aviators, the Federal Aviation Administration (FAA) does not have the authority under FAR, Part 77, Objects Affecting Navigable Airspace, to require lighting or marking of towers, wires, or other obstructions to air navigation. However, any construction in the vicinity of an airport which interferes with safe air navigation or any construction over 200 feet in height above the ground level at its site must be reported to the FAA. This must be accomplished with proper advance notice in accordance with FAR, Part 77, or the builder may be liable for a fine of $500 for the first offense, with increased penalties thereafter. There are no federal air regulations that require lighting or marking of obstructions. Compliance with these standards is voluntary and cooperation in this regard has been excellent.

The FCC enforces the lighting of licensed communication towers in accordance with FAA standards. Nevertheless, the ultimate responsibility for safe operation rests with the aviator. He must be aware of all obstructions along his route of flight. Any tall structure(s) not marked or lighted should be reported to the nearest FAA facility so that appropriate corrective actions in the interest of air safety may be taken.

Watch that spare nicad!

Aviators using night vision goggles (NVG) customarily carry a spare nickel-cadmium battery for immediate use in the event of failure of the primary battery. According to the Field Artillery Journal, a metal object coming in contact with the unprotected battery charge contact points will cause a thermal runaway. This shorts out the nicad battery, causing an explosion of sufficient force to knock a person down. One aviator has already been victimized by this unusual set of circumstances. In his case, it was the metal zipper of his flight suit that made contact with the points. The explosion caused bruises that required treatment by a flight surgeon. For you NVG users, remember to protect the spare nicad batteries you carry on your person. Prevent battery charge contact points from coming in contact with ANY metal.

A great big bouquet to our Red Leg friends and specifically the Field Artillery Journal for alerting us to the potential dangers of an unprotected nicad battery.

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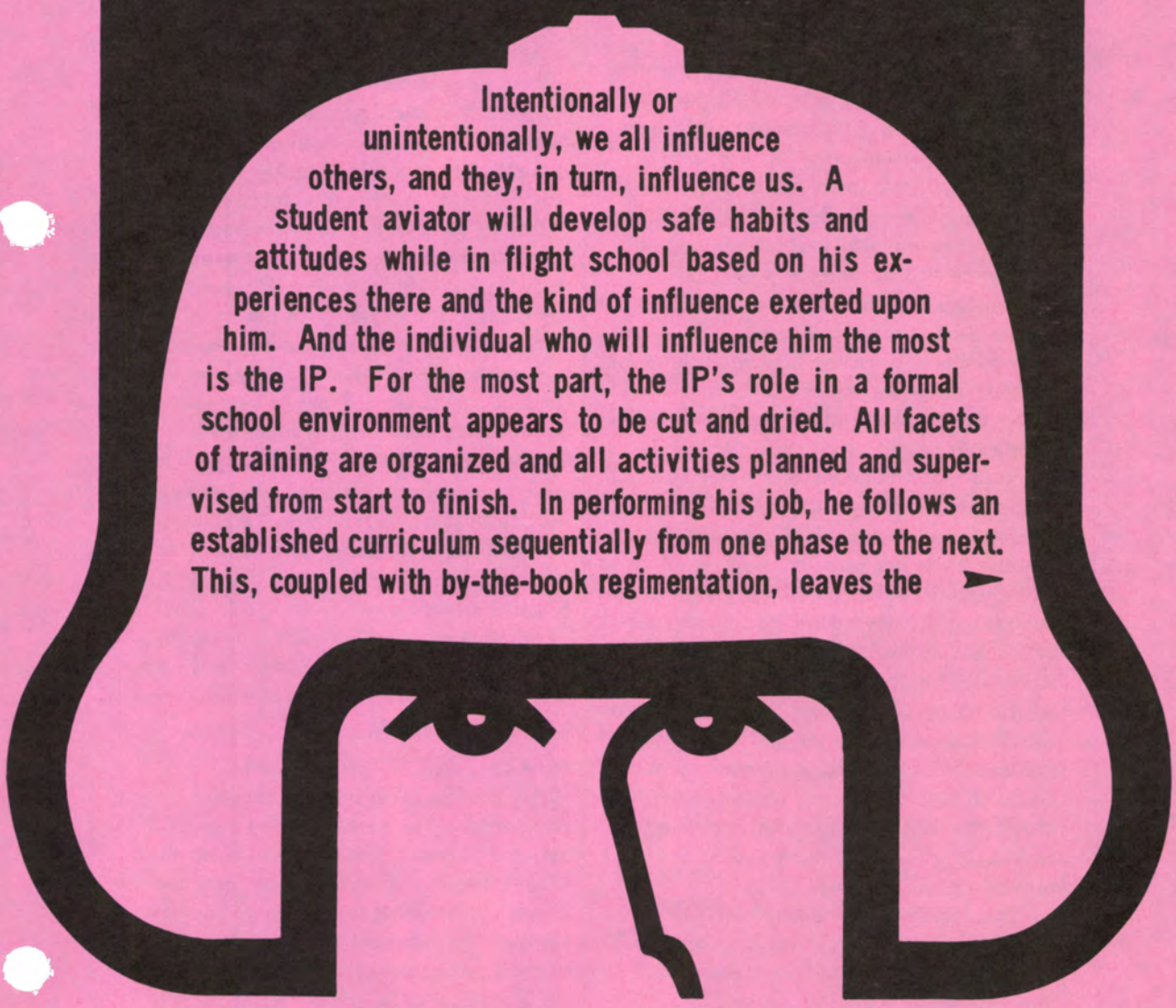
Are you really an IP?

Intentionally or unintentionally, we all influence others, and they, in turn, influence us. A student aviator will develop safe habits and attitudes while in flight school based on his experiences there and the kind of influence exerted upon him. And the individual who will influence him the most is the IP. For the most part, the IP's role in a formal school environment appears to be cut and dried. All facets of training are organized and all activities planned and supervised from start to finish. In performing his job, he follows an established curriculum sequentially from one phase to the next. This, coupled with by-the-book regimentation, leaves the ►



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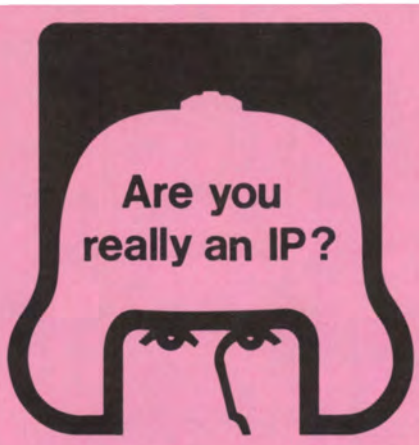
USAAAVS



student little chance to acquire unsafe habits. Yet, despite these safeguards, unsafe habits can be transmitted to the student and done so by the least likely of all individuals—the IP himself.

In one instance, following numerous reports of students buzzing local lake and land areas, spotter planes were dispatched to identify violators. Embarrassingly, the first to be caught was an IP on a proficiency flight. No, he wasn't doing it for thrills. He was an avid fisherman who, by his own admission, often used the aircraft as a means for checking the condition of area lakes. But despite his intentions, not only were his actions in violation of regulations but they also served to entice others to follow suit.

Sometimes, even the best intentions can backfire where safety is concerned. One such case involved an IP who, in an effort to promote safety consciousness among his students, embarked on a procedure that almost produced the opposite results. It all started when a student questioned him intently as to the turbulence associated with thunderclouds and its severity. After describing the hazardous winds associated with thunderclouds as well as he could, he proceeded to skirt around the edges of a relatively small, billowy cloud. His intent was to implant in the student's mind that if the amount of turbulence they encountered could be found outside a small inactive cloud, the student might well imagine the devastating forces present within a towering cumulonimbus.

The demonstration proved so effective the IP unofficially adopted it as a part of the curriculum. And all went well until one day, while rounding a cloud in a similar demonstration, he met a solo student skirting the same cloud from the opposite direction. Needless to say, the near miss put a stop to this practice. However, this experience does point out how fast word can travel and the vast amount of influence that rests in the hands of IPs.

JUDGMENTAL ERRORS

Unfortunately, IPs are sometimes guilty of initiating unsafe acts by exercising poor judgment. Basically, it involves "taking chances," especially with respect to inclement weather. It usually works this way. The IP and his student are operating out of an auxiliary field away from their home station when the weather begins to deteriorate. Suddenly, the IP must make a decision to either land and remain at the auxiliary site until the weather conditions improve or head for home. If he elects to land, it may mean a delay of several hours before flight can be safely resumed. Consequently, the decision "to get home" is commonly made. All too often this results in their encountering weather more severe than anticipated, and sometimes, in an accident. But even when the flight terminates safely, as is more often the case, what effect does such a decision have on the student? Someday, will he be enticed into making a similar choice—and maybe guess wrong?

SPECIAL SET OF PROBLEMS

Unlike the IP in a formal school environment, the unit IP faces a special set of problems. Here he is dealing with other professional aviators who are his peers. Is he going to give in to any pressure for leniency or is he going to demand professionalism? Is he going to be Mr. Nice Guy or Mr. Bad? While this, of

course, is an exaggeration, every newly assigned unit IP has to face this question in some form.

PSYCHOLOGIST AND FRIEND

Being knowledgeable and able to communicate is not enough. The IP must also be a psychologist and friend as well as judge and jury. Different IPs will handle this type of problem in different ways, and do so with equal success. One unit IP did it this way. In his words (paraphrased): ". . . In my case, it really wasn't difficult. The worst part was that I was new—from another unit—so I had to feel my way around a bit. Actually, the group was a good one. They took their flying seriously, and there was no horsing around. This made my job easy.

"I had respect for the responsibilities each had, and I felt they, in turn, would respect mine. Consequently, regardless of who the individual was, when we climbed into the cockpit, I suddenly acquired a case of amnesia. I didn't remember his face, rank, or title; and his name rang no bell. He became another individual who was to demonstrate his ability to fly a particular aircraft. But one thing I never forgot was that he was a person—with feelings—just like me. And that's how it was. If he was proficient, he passed. If I felt he needed more work, we scheduled additional training flights until I knew he was ready for the big one . . . ."

SET THE EXAMPLE

No IP can afford to act in any unsafe manner. He must set an example. As a matter of fact, under no conditions can such personnel as commanders, key supervisors, safety officers, and especially IPs afford to perform any unsafe acts related to flying.

An IP, then, is much more than a teacher. He is a leader who establishes guideposts, setting standards by example. He is a policeman who insures our aviators measure up to standards. He is an enforcer responsible for upgrading pilots to professional standards. He is the safety officer's right hand, who motivates pilots to abide by regulations and SOPs, and monitors their actions.

To accomplish his job, he must not only be knowledgeable and skilled in all aspects of flying but also must possess additional skills needed to work effectively with others. He must be understanding, patient, tactful yet firm, and possess the ability to communicate with others. He must be confident in his own abilities and capable of helping others develop confidence in themselves. Most of all, he must be dedicated to his job.

Yet, the IP is not an island unto himself. He needs support. Further, he is not infallible. Consequently, he, in turn, must be monitored. This is where the commander comes in. It is not enough for him to select the proper individual for IP duties. He must constantly monitor him for any weaknesses and support him in his responsibilities.

Along with the commander, safety officer, and other key supervisors, the IP is not merely an aid in the unit safety effort. He is especially vested with the responsibility for promoting safety consciousness among aviators. As a matter of fact, the "authority" that assigns him this responsibility is AR 95-63.

How do you stack up? On a scale from one to ten, how would you rate yourself? Are you really an IP? ■

Accident analysis

ANALYSIS 78-17
Type aircraft: UH-1H
Time: 1330
Classification: Major (total)
Injuries: 5 major, 2 minor
Estimated cost: $619,385 (acft, injuries)
Mission: Service

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	35	3,090	4,912
Copilot	CPT	35	438	3,550

The accident

As the aircraft was descending from 2,000 feet to 1,500 feet in a shallow right turn, the low rpm light and audio activated. The pilot lowered collective, glanced at the gauges, and noticed low rotor and engine rpm. He diagnosed the problem as low-side governor failure, reduced throttle, and called for emergency governor as he began a slow left turn back toward a road he had just crossed. Still devoting his attention inside the cockpit, the pilot added throttle, felt a yaw, heard a grinding noise, and saw what he thought was an excessive engine overspeed. He applied collective to reduce rpm and felt some "bad" vibrations. The pilot decided to abandon attempts to use the emergency governor because he felt the aircraft would break apart if the vibrations continued. He reentered autorotation at about 100 to 200 feet and elected to put the aircraft into the trees instead of on the road. During the descent, the copilot suggested areas the aircraft could land in but received no response. The aircraft settled into the trees and was destroyed by the postcrash fire.

The causes

- The pilot improperly performed the emergency procedure for underspeeding N_2 governor because of habit interference. He diagnosed the problem correctly but because of recent experience as an instrument IP, his instinctive reaction prevented early selection of a forced landing area and caused him to focus his attention inside the aircraft.

- After placing the selector switch in the emergency governor mode, the pilot failed to apply sufficient power to prevent engine rpm from exceeding the red line. When the aircraft yawed, made a grinding noise, and vibrated, the pilot abandoned his attempt to regain flight. He was induced to reenter autorotation even though the engine was operating normally.

The cures

- Insure personnel are ready and capable of performing assigned tasks, including emergency procedures, training, and memorization of those emergency actions which must be accomplished without delay.

- Insure no assigned personnel are hampered in flight procedures by negative habit interference. This could be done through the use of IPs/SIPs.

Thirteen receive Broken Wing Award

Thirteen aviators received the Army Aviation Broken Wing Award from April through June 1978.

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 Change 5 to AR 385-10.

Broken Wing Award recipients

- **CW4 Edward R. Beck**
AASF #1, ALARNG
- **CW2 John A. Brom**
Co A, 25th Avn Bn, 25th Inf Div
Schofield Barracks, Hawaii
- **MAJ Stephen J. Cole**
Flt Det, Fort Dix
- **CW2 Robert D. Fuller**
83d U.S. Army Reserve Command
Columbus, Ohio
- **WO1 Glenn Garland**
HHC, 1st Bde, Fort Lewis
- **CW3 Duane Gulker**
D Trp, 1/4 Cav, Fort Riley
- **CPT Charles P. Keith**
Trp B, 4th Sqdn, 7th Cav, APO SF 96358
- **CW2 Stephen T. Knowles**
A Trp, 7/17 Cav, Fort Hood
- **CW3 Sammy J. Logan**
USAMIRCOM, Redstone Arsenal
- **CW2 Mark E. Metzger**
USAAVNC, Fort Rucker
- **CW4 Merrick C. Murray**
Flt Det, Fort Dix
- **CW3 Clifford G. Walse**
AASF, CAARNG
- **CPT Rodney E. Willis**
USAAVNC, Fort Rucker

OH-58 torque values critical

Recently, when an OH-58 pilot applied throttle following a practice autorotation, he heard a buffeting noise coming from the engine, and he made a precautionary landing (see OH-58 precautionary landings, page 7). Inspection revealed a loose nut (TM 55-2840-231-23P, page 21, figure 13, item 7) on the right side of the double check valve accumulator. The aircraft had been flown approximately 15 hours since the double check valve had been replaced.

Other OH-58 mishaps caused by improperly torqued hardware associated with the fuel control system include forced landings, incidents, and accidents. One recent accident occurred because of a loose "B" nut on the accumulator end of the air tube assembly. In this instance, the engine suddenly lost power and rpm decreased during cruise flight over a mountainous area. The hard landing that resulted caused major damage to the aircraft.

Torque values are established for a purpose, and those pertaining to "B" nuts and fittings associated with the OH-58 fuel control system are especially critical ones. Overtorquing can cause failure of the parts involved while undertorquing can result in loose hardware. In either case, air leaks will cause improper sensing of differential air pressure within the fuel control governor system and result in loss of engine power.

To prevent additional mishaps from this cause, maintenance and quality control personnel are urged to insure these critical items are properly torqued. Toward this end, USAAAVS recommends that TIs not only inspect the installation of fuel control units and related parts but also personally monitor all torquing of associated hardware.

The correct torque values can be found in TM 55-2840-231-24, chapter 11, section 1, table 11-1. ■

Selected mishap briefs

Rotary wing

UH-1

Accidents □ Details unknown. Aircraft crashed during test flight and was destroyed. Three fatalities. □ Aircraft on unauthorized low-level flight hit three high tension wires and crashed inverted in 12 feet of water. Pilot was killed. □ Aircraft on night vision goggle training flight crashed and burned. Three fatalities.

Incident □ Aircraft was in shallow right turn at 100 feet agl on search and rescue mission when it hit unmarked wire strung from lake shore to building on island in lake. Right skid tube was lost and cross tubes were broken.

Precautionary landings □ Controls became increasingly stiff, followed by illumination of hydraulic caution light. Hydraulic failure was confirmed and aircraft was landed. Fatigue crack 3 inches from forward fitting in hydraulic line caused loss of hydraulic pressure. □ Tail rotor chip detector light came on. Caused by internal failure of 90° gearbox. □ Master caution and hydraulic pressure lights came on, but hydraulic control pressure was not interrupted. Caused by failure of hydraulic pressure switch. □ During emergency governor check on maintenance test flight, pilot noted oscillation of N_1 and egt rose to 700° C. momentarily. Engine surged and bleed band cycled. Caused by internal failure of fuel control unit.

AH-1

Precautionary landings □ DC generator caution light came on and ammeter fell to zero. Caused by failure of voltage regulator. □ Rpm audio and light came on, and N_2 tachometer needle dropped to zero. Caused by sheared N_2 tachometer generator drive. □ No. 1 hydraulic caution light flickered, then went out. Caused by internal failure of collective servo.

CH-47

Incident □ Pilot's door separated from aircraft during final approach.

Precautionary landings □ Master caution and transmission oil hot light came on. Oil temperature gauge pegged out on high side for each transmission. Caused by inoperative transmission oil temperature selector switch. □ Rotor tachometer failed during cruise flight. □ No. 2 engine transmission oil pressure light came on and oil temperature went to 129° C. Caused by failure of engine transmission assembly.

CH-54

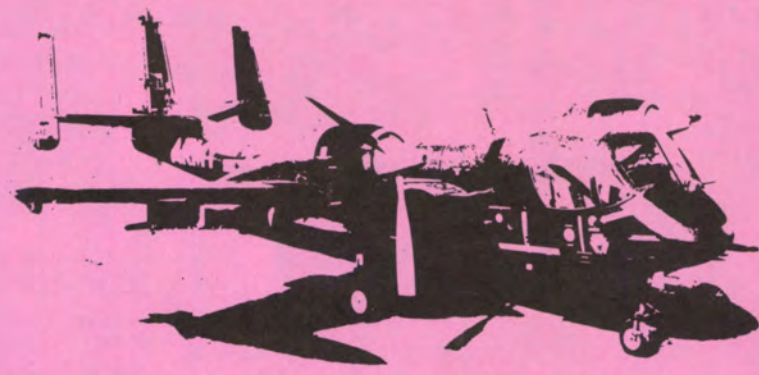
Precautionary landing □ Pilot saw oil on windshield during takeoff. Caused by failure of rotor diaphragm seal assembly.

OH-6

Forced landing □ Engine failed during cruise flight. Caused by lack of fuel. Pilot did not perform adequate preflight inspection. (See FLIGHTFAX, Vol. 4, No. 42, 11 Aug 76, for article on OH-6 preflight check and refueling procedures.)

OH-58

Precautionary landings □ Copilot's door partially jettisoned from lower attaching point during cruise flight. Postflight inspection revealed that the jettison rod was worn and bent, allowing the rod to partially engage lower door retaining pin. The door was also not safetied prior to flight and the jettison rod vibrated loose.



□ N2 rpm dropped to 101% and could not be controlled with governor switch. Caused by failure of valve assembly. □ On short final to command pad, tail rotor blade struck styrofoam hamburger container. Inspection of pad area showed paper, cans, and lids hidden in plants. Pad area was cleaned up and plants removed. □ Engine chip detector light came on. Large metal chips were found in oil.

TH-55

Precautionary landings □ Main transmission gearbox warning light came on. Caused by failure of gearbox oil pressure switch. □ Operational engine rpm could not be maintained during hover/taxi. Caused by failure of right magneto.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

T-42

Precautionary landing □ No. 1 alternator failed and No. 2 alternator would not carry load.

U-3

Precautionary landing □ No. 2 engine lost power on climbout. Suspect vapor lock.

U-8

Precautionary landing □ (D series) No. 2 engine ran rough, cylinder head temperature pegged, and oil pressure dropped to zero. Engine was secured and aircraft landed. Suspect valve ingestion.

OV-1

Precautionary landing □ (D series) Master caution and No. 1 engine chip detector lights came on. Metal particles were found on plug and oil screen.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Pilot heard loud banging noise and felt severe vibration. N2 decreased and egt passed through 600°. Inspection revealed bleed band actuator was out of adjustment. □ Smoke was seen coming from top battery vent during hover. Crew chief had not performed proper or timely battery check. □ Pilot was performing topping check at 10,000 feet. Instruments were indicating 42 psi torque and 96% N1. Aircraft yawed and three loud bangs were heard from engine. Caused by improperly rigged variable inlet guide vanes. □ Loud noise was heard from transmission area and hydraulic warning light came on. Hydraulic check valve fitting was cracked from possible overtorque during installation.

CH-47

Precautionary landing □ Crew chief noticed hydraulic leak and smoke on ramp, and utility hydraulic indicator dropped to 1100 psi. When utility pump was installed before flight, lines were not tightened properly.

OH-58

Precautionary landings □ Engine oil temperature climbed to 150°. Caused by loose wire on oil temperature sending unit cannon plug. □ Buffeting noise was heard from engine when throttle was applied after practice autorotation. Caused by loose jam nut on right side of double check valve. ►

Selected mishap briefs

□ Shortly after power was applied and climb established, N2 fluctuated and engine-out audio and light came on. Power was reduced and N2 stabilized at 94%. Caused by improperly installed lines. Aircraft had just had an engine change.

Maintenance advisory message

■ 111610Z Jul 78, subject: Maintenance/Technical Advisory Message **OH-58/OH-6** Helicopters, OH-58A-78-16 and OH-6-78-8. Message requested number of aircraft by serial number that have had the power turbine coupling nut replaced and number of aircraft that have not had the coupling nut replaced.

T-42

Precautionary landing □ No. 2 engine ran rough and fuel flow dropped to 5 psi. Fuel was then seen streaming around cowling on right engine. Engine was shut down and aircraft landed. Main fuel line to fuel distribution manifold was improperly torqued, allowing fitting to vibrate loose.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TOTAL MISHAPS FOR 14-20 JULY 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	3	1	0	33	37
AH-1	0	0	0	8	8
CH-47	0	1	0	7	8
CH-54	0	0	0	1	1
OH-6	0	0	1	1	2
OH-58	0	0	1	17	18
TH-55	0	0	0	8	8
U-21	0	0	0	2	2
T-42	0	0	0	3	3
C-12	0	0	0	2	2
U-3	0	0	0	2	2
U-8	0	0	0	1	1
OV-1	0	0	0	3	3
Total	3	2	2	88	95

7 Fatalities, 1 Injury
Estimated costs: $1,909,198

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VOL. 6, NO. 42 ■ 9 AUG 1978

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Crew coordination...

you, your crew and your responsibility

Your emotions and those of your crewmembers have an important effect on how well you do your job. You are not supposed to be a psychologist, but you do need some familiarity with the effects which changes in the personal lives of your crewmembers may have on their performance. ►

Prepared by the U.S. Army Agency for Aviation Safety, Fort Rucker, AL, AUTOVON 558-4479. 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 analyses. Direct communication is authorized by AR 10-29.

USAAAVS

Crew coordination...

One of the most easily overlooked aspects of aircrew coordination on a multi-seat aircraft is that of crew ambience —the tone, the environment of the particular crew. That's obvious, you say? You know how everybody's feeling today, how you'll work together. Do you really know?

What's happening with your crew? How have **you** been working lately? What do you and the other people on your crew carry onto the aircraft with you besides your equipment? It is suggested that you take a good look at the personalities of your crew (or crews, if you're their supervisor), in addition to their crew specialties. What might they have on their minds, and you on yours, in addition to professional duties? Are you naive in thinking that there is no room on the aircraft for personal problems? Perhaps not. But there **will** be personal problems and concerns on board. The more important the problem to the individual, the more it will affect his work. Unrealistic? Think back. How well did you perform the day your wife delivered, when she was hospitalized, when a loved one died? How well did you work as a crew after you returned from leave?

Too many questions? Let's consider four of the most obvious areas of individual concern as they interrelate and affect your performance: your family, your (and their) health, your finances, and your job.

FAMILY

How does your flying or alert schedule affect your family? Do you and your wife have the blues the day before you start TDY? Are you able to adequately explain to your children what keeps you from home? There are no model answers to these questions. Your schedule affects the lives and the personalities of others. Accept that and realize that what happens at home is carried onto the job, the airborne job. If you've had a family fight, do you take it out on your crew, or vice versa? Has your bachelor pilot been having social problems that keep him preoccupied?

How you relate to your crew in response to family joys, pressures, or problems is important. A degree of introspection may naturally be difficult, yet "knowing thyself" creates a more aware person, an individual who functions more easily in the airborne role.

HEALTH

Few problems carry the immediacy of medical ones. It is extremely difficult, if not impossible, to divorce ourselves from thinking of loved ones in pain or physical discomfort. Emergency leave, you say? Have you been overseas with a man whose family was hospitalized? Have you been that man? Emergency leave may not always be possible. But understanding and acceptance of the individual is **always** possible. If a crewmember is concerned with his own health or the health of someone close to him, **you** may see his performance change. Be aware that it will change and be ready for it. If **you** are that person, be more watchful of the routine portions of your crew duties, the areas you may neglect first through preoccupation.

FINANCIAL

Money. Few of us have too much of it; therefore, our concerns lie with making and distributing it. The distribution process involves problems that not only are compounded quarterly, but that must be documented yearly. The financial headaches of a crewmember are as easily carried to work as any other. They may be felt to be as pressing as medical problems and may be even more difficult to alleviate. Buying a new home or trying to arrange base housing? Your crew duties are time consuming enough even when your finances are stable. If you and your crew can recognize each other's feelings and financial worries, you might prevent inadvertent errors on the job.

YOUR JOB

Any major changes in an individual's working conditions will affect the way he sees himself and others. Have you changed crew seats through upgrading? Are you now in a new unit in a new aircraft? As your roles and their expectations change, your behavior will consequently change. Your peers will naturally sense these changes, and it is equally important that you realize them. "He's new on the job" means little during an in-flight emergency at 90 knots.

A second working condition responsible for major behavioral change is the PCS. Here the crewmember's entire environment is disrupted. His family, health, wealth, and professional roles may all be changed. His self concept may change radically, and with it his in-flight behavior. A man new to a unit or position, for example, may work within a closed environment until he feels secure in his new job or environment.

Equate the above areas of concern with your flights of the last year. What was on your mind? Have you descended early? Has your mission planning been detailed or hurriedly completed—"I've flown this mission many times before . . . ."

There are no pat solutions. The path to that solution begins with self-awareness. You—as a rated professional, crewmember, supervisor—are an individual subject to change. What affects you at home will affect you at work. Cognizance of your own and others' behavior in response to familial, medical, financial, or occupational variations will allow you to better prepare for your operational duties. Expecting crucial personal matters to produce changes in proficiency permits us to recognize and possibly avert problems in crew coordination and safety.

—From AEROSPACE SAFETY

Accident analysis

ANALYSIS 78-18
Type aircraft: OH-58A
Time: 1101
Classification: Minor
Injuries: None
Estimated cost: $8,485 (aircraft)
Mission: Service

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CPT	33	2,112	2,112

The accident

The aircraft, with a pilot and passenger, was flying over hilly terrain 200 to 300 feet above the ridge lines. As the aircraft approached a river, the pilot banked slightly to the right and then heard a loud, unusual noise (later thought to be a helmet falling to the floor from the rear seat). The pilot continued the turn to align himself with the river for a landing if it was required. About five-eighths of a mile down the river, the aircraft hit the middle wire of a powerline approximately 80 feet above the river and the pilot landed on an island in the river. After checking the damage (gash in forward cowling, scratch on windshield, and missing FM antenna), the pilot started the engine, brought the aircraft to a hover, checked all controls, and decided the aircraft was capable of flight. He then left the landing site (a course of action prohibited by SOP), landed at a farm house to have someone call the power company and forestry service because the woods were burning, and proceeded to an airfield.

The causes

■ The pilot flew the aircraft below the minimum operational altitude of 500 feet agl prescribed by major command directive. He was fully aware of the restriction, but elected to fly the aircraft low level and struck a powerline approximately 80 feet above the river.

■ The passenger, the unit executive officer, was aware of the altitude restriction but permitted the pilot to continue flight close to the water without questioning his actions.

The cures

■ Take positive command action to discourage improper performance by insuring compliance with established regulations and written procedures.

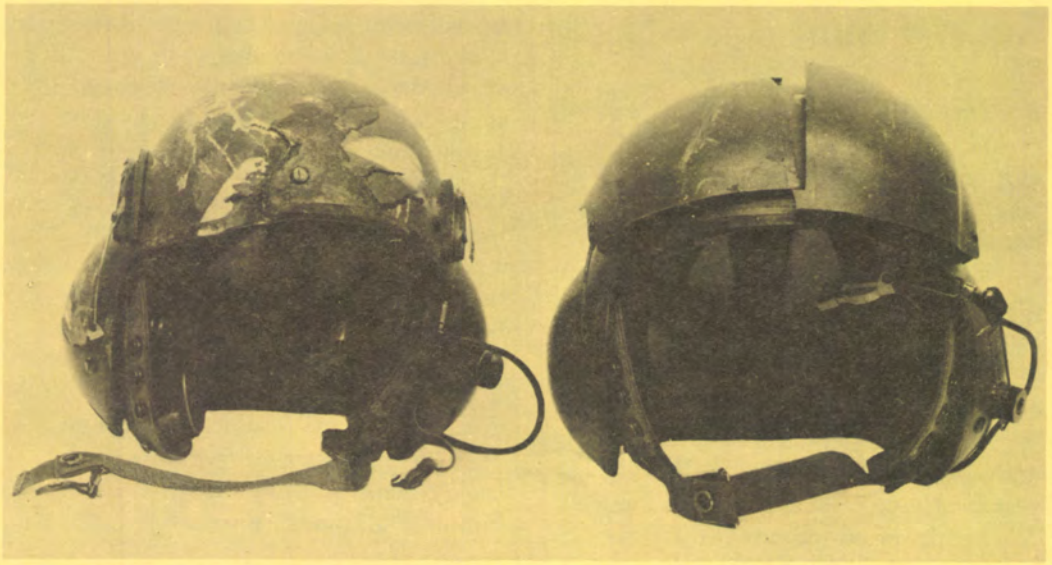
■ Inform command and staff personnel, through meetings, of circumstances of this accident and remedies.

TOTAL MISHAPS FOR 21-27 JULY 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	2	2	39	44
AH-1	0	2	0	8	10
CH-47	0	0	0	6	6
OH-6	0	0	0	2	2
OH-58	1	0	1	12	14
TH-55	0	0	0	3	3
U-4	0	0	0	1	1
U-21	0	0	0	3	3
U-8	0	0	0	2	2
OV-1	0	0	0	1	1
Total	2	4	3	77	86

0 Fatalities, 0 Injuries
Estimated cost: $78,291

Two more saves for the SPH-4



In a recent accident this Huey skidded upside-down on the runway for 200 feet. The helmets will have to be replaced but the crew won't. Both helmets stayed on during the crash sequence and prevented fatal head injuries, proving once again, better the helmet than the head. How about your helmet? Is it properly fitted? Order USAAAVS poster, "Let Safety Go to Your Head," for step-by-step instructions in helmet fitting. Call AUTOVON 558-4479 or write Commander, USAAAVS, ATTN: IGAR-EP, Fort Rucker, AL 36362. ■

Selected mishap briefs

Rotary wing

UH-1

Accident □ Pilot of No. 4 aircraft was told by pilot of No. 5 aircraft that he had an engine fire. Simultaneously, No. 4 pilot heard loud popping noise and power loss occurred. Pilot entered autorotation and cross tubes were bent during landing.

Incidents □ During maintenance runup at 6600 rpm, aircraft rose to 3- to 4-foot hover. Collective was immediately lowered and cross tubes were damaged during hard landing. Suspect failure of collective servo or irreversible valve. □ Pilot had just completed tethered hover training and was taking off after receiving a signal from the ground crew which he interpreted to mean that cable was released from cargo hook. Pilot applied forward cyclic and tether cable reached its full length, causing aircraft to land hard, damaging skids, cross tubes, and underside of aircraft.

Precautionary landings □ Engine oil temperature exceeded 150° C. for about 5 minutes before shutdown. Engine oil bypass valve failed in closed position and did not allow oil to flow through oil cooler. □ During cruise flight, while transferring fuel from 150-gallon internal auxiliary fuel cell, strong odor of fuel was detected. Postflight inspection revealed fuel leaking from within tail boom. Leak was caused by malfunction of high level switch assembly. □ Crew chief on the ground noticed puff of smoke and oil coming from tail section and aircraft was signalled to land. Caused by failure of 42° gearbox input seal.

AH-1

Incidents □ Tail rotor hit tree limb during hover, damaging blades. Gearboxes, hanger bearings, and tail rotor drive shaft were damaged by sudden stoppage. □ Postflight inspection revealed dent in one tail rotor blade. Dent was caused by right fairing nose cap which came off in flight.

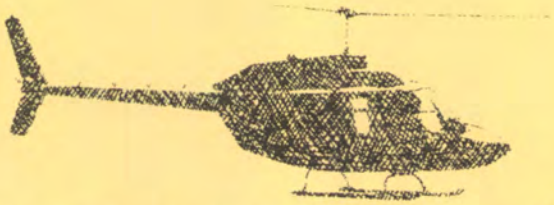
Precautionary landings □ Engine chip detector light came on during hover. Hex nuts on magnetic portion of plug had lost their torque and allowed plug to touch outer housing and short out. □ Aft fuel boost light and master caution light came on. Boost pump check indicated zero pressure. Caused by internal failure of boost pump assembly. □ Engine oil pressure light came on during cruise flight. Caused by failure of oil pressure switch.

CH-47

Precautionary landings □ Crew chief noticed hydraulic leak around generators and AGB, and utility hydraulic pressure dropped to zero. Caused by cracked utility hydraulic pump housing. □ No. 1 d.c. loadmeter increased beyond normal reading on final approach. Caused by internal failure of battery.

OH-58

Accident □ Copilot had started preflight and had gotten to the tail rotor gearbox section when he had to leave the aircraft for a minute. He laid the checklist on the



tail cone and asked the pilot, who had by that time arrived, to continue from that point. The pilot took out his checklist and resumed the preflight. The copilot returned as the pilot was finishing the main rotor head and was told to get in the aircraft. The pilot and copilot finished the interior check, before-start check, and start and runup checks. The aircraft was picked up to a 4-foot hover and a left pedal turn was initiated. The checklist that was left on the tail cone hit the tail rotor blades, damaging the blades and 90° gearbox.

Precautionary landings □ Cyclic would not move to forward position and running landing was made. Caused by failure of hydraulic servo cylinder. □ Transmission oil hot light came on. Grass was blocking transmission oil cooler exhaust screen. □ Pilot felt cyclic binding in forward quadrant. Caused by failure of magnetic brake assembly.

TH-55

Precautionary landings □ Engine ran rough during runup. Inspection revealed malfunction of fuel injector servo, four fouled spark plugs, and dirty injector nozzles. □ Engine tachometer indicator needle separated from rotor needles and dropped to almost zero. Caused by internal failure of dual tachometer.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-21

Precautionary landing □ (A series) During approach, right inboard flap failed and streamlined. Other three flaps remained extended. Caused by flap actuator failure.

U-8

Precautionary landing □ (F series) During cruise flight at 11,000 feet in moderate icing conditions, No. 2 engine began surging and running rough. After descent to 9,500 feet, engine smoothed out. Alternate air mechanism in No. 2 nacelle did not close off filter air completely, allowing unheated outside air to enter engine induction system and form ice.

OV-1

Precautionary landing □ (D series) Pilot was attempting left turn onto runway to prepare for takeoff. When pressure was applied to left brake, it went all the way to the floor. Visual check revealed hydraulic fluid leaking from vicinity of left brake assembly. Caused by failure of cylinder piston O-ring.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

UH-1

Forced landing □ Loud noises were heard from engine compartment, power was lost, and strong vibrations were felt. Inspection revealed bleed band actuator valve on fuel control was not adjusted properly.

Precautionary landings □ Collective could not be completely lowered to attain desired altitude. Bolt was found at base of pilot's collective. □ Unusual amount of right pedal was required for cruise flight. Caused by improper tail rotor rigging. □ Back of passenger's seat on right side of aircraft came loose. Retainer hook came off seat back strap and landed on floor. Crew chief could not reach hook without unbuckling his ►

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Selected mishap briefs

seatbelt. Strap was not installed properly through hook.

OH-58

Precautionary landing □ Lower hinge pin of copilot's door disconnected in flight, but door did not separate from aircraft. Door was improperly installed.

U-21

Precautionary landing □ Flap switch was lowered to approach position during test flight. Before test pilot could recognize problem and stop the movement, left flap panels and right outboard panel went to full down while right inboard panel stayed up. Postflight inspection revealed right inboard actuator shaft assembly was not properly torqued.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

CH-47 cockpit doors still coming off

A lot of emphasis has been placed on proper installation of cockpit doors, but door losses are still occurring, although less frequently. The problem will be corrected by MWO, but this action is almost a year away. An interim fix developed by Applied Technology Laboratory, if adopted, is a month or two away from implementation. In the meantime, we are going to have to live with what we have and what we have, in many cases, is improper installation. Supervisors and maintenance personnel are encouraged to check and double-check cockpit door installation and perform by-the-book maintenance only. Don't take shortcuts. Do it right the first time. ■

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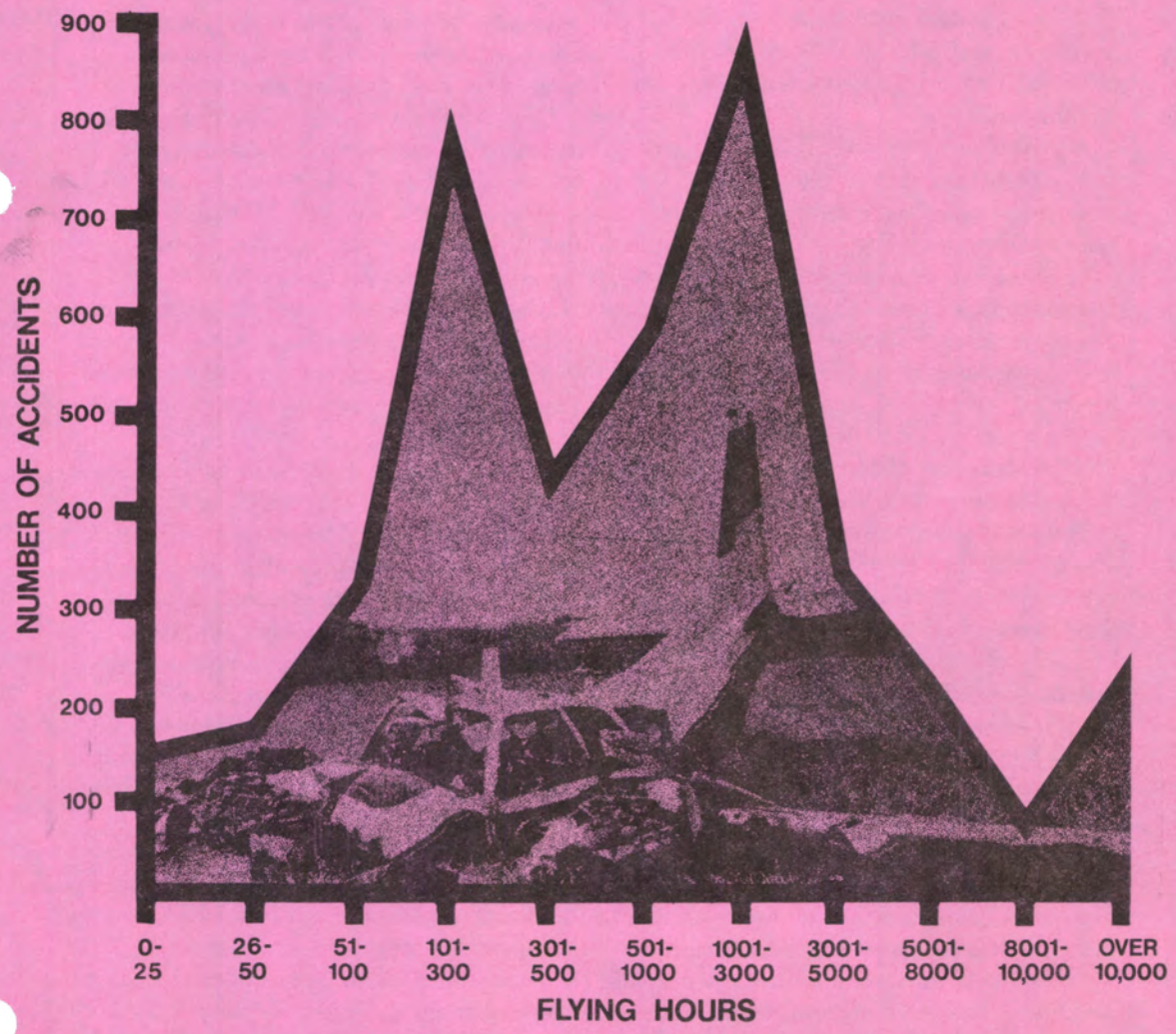
Margin for error. . .

How high-time pilots get into trouble



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USAAAVS

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Do most accidents occur to low-time pilots? Does the likelihood of a pilot becoming involved in an accident decrease steadily in proportion to his experience?

Not necessarily so.

When you bracket experience groups against accident statistics you discover some surprising facts, such as the following:

- The greatest number, by far, of all accidents, and fatal accidents, occur to pilots who have logged between 1,000 and 3,000 hours.
- Fewer accidents occur to pilots with 50 hours or less than to pilots in any experience group except those with more than 8,000 hours.
- The curve of accident incidence consistently peaks first at the 101 to 300 hours group, declines, and then reaches its highest peak with the 1,001 to 3,000 hours group.

What can we learn from these figures about experience and accidents? For one thing it appears that the typical pilot exercises a good deal of caution until he or she logs about 100 hours. After this the pilot appears to relax his guard, and accident figures balloon. Overconfidence very probably plays a major role in this phenomenon. But what can we say about the similar jump in accident figures that is seen in the 1,001 to 3,000 hour group?

An airman with over 1,000 hours of flight time is generally considered an experienced pilot. By this time, if he has been flying regularly, the flight operation has become almost as familiar to him as the operation of his car. His judgment has been honed to a fine edge by numerous in-flight decisions, and the multitude of cockpit duties have fallen into a familiar routine. Regulations and procedures have been memorized. Is he then victimized only by "unavoidable accidents"? By emotional flare-ups, or by overconfidence? Or does he succumb to the same type of accident that is common to lesser experienced pilots?

A case by case examination of the 141 fatal accidents which occurred to pilots in the 1,001 to 3,000 hour group in 1975 suggests that the pattern of accidents for these pilots does not vary significantly from the overall fatal accident pattern.

The leading type of fatal accident—uncontrolled collision with the ground or water—accounted for 17 percent of all accidents in the 1,001 to 3,000 hour group. But it was also 17 percent for the pilot population at large. Engine failure accounted for 14 percent of the experienced pilots' accidents; overall it was 12 percent. In each type of accident the two percentile figures were too close together to indicate any significance.

This similarity is difficult to understand, since it is obvious that the pilot with several thousands of hours of air time is bound to be more proficient in the cockpit and more familiar with aircraft operation than the low time pilot. One possible explanation is that as experience and skill accumulate, the pilot **unconsciously reduces his operational margin for error,** and that this margin becomes so thin that any unusual set of circumstances can break it down. Like the high wire performer in the circus who first performs with a safety net, and later without it, he may fall into the habit of staking his life on doing everything exactly right.

Consider a recent accident near Albany, NY, involving a 48-year-old pilot with 2,300 hours of flight time, including over 1,000

hours of military experience. He owned a Beech "Travel Air" which he used frequently in the conduct of his insurance business. He was in the habit of flying over his home on his return trips and circling the house to alert his wife that he was about ready to be picked up at the airport. On his last flight, with four associates on board, he made his customary circle over the house at an altitude estimated by witnesses on the ground to be approximately 500 feet. His wife came out of the kitchen door and waved an acknowledgement. The pilot dipped his wing in salute, as was his habit, and at that point the aircraft stalled and crashed into a dense clump of woods, killing all on board.

The maneuver was technically performed at a legal altitude, inasmuch as the area was not heavily populated, and an open field which could have served as an emergency landing spot was available near-

SELECTED ACCIDENT DATA–ALL OPERATIONS

	1976 ACCIDENT RECORDS		1975 ACCIDENT RECORDS	
	Total	Fatal	Total	Fatal
0-25 hours	149	10	164	16
26-50 hours	175	18	169	20
51-100 hours	311	39	324	38
101-300 hours	762	116	766	127
301-500 hours	404	74	404	66
501-1000 hours	547	109	564	92
1001-3000 hours	890	154	901	138
3001-5000 hours	383	64	356	49
5001-8000 hours	227	35	252	45
8001-10,000 hours	77	14	87	17
Over 10,000 hours	213	36	191	37
Unknown/not reported	103	49	110	43
Total	4,271	718	4,288	688
Pilot Time in Aircraft Type				
5 or less hours	222	31	243	43
6-25 hours	717	82	758	92
26-50 hours	572	85	529	63
51-100 hours	596	80	559	65
101-300 hours	796	126	853	114
301-500 hours	333	39	301	27
501-1000 hours	341	40	351	49
1001-2000 hours	195	30	218	22
2001-3000 hours	86	8	70	10
Over 3000 hours	98	11	103	11
Unknown/not reported	285	186	303	192
Total	4,271	718	4,288	688

From: National Transportation Safety Board, "Annual Review of Aircraft Accident Data"

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by. The pilot had flown over his house and dipped his wings in this manner "hundreds of times," according to his wife, without any difficulty whatever. The light twin-engined aircraft had recently undergone an annual inspection, and the accident investigation disclosed no evidence of mechanical failure that could have contributed to the crash, other than an excessive gross weight of 150 pounds. One witness on the ground said that she had heard one engine misfire, but others stated that the engines sounded perfectly normal. The pilot was known to be a skillful, reliable flyer who had never before been involved in any kind of accident or incident and had been flying for 20 years.

As experience and skill accumulate, the pilot unconsciously reduces his operational margin for error, and this margin becomes so thin that any unusual set of circumstances can break it down.

The official "probable cause" assigned to this accident was "Unwarranted low flying," and certainly this kind of flying always offers the possibility of a serious mishap. The pilot, from long experience, evidently considered himself capable of signaling his home in this manner without jeopardizing safety. Perhaps without realizing it he had been making this pass at progressively lower altitudes. Perhaps his attention had been distracted on this particular day by something he saw in his backyard. Perhaps he had dipped his wing more than usual in response to a request from one of his passengers who had a camera. Perhaps the excessive gross weight had contributed to the stall, or the center of gravity limits had been exceeded (it had not been possible to determine this, owing to the destructive force of impact and subsequent fire). Perhaps the plane had been caught in a sudden downdraft. . . .

The possibilities are endless, and in this case will never be determined. The point is that when an aircraft makes a circling maneuver at low altitude, the margin for error—or safety—has been shaved rather thin regardless of the pilot's skill: any combination of the above-mentioned conditions could bring about loss of control and no opportunity to recover before striking the ground. Reducing the airspeed or dipping a wing, of course, would reduce that margin for error even further.

"Time in type" (hours of experience in the aircraft) is often considered an important safety factor, since lack of experience with a new type of aircraft can precipitate procedural errors on the part of the pilot. However, when we look at brackets of time-in-type against accident statistics, we also see a double peaked curve, with the first peak (a very dramatic one) occurring in the 6 to 25 hours grouping and the second and largest peak occurring in the 101 to 300 hours-in-type group. Here again it appears that some change in attitude or habits takes place after a certain familiarity with a given aircraft is gained, which makes for accident susceptibility.

An accident which took place recently near Orlando, FL, involved a 54-year-old pilot, instrument rated, who used his "Lark Commander" for lengthy trips around the state inspecting real estate property. His

logbook showed some 2,700 hours, including 760 hours in the "Lark" he was flying at the time. Returning home late one afternoon, with a client on board, after being delayed on the ground by a passing squall, and adverse winds en route, he found that it was well after sundown when he approached his home field for landing. He had not flown at night for many years, and never in this aircraft, which had a red/white light selector overhead. When he turned on the instrument lights he found the cockpit flooded with a white glare that made it difficult for him to see well outside the airplane. He was already on a short final and after fumbling unsuccessfully in search of the appropriate (red) night panel switch he decided to turn off the cockpit light and land without it. Since he "knew that aircraft like the back of my hand," he thought it was unnecessary to inconvenience his client by going around and taking the time to find the switch.

He felt the controls becoming mushy while he was still short of the threshold, realized that he had lost too much airspeed and added power, but crashed into a fence short of the runway. Both the pilot and his passenger were severely injured. Hours in type are important to the competency of any pilot, but they are no assurance of safety unless they include experience with all possible usages of the aircraft.

Commercial pilots who fly fixed routes day after day or night after night, such as air cargo or air mail routes, are quite likely to allow their margin for error to erode imperceptibly. On night flights, when traffic is minimal and cockpit duties light, the pilot may find it difficult to remain fully alert. In these circumstances pilots have drifted off to sleep, or allowed a course or altitude deviation to creep in, with fatal results. Flights which would be a challenge, and hence stimulating, to the low time pilot often appear routine and dull to the veteran, who may have to take special measures to insure his alertness, especially when flying alone at night.

An unfortunate accident involving an air mail pilot occurred recently near the town of Troy in central Alabama. Although only 24 years old, the pilot had already logged nearly 2,000 hours and held a commercial certificate with multi-engine and instrument ratings. He had acquired 641 hours in the company's twin Beech 18, most of which had been accumulated flying a round robin course from Dothan, AL, and Memphis, TN. On the night of the accident the mail truck appeared as usual on the ramp at 7:30 p.m. and the young pilot took off 15 minutes later. His itinerary called for a stop in Montgomery, another at Birmingham, then over the northeastern corner of Mississippi to Memphis, then back to Birmingham, Montgomery and finally return to Dothan. The flight required a little under five hours.

The early phases of the flight that evening went without incident, as the pilot deposited and picked up mail at each of the five stops. He supervised the loading of mail, noted the weight marked on each bag, and made the proper weight and balance computation. It was on the very last leg of the flight that the tragedy occurred—the 100-mile flight from Montgomery to Dothan, which usually took about half an hour. Departure from Montgomery was at 3:24 a.m.

Official records indicate that the pilot did not request a weather briefing ►

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from the National Weather Service at Montgomery. Available to him would have been the area forecast issued by the NWS at 7:40 p. m. of the previous day and valid until 2:00 p. m. of the day of the accident. This included the following information:

> Significant clouds and weather. Over area north and east of Dothan-McComb-Dyersburg line. No significant clouds or weather expected except for patches, ceilings 1,500 broken, top 3,000, visibility 3 miles, fog, smoke, haze forming after 0400 along southern and western portion this area.

The pilot did not file a flight plan.

At about 3:50 a.m., some 26 minutes after the takeoff from Montgomery, a number of people near Troy, AL, were awakened from sleep by the sound of an aircraft flying low overhead. Troy is about half-way between Montgomery and Dothan, and it is surrounded by dense stands of tall pine trees. One witness said the aircraft was "unusually low and making very loud noises," and he was afraid it would hit his house. Another witness saw the rotating beacon as the Beech went over her house. One witness who lives about a quarter of a mile from the crash site stated: "I was awakened by a loud and unusual noise. I got out of bed, went outside, and walked around my house. I was not able to see or hear anything unusual. As I walked around the house I could see a heavy fog; however I could see the moon through the fog."

The wreckage of the Beech—and the deceased pilot—was discovered 2⅞ miles east of Troy.

The subsequent NTSB investigation showed that the aircraft had initially hit the trees at the 40-foot level on a magnetic heading of 068. The aircraft was in an approximately **level attitude** at the time of contacting the first group of trees. The Beech then continued airborne over an open field straight ahead for 120 yards before hitting a group of trees at a slightly lower level than the original impact. The aircraft's crash path next changed to 080 degrees for an additional 96 yards.

A detailed examination of the aircraft wreckage revealed no malfunction which could have contributed to the accident.

A pathological and toxicological examination of the pilot's body did not reveal any physical impairment which would have affected his duties in the cockpit.

Whether the pilot had allowed the aircraft to descend slowly in the dark while he worked on his forms to save time after landing, or whether he had momentarily closed his eyes will never be known. Apparently he had elected on this last leg of his flight to slip into Dothan underneath the low clouds rather than take the time to file and fly an instrument flight plan. He had flown from Montgomery to Dothan at night hundreds of times without incident, but on this particular night the combination of fog, low altitude, the lateness of the hour, and perhaps other personal factors of which we have no knowledge brought fatal consequences.

The more experience a pilot gains, the greater his temptation to reduce his margin for error. It is important to remember, as the hours pile up, that unless you keep a good safe margin at all times, you are like the (late) great Wallenda on the high wire: you are at the mercy of the unexpected. The slightest mistake can be fatal.

—From FAA General Aviation News

Duty restrictions for medically-grounded crewmembers

Comments from the field indicate that some misunderstanding exists regarding the type of duty an aircrewmember (including aviation maintenance and ATC personnel) may perform when restricted from flying for medical reasons (grounded). While pertinent Army regulations do not spell out a list of allowed duties for grounded aircrewmembers common sense dictates that no grounded aircrewmember should perform any duty involving aircraft (to include flying, maintenance, and air traffic control). Both medication given and the medical reason for grounding itself can cause an aircrewmember to be less than attentive to detail required in such duties. The decision for allowable duties cannot be left to individual discretion of a grounded aircrewmember. Commanders must take the initiative to insure that grounded aircrewmembers are not involved in flight line operations or activities. The proponents for pertinent regulations have been alerted regarding this problem and plan to clarify this area in forthcoming revisions. ■

Caution – protect your gyros

Another reminder to let your aircraft stay put after you remove electrical power from the MD-1 displacement gyros and the CN-998/ASN-43 directional gyros. If you must relocate the aircraft after shutdown, you should reapply power to the MD-1 and the CN-998/ASN-43 gyros for 5 minutes before repositioning the aircraft, **with power left on.** Failure to follow this procedure can damage the gyros, causing the attitude indicators to precess 3 to 5 degrees. A "caution" to this effect will be forthcoming in the next change to the dash 20 for each type aircraft.

For additional information, contact CPT C. K. Griffin, AUTOVON 558-3901/3913, commercial 205-255-3901/3913. ■

Check your engine cowling

During the past 6 weeks, USAAAVS has received 5 reports of engine cowlings coming loose in flight. In one instance, the cowling separated from the aircraft, causing incident damage. It could have been worse. And the next time it might.

Inspecting the engine cowling for security is a preflight checklist item—and the pilot's responsibility. So, do **not** depend on your crew chief to do this job for you. Instead, play it safe and perform all your inspections by the book. ■

Accident analysis

ANALYSIS 78-20
Type aircraft: UH-1H
Time: 1521
Classification: Major (total)
Injuries: 2 (minimal)
Estimated cost: $618,475 (acft, injuries)
Mission: Service

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CPT	31	586	586
Copilot	CW3	28	2,088	2,088

The accident

As the aircraft was climbing through 2,800 feet msl, the rpm audio and light came on and the engine failed. The pilot entered autorotation, selecting a forced landing area to his right, and noted N1, torque, and engine rpm dropping to zero. He rejected his chosen forced landing area because it had too much slope and decided on a second area. The pilot tried to maintain 70 to 80 knots airspeed and turned to final at about 250 feet. A slow deceleration was started at 100 feet agl and the pilot saw a line of trees perpendicular to his approach path. He deliberately applied aft cyclic to clear the trees and inadvertently applied collective pitch. After clearing the trees, and at about 20 to 30 feet agl, the pilot noticed rotor rpm at 150 and pulled all remaining collective pitch. The aircraft hit the ground tail first, rotated onto the nose, and then slammed down onto the skids and belly, coming to rest upright.

The causes

■ The pilot did not adjust airspeed to make the forced landing area he had selected. He maintained 70 to 80 knots airspeed instead of increasing airspeed to the best glide speed of 99 knots, and selected an area which required extending the glide

distance when closer areas were available. He did this because of inadequate unit training. The pilot had been omitted from the unit training program because he was the unit maintenance officer. He had been designated as a unit test pilot without ever receiving a pilot evaluation flight as required by par. 1-16, AR 95-63. He did receive a currency ride one month before the mishap, but the ride included only one standard autorotation, one low-level autorotation, and one forced landing in the traffic pattern.

■ The copilot had not received a standardization checkride in any aircraft in the 90 days preceding his birthday. He also worked in maintenance.

■ The pilot inadvertently increased collective early in the deceleration because of inadequate attention. He channelized his attention on the selected forced landing area and was not aware that his flight path was converging on the tree line until too late to select a more suitable course of action.

The cures

■ Provide adequate unit training to all aviators. Place increased emphasis on standardization and training of maintenance test pilots.

■ Revise administrative procedures in unit operations to insure all aviators receive flight evaluations as required by AR 95-63.

■ Inform personnel, through safety meetings, of the hazard of channelized attention during emergencies.

TOTAL MISHAPS FOR 4-10 AUGUST 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	2	0	3	38	43
AH-1	0	0	1	11	12
CH-47	0	0	0	7	7
OH-6	0	0	0	1	1
OH-58	0	1	2	13	16
TH-55	0	0	0	1	1
C-12	0	0	0	2	2
U-8	0	0	0	1	1
UV-18	0	0	0	1	1
OV-1	0	0	0	2	2
Total	2	1	6	77	86

4 Fatalities, 0 Injuries
Estimated costs: $701,757

Selected mishap briefs

Rotary wing

UH-1

Accidents □ Aircraft crashed during medevac mission. Details unknown. □ Aircraft crashed during takeoff and burned. Four fatalities. Details unknown.

Forced landing □ Left fuel boost pump and 20-minute fuel warning lights came on during high hover portion of maintenance test flight. During descent, right fuel boost pump light came on, fuel pressure dropped below zero, and engine flamed out. Mission was started with 250 pounds of fuel on board to verify adjustments to 20-minute fuel warning system. During high hover checks, low fuel state of 150 pounds combined with aircraft attitude to cause cavitation of boost pumps, fuel starvation, and flameout.

Precautionary landings □ Airframe vibrated excessively during takeoff. Caused by failure of scissors pivot bearing. □ Master caution and chip detector lights came on. Caused by internal failure of 90° gearbox. This was the fourth time in 60 days the 90° gearbox chip detector light had illuminated. Metal material on plug was progressive in magnitude and density. □ Crew heard loud noise and felt lateral vibration. Caused by failure of blade skin bonding from underside of main rotor blade tip to 3 inches inboard. □ Airspeed indicator did not function properly on takeoff. Postlanding inspection revealed pitot tube contained spider's nest and eggs. None of the foreign matter was visible on the outside of the pitot tube.

AH-1

Forced landing □ Pedals froze on downwind leg. On base leg, with pressure on right pedal, pedals released with abrupt right yaw. At this point, aircraft had no reaction to pedal input. Deceleration was maintained to about 3 feet and pitch was applied. Aircraft touched down at about 20 knots and slid 180 feet. Caused by failure of long, dark chain assembly.

Precautionary landings □ Engine oil pressure light came on and pressure gauge indicated 92 psi. Caused by failure of oil pressure switch. □ Severe vertical vibrations increased in intensity during landing. Caused by failure of pylon transducer. □ Extreme vertical vibration occurred in flight. Main rotor hub was replaced.

CH-47

Precautionary landings □ No. 1 engine failed on short final. Variable inlet guide vane disintegrated, causing major damage to engine compressor section. □ Both generators went off line and could not be reset. Aft strut of No. 3 tunnel cover chafed through main generator wire bundle, causing it to short out and burn. □ Crew chief saw oil leaking from combining transmission area during cruise flight. Inspection revealed cracked "T" fitting on No. 1 engine transmission.

OH-58

Incident □ Main rotor blades hit tree during NOE flight.

Precautionary landings □ DC generator caution light came on. Caused by sheared generator shaft. □ While accelerating engine from idle to operating rpm, two loud bangs were heard. Mixing valve was found stuck in open position. □ Transmission chip detector light came on. Large metal slivers were found on plug. □ Pilot encountered

unforecast visibility below .4 NM and landed.

TH-55

Precautionary landing □ IP heard unusual noise from engine area. Inspection revealed hole had burned through manifold assembly to the No. 1 and No. 2 cylinders.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landing □ (A series) After takeoff, pilots smelled fumes and their eyes started burning. Caused by failure of forward vent blower motor brushes.

OV-1

Precautionary landings □ (D series) Master caution and No. 1 chip detector lights came on. Caused by failure of ball bearing in western gearbox. □ (D series) Landing gear failed to indicate safe down. Caused by failure of down-lock microswitch.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Master caution and hydraulic segment lights came on. Hydraulic line was chafing transmission oil return line, causing leak in hydraulic line. □ Strong JP-4 smell was noticed on takeoff. Solvent was not completely washed from hellhole with water.

OH-58

Forced landing □ Pilot and copilot saw an aircraft accident, landed from hover, and rapidly reduced throttle to engine idle so pilot could exit aircraft. Copilot remained on controls. About 3 minutes later, engine stopped. Caused by improper rigging of fuel control magnified by rapid reduction of throttle.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Safety messages

■ 071701Z Aug 78, subject: Safety Message, One-Time Inspection of Seatbelt Latch MS3488(AS) in CH-47, CH-54, UH-1, AH-1, T-41, U-1, U-6, U/RU-8, EH-1H, TH-1G, O-1 Aircraft, TB 55-1500-200-20-23 (GEN 78-10).

■ 091550Z Aug 78, subject: Safety Message, One-Time Inspection of Seatbelt Latch MS3488(AS) in CH-47, CH-54, UH-1, AH-1, T-41, U-1, U-6, U/RU-8, O-1 Aircraft, TB 55-1500-200-20-23 (GEN 78-11).

Recap of TSARCOM messages

Following is a list of all AIG 8881 addressed messages transmitted by TSARCOM (DRSTS-M) from 1 January through 30 June 1978 for the AH-1, EH-1 and UH-1 aircraft.

AH-1-78-1 One-Time Inspection of All T53-L-13B Engines for Unmodified Fuel Controls (TB 55-1500-200-20-19)

AH-1-78-2 Concerning AH-1 Engine Mount Components

US Army Aviation Training Library
Fort Rucker, Alabama 36360

AH-1-78-3 Installation of Infrared Suppressors on AH-1S Helicopters

AH-1-78-4 Concerning P/N 540-011-001-5 and 540-011-250-1 Main Rotor Blade Assemblies Utilized on AH-1G/Q/S and TH-1G Series Helicopters

AH-1-78-5 Concerning P/N 540-011-001-5 and 540-011-250-1 Main Rotor Blade Assemblies Utilized on AH-1G/Q/S and TH-1G Series Helicopters

AH-1-78-6 Hydraulic Oil Filter

AH-1-78-7 AH-1S Attack Helicopter Installation of PP-7274 B/A Static Inverter

AH-1-78-8 Operational/Maintenance for All Prod AH-1S Aircraft

AH-1-78-9 Installation of Clamps on Flexible Confined Detonating Cord of All AH-1 Series Aircraft Except the AH-1S (PROD)

AH-1-78-10 MWO 55-220-30-2 for AH-1Q and AH-1S (Mod) Attack Helicopter M28 Turret Weapons

AH-1-78-11 One-Time Inspection TB 55-1500-200-20-21 for All AH-1G, TH-1G, AH-1Q, UH-1B, UH-1C, UH-1D/H/N, UH-1M Aircraft, Msg Nos. AH-1-78-11 and UH-1-78-5

EH-1-78-1 One-Time Inspection TB 55-1520-210-20-14 (Unsealed Bearings on Inverters)

UH-1-78-1 One-Time Inspection of All T53-L-13B Engines for Unmodified Fuel Controls (TB 55-1500-200-20-19)

UH-1-78-2 Inspection Requirements for Nonstandard, Locally Manufactured, Heavy Duty Skid Shoes on UH-1 Series Aircraft

UH-1-78-3 Combined Installation of Interim Infrared Suppressor and Command Console, AN/ASC-15, on UH-1 Helicopters

UH-1-78-4 Hydraulic Oil Filter

UH-1-78-5 One-Time Inspection TB 55-1500-200-20-21 for All AH-1G, AH-1Q, UH-1B, UH-1C, UH-1D/H/N, UH-1M Aircraft, Msg Nos. AH-1-78-11 and UH-1-78-5

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No one outgrows the need

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USAAAVS

No one outgrows the need

A new pilot fresh out of flight school has acquired the necessary knowledge and skills he needs to become a proficient aviator, but he lacks experience. It is one thing for him to fly under the hood in calm weather with an IP beside him, and quite another to inadvertently encounter weather conditions that suddenly put him on instruments when no IP is on board. Inadvertent IMC is often all that is needed for an inexperienced pilot to become involved in an accident. It has happened more than once.

A recent accident involved an OH-58 pilot who became disoriented while hovering in snow. One main rotor blade struck the ground, causing the mast to separate and severing the tail boom aft of the horizontal stabilizer. The aircraft then ended up on its left side. This pilot was fortunate. A bit shaken up, he managed to exit the aircraft through the right cockpit door uninjured.

To begin with, this pilot was flying in weather conditions beyond his capabilities. Further, he persisted in his attempt to continue flight even though he had previously experienced spatial disorientation in a whiteout. He was not adequately trained nor did he have knowledge of the techniques for hovering in falling and blowing snow. An effective unit training program would have lessened the possibility of this inexperienced aviator being placed in such a situation.

ON HIS OWN

It must be remembered that the new pilot has become accustomed to having assistance—someone to rely on. Namely, the IP. When he embarks on his own, no one is available to make his decisions for him.

In gaining experience, the new pilot must not only develop proficiency in handling his aircraft but also, and what may be even more important, in handling situations—making right decisions and coping with any problems that may arise. Without benefit of unit training, he must acquire this experience on his own. Consequently, he may pick up wrong habits and develop self-taught practices or procedures not found in the operator's manual or contrary to those published. Sooner or later, this means trouble.

HELPING HAND

In a sense, then, unit training takes the place of the instructor, or "helping hand," after a pilot leaves flight school. And this kind of helping hand is necessary not only for the new aviator but for the seasoned one as well. Neither outgrows the need for it. The veteran aviator left to his own designs can develop a case of severe overconfidence to the point that his technique becomes sloppy. Further, he may become so familiar with routine

missions that he may disregard established procedures.

Another important purpose of an effective unit training program is that it surfaces an individual's strong points as well as his weak ones, and points them out not only to the pilot involved but also to his commander. Armed with this information, the commander can intelligently assign missions within the capabilities of his pilots, and provide any necessary training. **His failure to know the limitations of his pilots can result in mishaps.**

Recently, during field exercises, the crew of an OH-58 was detained after completing a mission to a field location because it was thought the aircraft might be needed for another mission. The crew made several requests to be released from further duty because of approaching darkness and the need for crew rest. These requests, however, were denied. Finally, around 2100 hours, the aircraft was released for flight back to the training area which was located on flat terrain devoid of trees or other vegetation. While on final approach to an unlighted landing pad, the aircraft impacted the ground in level attitude, causing one minor injury and major damage to the aircraft estimated at $250,000. The crew was fatigued and both pilots had limited experience in executing night approaches to minimum or nonlighted areas. In addition, no night training program had been established. Couple these facts with the extremely low ambient light conditions that existed, the absence of vegetation or other land features to aid in depth perception, and the dust present in the area to further restrict visibility, and it can readily be seen that the demands placed on these pilots far exceeded their capabilities.

TAILORED PROGRAM

To be effective, a training program must be tailored to a unit's needs. Consequently, no two programs will necessarily be exactly alike—even if the units involved are operating in the same geographic area and using the same type of aircraft. Specific mission requirements of each unit are the prime considerations along with the equipment being used and the environment in which the unit must ►

No one outgrows the need

operate. This includes climate and topography.

SPECIAL PROBLEMS

Although many training tasks can be readily worked into the unit's normal operations, some cannot, and these pose special problems. For example, functions such as inserting and extracting troops in confined areas or tactical missions that require night formation flying fall into

this category. Special training is necessary in areas such as these, and often the training hours available to conduct it are insufficient. This is where a good record system can be invaluable. While it won't magically produce extra hours for training, it will show the number of pilots qualified to perform a particular type of mission. If this number is insufficient and the supported unit must have that type of support, then some kind of arrangements will have to be worked out to give the pilots the necessary training and experience.

This may mean an increase in flying hours to be allocated for the following year; or it may mean fewer hours to be applied to support missions, with more to training. **In any case, the commander will not be guessing when he assigns his pilots to specific missions. He will be aware of their capabilities and be able to provide documentation as to what they can and cannot do.** When he makes an assignment, he will know the personnel selected are knowledgeable, experienced, and able to accomplish the mission, and do so with maximum safety.

A good unit program does more than point out strengths and prepare and maintain unit personnel in full readiness. It also surfaces any weaknesses associated with the unit's operations for corrective or preventive action.

FOR EVERYONE

Although the emphasis for unit training is placed on pilots, the supporting elements must not be forgotten. Training is equally important for maintenance and other personnel, including TIs. Sooner or later, experienced mechanics are reassigned. Their replacements may be seasoned or green. In addition, equipment changes, and so do maintenance procedures. Even TIs can become lax, especially when they know they are working with mechanics who are thorough and conscientious.

All in all, effective unit training sharpens the skills of all personnel and maintains the entire unit in a state of readiness to accomplish its mission. It enhances safety, produces pride in the individual, increases his self-confidence and morale, and insures peak performance.

Accident analysis

ANALYSIS 78-21
Type aircraft: OH-58A
Time: 1214
Classification: Major (total)
Injuries: 2 (major)
Estimated cost: $278,530 (acft, injuries)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	WO1	27	342	342

The accident

During the hour and a half before the accident, the pilot made several practice approaches to large confined areas and was demonstrating aircraft control techniques to the crew chief. One of these techniques was controlling altitude by varying airspeed. The pilot flew over the unit's last bivouac area and was pointing out the locations of various unit sites to the crew chief. During this sequence the pilot lowered the nose of the aircraft and began a descent with a constant collective setting. At about 75 to 100 feet agl, aft cyclic was applied to arrest the descent and a right turn was begun. The pilot said his intention was to slowly roll into a 60-degree bank. However, he noticed that the bank had increased to 90 degrees or more. As the aircraft leveled out of the bank, it was very close to the ground, descending rapidly. The pilot applied full aft cyclic but does not remember increasing collective pitch. The aircraft hit several trees and came to rest in a near inverted position.

The causes

■ The pilot attempted a steep turn which was not necessary for the flight and, therefore, not in accordance with AR 95-1, paragraphs 3-3 and 1-8d. He made this error because written procedures are ambiguous and subject to individual interpretation. Supervision by the unit commander was also deficient. The pilot stated he had used these steep turns many times in the past and he felt 60-degree banks were normal in the unit. It is felt that the pilot "learned" this maneuver from other aviators in the unit as this was his first assignment since flight school. In addition, the pilot used poor judgment in attempting the steep turn at such a low altitude.

■ The pilot made an improper flight control action (excessive lateral cyclic), causing the bank angle to increase and reach approximately 90 degrees of bank. It is suspected that this error was caused by inadequate attention. The pilot probably looked away from his visual reference long enough to allow the bank angle to increase beyond 60 degrees.

The cures

■ Revise TM 55-1520-228-10 to include more specific guidance on prohibited maneuvers. Specific bank angles and pitch attitudes should be included.

■ Improve monitoring of personnel. Whenever possible, require two pilots on missions. Pilots should also be assigned specific tasks for training missions.

■ Inform aviators, through safety meetings, of the circumstances of this accident and the hazards associated with steep turns at low altitudes.

■ Provide unit training to improve aviator attention. The importance of proper attention to visual references at all times, especially during turns, should be stressed.

Selected mishap briefs

Rotary wing

UH-1

Incident □ Aircraft hit tree branches during takeoff from confined area, damaging main rotor blade.

Forced landings □ Copilot applied power and left pedal to terminate at a 3-foot hover from normal approach. Aircraft started to turn right and left pedal could not stop turn. Pilot took controls as aircraft pitched nose low. When level attitude was regained, pilot rolled off throttle and autorotated to ground. Caused by broken silent chain. □ Hydraulic caution light came on and controls became stiff. Caused by defective metal tube, which cracked during flight.

Precautionary landings □ Master caution and left fuel boost pump lights came on during takeoff. Caused by clogged fuel boost pump mesh screen. □ Pilot was flying hood from the left seat with the window open. When he looked down to read his en route chart, the hood fell off his helmet and out the window. □ Electrical fumes were noted in cockpit. Caused by failure of main inverter. □ When power was applied at termination of approach, directional control could not be maintained with left pedal. Caused by materiel failure of six links of silent chain. □ Master caution and hydraulic segment lights came on. Caused by failure of hydraulic pressure switch.

AH-1

Incident □ Aircraft was at stabilized hover at 44 psi and 95% N_1. Pilot recycled armament switches, noticed torque at 62 psi, and landed.

Forced landing □ Engine failed as aircraft was on base leg for landing. Caused by failure of third, fourth, and fifth stages of compressor.

Precautionary landings □ Transmission oil hot light came on. When aircraft was landed, transmission oil pressure light came on. Oil cooler was found to be plugged with oil and sand externally. □ Master caution and engine oil pressure lights came on. Caused by failure of engine oil pressure switch. □ Pilot noticed high engine oil temperature on takeoff. Caused by failure of engine oil cooler fan.

CH-47

Precautionary landing □ Transmission oil low pressure light came on and selector positioning revealed No. 2 engine transmission pressure fluctuation of 0-15 psi. Caused by malfunction of transmission pressure selector switch.

OH-58

Incident □ Main rotor blade hit tree during NOE flight.

Forced landing □ N_1 indicated partial power loss. Pilot reduced power and N_1 went back to 103%. Power loss occurred again and aircraft was landed. Metal tube assembly was found to be loose where it connects to the elbow tube on the air accumulator.

Precautionary landings □ Pilot heard grinding and howling noises in flight. Caused by failure of free wheeling aft bearing. □ Pilot smelled something burning and master caution and segment lights illuminated. Caused by failure of static inverter. □ High frequency vibration in pedals occurred during landing. Caused by failure of support bearing.

(Continued on back page)

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STACOM 32 ■ 30 AUGUST 1978 COL CHARLES S. WINGATE ■ 558-6487/7174
STACOM articles represent the views of the Directorate of Evaluation and Standardization on aviation standardization subject matter and should not be considered as official interpretations of the Department of the Army directives, policies, and regulations. Direct communication for official interpretation is encouraged.

Operator's manual and checklist update

Listed below are the effective dates of the current aircraft operator's manuals and checklists with the number and date of the latest change. This update is current as of 16 Aug 1978. Please check your weekly AG Publication Center Bulletin for subsequent changes.

TM No.	Aircraft	Basic Manual	Last Change	Basic Checklist	Last Change
Rotary wing					
TM 55-1520-					
209-10	CH-47A	30 Mar 73	23, 6 Jan 78	Jan 73	7, 16 Mar 77
210-10	UH-1D/H	25 Aug 71	19, 15 Feb 78	Aug 71	9, 16 Mar 77
214-10	OH-6A	17 Dec 76	5, 16 May 78	Dec 76	1, 16 Mar 77
217-10-1	CH-54A	8 Apr 77	1, 9 Jan 78	Mar 77	1, 13 May 77
217-10-2	CH-54B	15 Apr 77	1, 9 Jan 78	Mar 77	1, 13 May 77
219-10	UH-1B	Jan 69	13, 15 Feb 78	Dec 68	7, 16 Mar 77
220-10	UH-1C/M	Nov 68	16, 15 Feb 78	Jul 71	7, 22 Jul 77
221-10	AH-1G	12 Dec 75	6, 16 Jan 78	Dec 75	3, 10 Aug 77
221-10-1	AH-1Q	31 Dec 75	7, 15 Feb 78	Dec 75	1, 16 Mar 77
227-10-1	CH-47B/C	3 Aug 73	29, 16 Jun 78	Jun 73	13, 27 Dec 77
228-10	OH-58A	7 Apr 78	1, 23 Jun 78		
233-10	TH-55A	30 Sep 76	1, 18 Mar 77	Sep 76	2, 18 Mar 77
234-10	AH-1S (MOD)	17 Nov 76	6, 25 Apr 77	Nov 76	1, 16 Mar 77
235-10	OH-58C	7 Apr 78			
236-10	AH-1S (PROD)	29 Apr 77	1, 15 Feb 78	Jul 78	
Fixed wing					
TM 55-1510-					
201-10/4	U-8D/G				
	RU-8D	3 Apr 78		Feb 69	4, 30 Mar 77
201-10/5	U-8F	21 Mar 78		Feb 69	4, 30 Mar 77
204-10/3	OV-1B	11 Feb 70	13, 15 Feb 78	Jan 70	6, 21 Mar 77
204-10/4	OV-1C	11 Feb 70	15, 16 Feb 78	May 71	6, 28 Feb 78
204-10/5	OV-1D	29 Aug 75	6, 31 Mar 78	Sep 75	3, 28 Feb 78
208-10	T-42A	19 Dec 75	1, 15 Feb 78	Dec 75	2, 12 Aug 77
209-10	U-21A	25 Mar 77	3, 17 Jul 78	Feb 77	4, 16 Aug 78
209-10-1	RU-21A/D	28 Feb 77	3, 30 May 78	Mar 77	1, 20 Jun 77
212-10	T-41B	31 Oct 74	2, 18 Mar 77	Oct 74	2, 18 Mar 77
214-10	RU-21B/C	15 Mar 77	4, 15 May 78	Apr 77	2, 8 May 78
215-10	U-21G	11 Mar 77	3, 16 Jan 78	Apr 77	1, 25 May 77
215-10-1	RU-21E/H	31 Mar 77	4, 15 Feb 78	Apr 77	4, 3 Jul 78
216-10	U-3	May 77	1, 15 Feb 78	May 77	
	C-12A	15 Aug 77	A2, 18 Nov 77	May 77	A2, 18 Nov 77

US Army Aviation Training Library
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Selected mishap briefs

(Continued from page 6)

TH-55

Precautionary landing □ Lateral cyclic trim became inoperative during flight. Caused by failure of cyclic trim motor assembly.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-21

Incident □ (A series) Nose gear would not extend and aircraft was landed wheels-up on foamed runway. Incident damage to inboard flaps.

Precautionary landing □ (A series) Fuel was siphoning from right nacelle tank after level-off. Caused by improper seating of cap.

OV-1

Precautionary landings □ (D series) Shortly after acceleration for takeoff, cockpit filled with smoke. Caused by failure of motor generator. □ (D series) Smoke and electrical fire odor were noticed in cockpit. Radar scan board overheated and burned out.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

AH-1

Precautionary landing □ Multiple pitch hardovers occurred during takeoff to hover. IP took controls, disengaged SCAS, and landed. SCAS cards were improperly balanced.

OH-58

Precautionary landing □ Transmission oil pressure light came on. Magnetic bayonet plug on transmission free wheeling unit was not properly installed.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Maintenance advisory and safety messages

■ 261801Z Jul 78, subject: Maintenance Advisory Message Concerning Inspection Requirements for the Model 540 Main Rotor Hub Assemblies Utilized on UH-1C/M, AH-1G/Q/S and TH-1G Series Helicopters (UH-1-78-8) and (AH-1-78-13).

■ 151827Z Aug 78, subject: Safety Message, One-Time Inspection of Seatbelt Latch MS3488(AS) in CH-47, CH-54, UH-1, AH-1, T-41, U-1, U-6, U/RU-8, EH-1H, TH-1G, O-1 and OH-58 Aircraft, TB 55-1500-200-20-23 (GEN-78-12).

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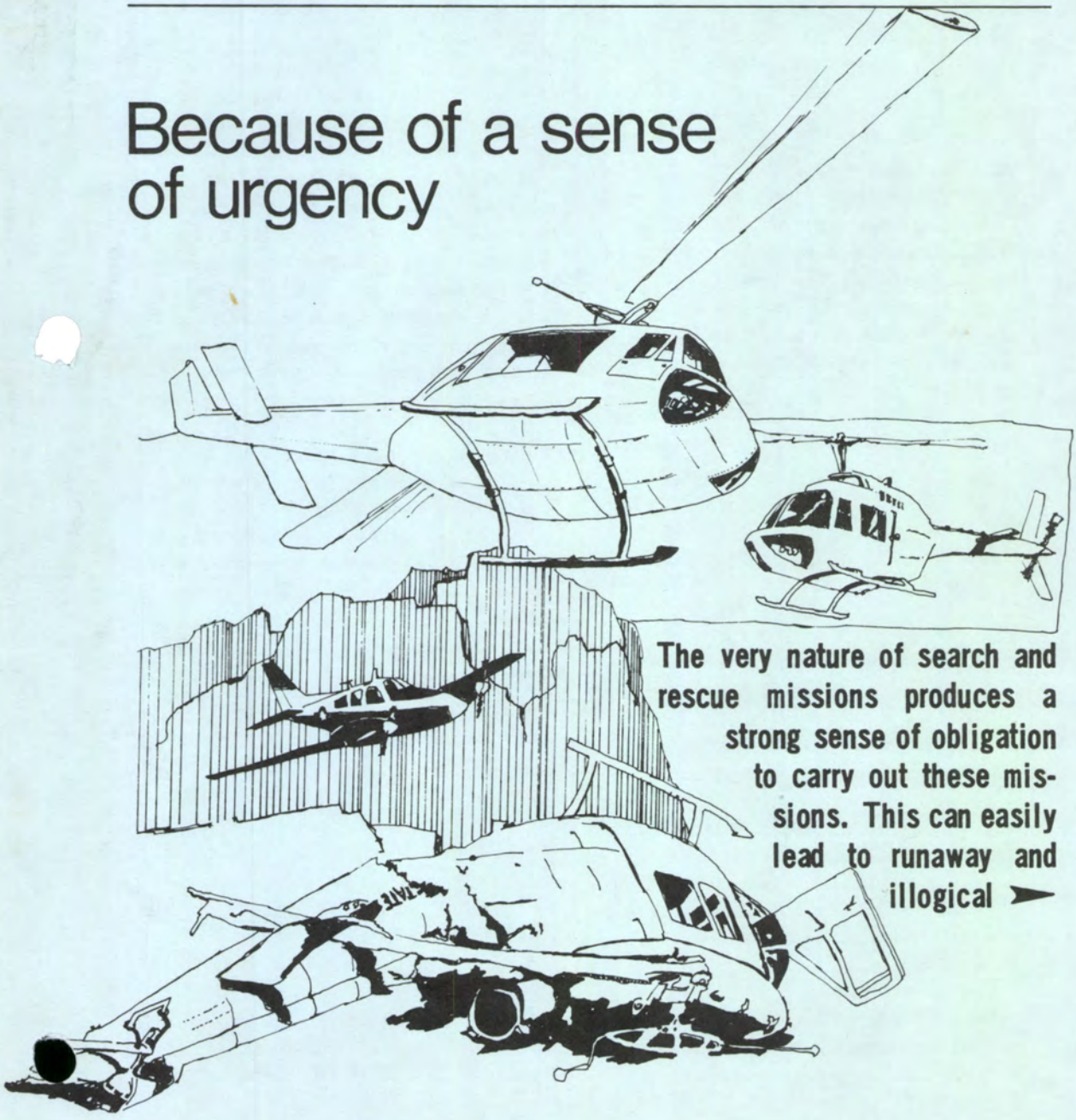
Because of a sense of urgency



The very nature of search and rescue missions produces a strong sense of obligation to carry out these missions. This can easily lead to runaway and illogical ➤

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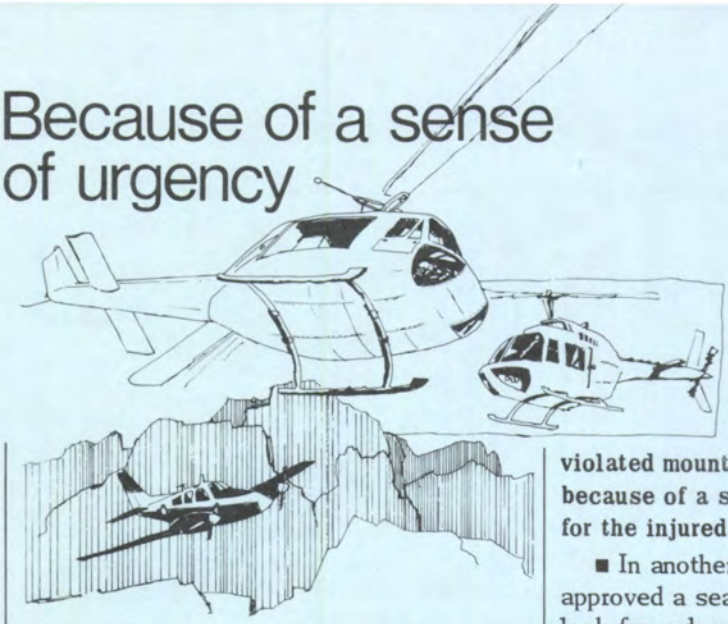
USAAAVS

Because of a sense of urgency



reactions where crew and aircraft capabilities are exceeded. Consider the following:

■ The aviation unit S-3 launched a search and rescue mission to look for the injured personnel of an overturned vehicle in the mountains. In the meantime, the aviation section commander decided on his own to participate in the search using a fixed wing aircraft. He and his crew chief took off, crossed a 7,000-foot ridgeline, and started circling over a canyon. He then turned left and flew south up the canyon. The weather was 2,000 feet broken with good visibility, and there were rainshowers in the vicinity. The wind was estimated to be from the south at 15 knots with gusts to 25 knots and density altitude of 9,100 feet. Nearing the top of the canyon, the pilot made a left crosswind turn to fly back over the ridgeline. Unable to clear the 8,600-foot ridgeline, he continued the steep left turn downwind either to fly down the ridge and cross at a lower elevation or to fly back down and out of the canyon. The aircraft crashed into the mountainside in a left wing-low attitude. The pilot was killed on impact. The crew chief, although injured and unable to walk, managed to get out and crawl away from the burning aircraft.

This pilot violated regulations by participating in the search without approval; failed to maintain adequate terrain clearance for the existing conditions; and violated mountain flying techniques . . . because of a sense of urgency to search for the injured.

■ In another case, the pilot-in-command approved a search and rescue mission to look for a downed helicopter and eight injured persons in the mountains. After a fruitless 2-hour search at night, the crew returned to home base because of bad weather. The aircraft was refueled and shut down to await further developments.

About an hour and a half later, ground personnel near the site reported that the weather was improving and that three of the survivors were seriously injured and three were unconscious. It was requested that a helicopter be sent to the site.

The crew of four, after filing a VFR flight plan, again attempted the mission. While the crew was en route to the site, ground control personnel tried to tell the pilot that the weather at the crash site was bad and that he shouldn't attempt the rescue.

Because of excessive self-motivation and a sense of urgency to rescue the injured, the pilot, instead of landing, continued on. Nearing the crash site, the pilot inadvertently went IMC, lost control of the aircraft, and crashed. Three crewmembers were killed and the other seriously injured.

Why did the PIC, rather than a higher unit authority, approve the mission? The unit SOP established the first up PIC as the controlling agent for missions. This procedure gave the PIC on duty the responsibility and authority to accept or reject missions without review by higher authority. Had this mission been

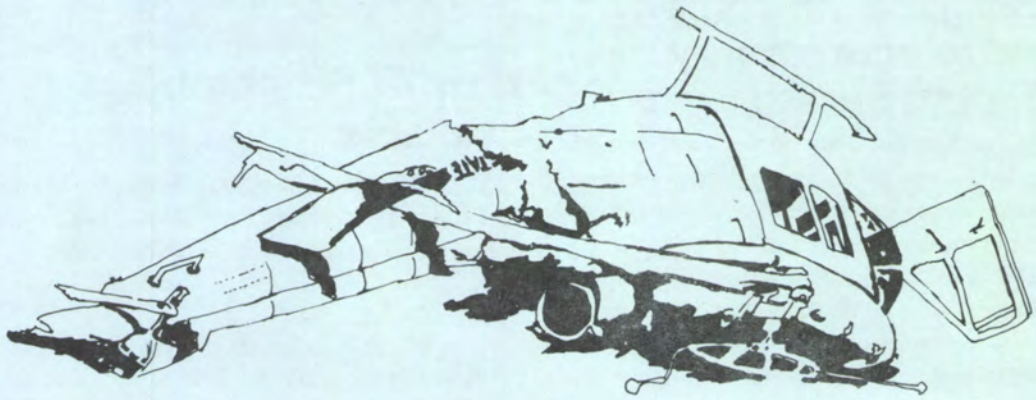
questioned, reviewed, or approved by an operations officer, site commander or section leader, it is possible that it would not have been undertaken or else the PIC's actions might have been modified.

Search and rescue missions generate a sense of urgency. But this does not justify jeopardizing crews and aircraft when crews are not properly trained or their aircraft are not properly equipped to perform the mission. Known risks must be carefully weighed against the mission's chances for success and the known gains to be realized. **Unless the chances for saving lives are within the capabilities of the personnel and equipment available, aviation resources should not be committed.** A good example of such a situation was the assignment of only one aviator to a mission to search for a drowning victim. Being the sole occupant, the pilot had to fly the aircraft while simultaneously looking for the victim. The helicopter hit wires and crashed into the water. Fortunately, only the aircraft was lost. The pilot managed to get out of the helicopter and was picked up by a boat.

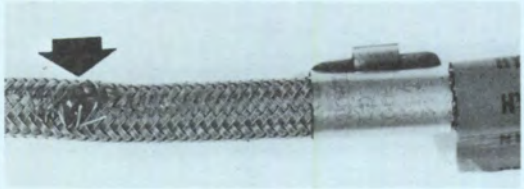
While the Army does not maintain organizational rescue units, each unit must have as a secondary mission an SAR capability to support its own operations. But when tasked for SAR support, units must provide aircraft and crews within their capability as long as the SAR doesn't interfere with their primary mission.

AR 500-2 clearly states that installation commanders are responsible for insuring that personnel assigned SAR duties are instructed and trained in the procedures and techniques of the National Search and Rescue Manual (AFM 64-2, CG-308, FM 20-150, NWP-37(B)). This manual is a complete and comprehensive guide for planning and conducting SAR operations and also serves as a training and operational manual. In addition, installation commanders should insure that their units establish and publish supporting local SAR operating procedures and instructions so that their missions can be accomplished successfully.

Above all, commanders must insure that the capabilities of the crews and aircraft are not exceeded and that aviators do not violate flight discipline due to a sense of urgency. ■



Don't let this happen to you



A recent UH-1 accident uncovered a problem with flexible lubrication lines being worn by the identification tags. As indicated by the photo, the **steel** tag, through continuous vibration, wore the wire brading to a point where the line was allowed to rupture. Change 2 to TB 750-125 changed the material requirement for these tags to aluminum; however, it did not specify removal of steel tags if already installed. TSARCOM message 251400Z Aug 78 (UH-1-78-10/AH-1-78-16), subject: Maintenance Advisory Message, contains instructions for removing the steel tags, inspecting and replacing lines if necessary, and retagging with aluminum tags. Even though this message applies to UH-1 and AH-1 only, it is recommended that all aircraft with flexible lubrication lines be inspected for this deficiency. ■

Last plea for forced and precautionary landing survey

About 6 months ago, forced and precautionary landing report forms were sent to 14 units selected by FORSCOM to participate in a survey. Forms were also mailed to other units participating on a voluntary basis. We're closing out this survey in October and we've only received completed forms on 400 of the 1,600 precautionary and forced landings that could have been included in the survey. Please round up your forms and send them in. We need this information to justify improvement of equipment. Your help is essential. If you need additional information, call USAAAVS, AUTOVON 558-4510/4812. ■

Sunburn preventive ineffective

The Army Medical Materiel Agency has ordered the destruction of sunburn preventive preparation cream, DSA 400-67-C-2971, manufactured by Hillcrest Labs during 1966 and 1967. This cream has been proven to be ineffective in the prevention of sunburn. ■

Certain flares for training use only

According to Rock Island Arsenal, MK-13 mod O smoke flares issued under lot numbers 20-HK0367 and 31-HK0367 dated March 1967 are restricted to training use only. New flares should be requisitioned for survival kits. ■

New ALSE pamphlet available

DARCOM has published a new aviation life support equipment pamphlet. This pamphlet supersedes the March 1977 issue. To get yours, write DARCOM Project Office, Aviation Life Support Equipment, ATTN: DRCPO-ALSE, P.O. Box 209, St. Louis, MO 63166; or call AUTOVON 698-3241/3291. ■

Selected mishap briefs

Rotary wing

UH-1

Accident □ Aircraft was on base leg for landing when pilot saw low N2 and heard low rpm audio warning. Aircraft landed hard and came to rest on side. Suspect engine failure.

Incidents □ About two-thirds of copilot's overhead greenhouse separated during flight. □ Main rotor blades hit tree limbs as aircraft was being repositioned for parking after landing in confined area. □ Aircraft hit tree branch during takeoff, damaging blade tip.

Forced landings □ Low rpm audio came on during approach with low power setting and engine quit. Caused by failure of gas producer blades. □ Transmission oil pressure light came on. Pressure was at 28 psi. Caused by ruptured transmission oil cooler.

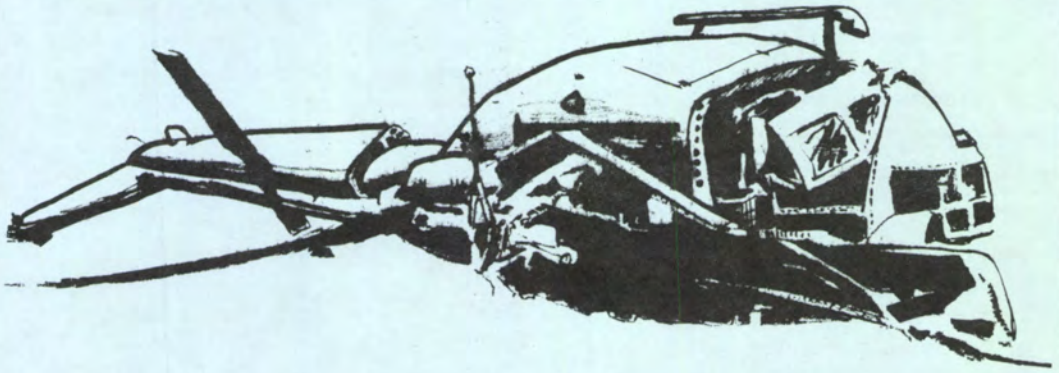
Precautionary landings □ Right fuel boost pump and master caution lights came on. Boost pump was replaced. □ Transmission oil pressure gauge suddenly dropped out of the green and fluctuated between 10 and 20 psi. Caused by inoperative pressure gauge. □ Master caution light flickered on and off. After 30 minutes of flight, hydraulic pressure light came on. Caused by failure of hydraulic pressure sending unit.

AH-1

Ground accident □ Crew chief, helping pilots with MOC, was told to get his tools He walked from left side of aircraft, which was at flight rpm, into tail rotor. Crew chief was killed by blade strike.

Forced landing □ Gas producer was seen going below 35% during low-level autorotation. IP took controls and made power-off landing. After aircraft stopped, throttle was found to be fully closed. Flight idle stop solenoid was defective.

Precautionary landings □ Pilot had indication of stuck right pedal when he entered left turn and reduced power to return to airfield. Caused by failure of black silent chain. □ On runup, transmission oil pressure dropped to 20 pounds, transmission oil pressure light came on, and smoke was seen coming from engine.



Selected mishap briefs

Caused by failure of gasket on transmission internal oil filter. □ Low ceiling and heavy precipitation obscured visibility and aircraft was landed.

CH-47

Precautionary landings □ Transmission oil hot and master caution lights came on. Caused by broken wire 3 inches from forward transmission temperature bulb. □ Master caution light and No. 1 flight boost segment light came on, and No. 1 flight boost pressure indicator fell to zero. Flight engineer saw hydraulic fluid spraying on ramp area. Caused by failure of elbow fitting. □ Aft transmission pressure light came on and pressure dropped to 15 psi. Caused by failure of oil transducer.

OH-58

Precautionary landings □ Transmission oil pressure light came on. Caused by failure of sensing switch. □ Transmission oil hot light came on. Caused by failure of thermal switch. □ Intermittent lateral vibration occurred at 50 to 60 knots. Caused by spanwise imbalance in main rotor system.

TH-55

Precautionary landings □ Lateral cyclic trim was inoperative during hover/taxi. Caused by failure of trim motor. □ Main transmission gearbox warning light came on. Caused by failure of gearbox oil pressure switch.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landing □ (A series) As aircraft was on takeoff roll, an observer on the ground saw what he thought was a puff of smoke coming from right main landing gear. Aircraft was landed and no deficiency found. During second takeoff, aircraft rolled through puddle of water, causing a misty spray that appeared to be smoke.

OV-1

Ground accident □ (D series) As aircraft was being taxied to runup area to MOC No. 2 engine, crew chief reversed both engines, No. 1 engine chip detector light came on, and N_1 decreased. Inspection revealed foreign object damage to No. 1 engine.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landing □ Torque dropped to

zero, then to 80 pounds. Caused by loose cannon plug at torquemeter connection.

CH-47

Precautionary landing □ During prelanding check, main transmission oil temperature was fluctuating from 80° C. to 120° C., with selector switch in scan position, and No. 2 engine oil temperature was fluctuating from 100° C. to 140° C. Engine oil temperature fluctuation was caused by pinched wire on cannon plug at engine. Transmission oil temperature fluctuation was caused by internal malfunction of gauge.

OH-58

Precautionary landing □ Aircraft was in level flight when pilot felt tail rotor pedals start to vibrate. Vibration continued to increase and nose of aircraft began to yaw back and forth about 3° left and right from center. Pedals began to bounce off pilot's boots and aircraft was landed. Piece of weather stripping was found wrapped around tail rotor. Caused by insufficient adhesive on weather stripping on copilot's door frame.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Safety and advisory messages

■ 031520Z Aug 78, subject: Maintenance Advisory Message for UH-1 and AH-1 Aircraft to Add Silicone Oil to T53-L-13B Engine Fuel Controls (UH-1-78-9 and AH-1-78-14).

■ 221925Z Aug 78, subject: Safety-of-Flight (Operational/Maintenance) for Production AH-1S Aircraft (SN 76-22568 through 76-22599, 76-22601 through 77-22750, 77-22752, and 77-22754 (AH-1-78-15).

■ 251400Z Aug 78, subject: Maintenance Advisory Message for All UH-1/AH-1 Series Aircraft (UH-1-78-10/AH-1-78-16).

Retarder spring not required

The front seat shoulder harness, NSN 1680-00-440-5376, P/N 0101949-1, shown in figure 35, page 102, TM 55-1520-221-20P, in AH-1G/Q and TH-1G Cobras does not require the webbing retarder spring found in the rear seat shoulder harness assembly. ■

TOTAL MISHAPS FOR 18-24 AUG 1978

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	1	3	2	34	40
AH-1	0	0	1	9	10
CH-47	0	0	0	6	6
OH-58	0	0	0	14	14
TH-55	0	0	0	16	16
U-21	0	0	0	4	4
C-12	0	0	0	1	1
Total	1	3	3	84	91

1 Fatality,* 2 Injuries

Estimated costs: $105,842**

**AH-1 ground accident*

***Includes $35,000 OV-1 ground accident*

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Recap of TSARCOM messages

Following is a list of all AIG 8881 addressed messages transmitted by TSARCOM (DRSTS-M) from 1 January through 30 June 1978 for the OH-6, OH-58, and CH-47 aircraft.

OH-6-78-1 Inspection of the T63-S-700/5A Power Turbine Outer Coupling Nut
OH-6A-78-2 Inspection of T63-A-700-5A Engines
OH-6A-78-3 Maintenance Advisory Message OH-58A/OH-6 Helicopters
OH-6A-78-4 Operational for OH-58A/OH-6A Helicopters
OH-6A-78-5 One-Time Inspection for OH-6A Aircraft TB 55-1520-214-30-3
OH-6A-78-6 OH-6A Aircraft (Cracks in Landing Gear Struts

OH-58A-78-1 Inspection of the T63A-700/5A Power Turbine Outer Coupling Nut
OH-58A-78-2 Inspection of the T63-A-700/5 Power Turbine Outer Coupling Nut
OH-58A-78-3 Maintenance Advisory Message OH-58A/OH-6 Helicopters
OH-58A-78-4 Operational for OH-58A/OH-6A Helicopters
OH-58A-78-5 Retorque of the Upper Clamp on the Fuel Hose Inside the Fuel Tank
OH-58A-78-6 Removal of Passenger Seat Cushions
OH-58A-78-7 One-Time Inspection to Locate Specific Serial Numbered OH-58A/B/C Main Rotor Heads to Remove and Replace Suspected Hydrogen Embrittled Parts—TB 55-1520-228-20-23
OH-58A-78-8 Amending Safety-of-Flight Message No. OH-58-78-7
OH-58A-78-9 (Technical) for OH-58A and OH-58C Helicopters
OH-58-78-10 For the OH-58A and OH-58B Helicopters Concerning TB 55-1520-228-20-23 (Main Rotor Heads)
OH-58-78-11 One-Time Inspection to Locate Specific Serial Numbered OH-58A/B/C Swashplate and Support Assemblies, Urgent TB 55-1520-228-20-24
OH-58-78-12 For OH-58A/B/C Helicopters Concerning TB 55-1520-228-20-24 (Swashplate)
OH-58-78-13 For OH-58C Helicopters Concerning Changes to TM 1520-235-10
OH-58-78-14 Amending Safety of Flight Advisory Operational Message No. OH-58-78-13 for OH-58C Helicopters (Changing Aft Limit From 2,500 Pounds to 3,200 Pounds Gross Weight)

CH-47-78-1 CH-47A, B & C Aircraft Cargo Hook Special Inspection
CH-47-78-2 T55 Lycoming Engine "L" Stand and Adapter NSN 4920-00-991-0440, P/N SWE 13852-1910, Breakage
CH-47-78-3 CH-47A/B/C Aircraft

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OH-58 tail rotor stall

Several OH-58 pilots have been involved in remarkably similar accidents in which loss of tail rotor-control preceded each mishap.

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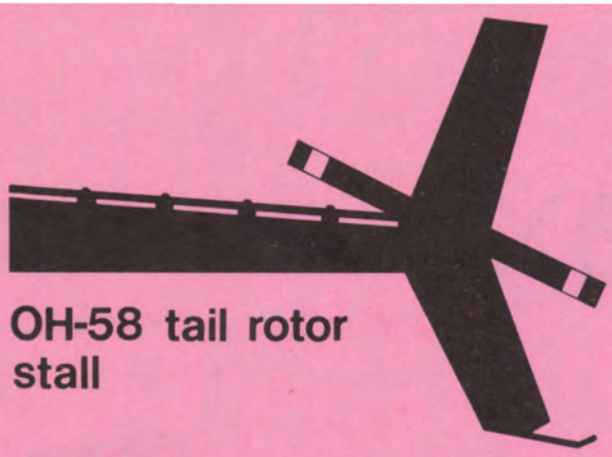
USAAAVS



OH-58 tail rotor stall

This article, previously published by USAAAVS in the AVIATION DIGEST under the title "How to Crash–By the Book," is being reprinted here because of a recent visit by an OH-58 pilot who credits it with possibly saving his life. The pilot had a tail rotor stall, remembered and applied what he had read in the article, and got his helicopter down safely.

Not too many years ago–before the advent of the recovery room–the expression "The operation was a success . . . but the patient died," was common, and unfortunately, true. All too often the surgeon's best efforts were negated by some complication that developed while the patient was left unattended. Today, we could properly coin a somewhat similar saying in Army aviation, and it might be worded something like this: "The flight was planned and conducted by the book . . . but the aircraft crashed."

Here, again, the cause can be properly attributed to some form of inattention; yet this type of situation is not an isolated one. Several OH-58 pilots have been involved in remarkably similar accidents in which loss of tail rotor control preceded each mishap. Further, in each instance, investigators found no evidence of maintenance error or materiel failure. Nor did they find any single aircraft limitation such as gross weight, CG, altitude, airspeed, etc., had been exceeded. Technically speaking, each flight had been properly planned and conducted in accordance with correct procedures. Nevertheless, in each instance, the tail rotor failed to respond to pedal input, and the resulting loss of control led to an accident.

Let's look at one of these mishaps through the eyes of the pilot. Here is what he had to say: "I changed my frequency (FM) to that of the unit that I was supporting and turned around to insure that my passengers were properly strapped in, doors secure, and belts inside the aircraft. I visually insured this and was also given a thumbs-up from the back seat personnel.

"At approximately 1030 I performed my pretakeoff check. All instruments were normal, hover was normal, and I made my takeoff southwest into the wind. I was given directions to proceed southerly to a ground troop objective area. The object of the mission was to make radio contact, spot and observe the progress of some ground troops.

"I proceeded southerly . . . and made a left-hand turn over the objective area. It was one complete 360-degree orbit plus 180 degrees, rolling out on a northerly heading. I traveled several thousand meters north and made a right-hand turn . . . .

"I traveled southerly for approximately 1,000 meters and entered a right-hand turn to a northerly direction. I traveled approximately 1,000 meters northerly and initiated a right-hand turn to a southerly direction. The aircraft fuselage continued to turn right. I applied left cyclic and removed right pedal input in order to straighten the aircraft out on a southerly heading. It was at this time that the aircraft first failed to respond to control input. As I entered the turn, all instruments were normal . . . and airspeed was approximately 50 knots. As I tried to pull out of the turn, the nose of the aircraft continued right and the aircraft was

crabbing badly and continued to turn right. It would not respond to left pedal pressure. As it continued to turn, I could feel the tail lift up as it passed through a southerly direction (downwind) . . . .

"Sometime during this period, I saw the airspeed at 40 knots. The aircraft continued to rotate to the right with increasing velocity, going from a somewhat elliptical pattern into a pattern of the fuselage rotating around the mast. The rotation was violent and completely uncontrollable, and gave the feeling the aircraft would come apart.

"During this time, the aircraft was picking up an increased rate of descent. During one of the rotations, when it became apparent that recovery would not be possible, I split the needles and reduced collective to full down. The aircraft continued to rotate at least 270 degrees to the right. I was unable to adjust the aircraft attitude so as to choose the point of landing (impact). I realized I would hit the trees. I leveled the aircraft and, just above the trees, I applied all available collective pitch to slow my rate of descent, and made a Mayday call.

"As I hit the trees, the nose of the aircraft pitched down as the tail made initial contact . . . . The aircraft came to rest on the lower chin bubble portion of the fuselage, with the tail in the air . . . ."

Now, for a more complete picture, let's fill in the gaps with information from the accident report.

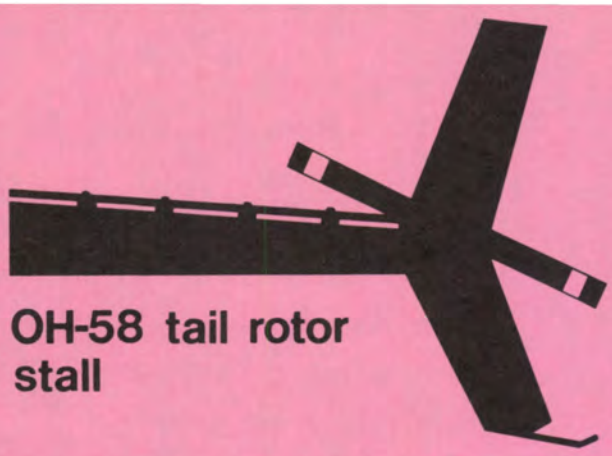
To begin with, the pilot was to have picked up only one passenger before conducting the reconnaissance flight. However, a last-minute change resulted in three passengers boarding the aircraft. This increased the gross weight of the aircraft to more than 2,600 pounds.

When the aircraft arrived over the area to be reconned, the pilot flew a racetrack pattern approximately 1,500 meters long and 400 meters wide at an altitude that varied from 150 feet to 250 feet agl and at an indicated airspeed that fluctuated from 40 to 70 knots. The density altitude was approximately 3,100 feet. In making his turns, the angle of bank was determined to have approached 30 degrees.

While in a right downwind turn, the pilot noted loss of tail rotor control, and the aircraft continued to turn right in a nose-low attitude. The pilot applied left pedal and left cyclic, but the aircraft did not respond to control input. Instead, it began to spin in a clockwise direction, remaining in a nose-low attitude as it continued to descend at a moderate rate.

When it became evident that he could not regain control of the aircraft, the pilot entered autorotation while over a wooded area, then pulled all available pitch to cushion the aircraft and slow descent. The aircraft struck trees while still spinning to the right. On impact with the trees, the clockwise rotation stopped. The tail boom then hit a tree limb, causing the nose to pitch down steeply. The aircraft fell about 15 feet, struck the ground, and came to rest in a nose-low position, with the tail boom in the trees at about a 45-degree angle. The pilot and passengers evacuated the aircraft, with minor abrasions. There was no fire.

Additional pertinent information provided by the accident report shows the pilot was highly qualified and current, and had logged more than 3,000 hours of flight time. He was rested, and in excellent condition both physically and emotionally. Similarly, the



OH-58 tail rotor stall

aircraft was in excellent mechanical shape and no maintenance problems or materiel failure contributed to this mishap. As a matter of fact, accident investigators were in total agreement that "All aspects of the flight were found to be within limitations as prescribed by the operators manual, with the exception of height/velocity (dead man's curve) for safe autorotation." So the question remains: What caused loss of tail rotor control in this as well as in other similar mishaps?

For the answer, let's revert to some basic fundamentals, keeping the following facts in mind:

- The pilot was fully qualified, and was in peak physical and mental condition for the mission.
- No mechanical or materiel problems contributed to loss of control.
- Low airspeed and altitude above ground level prevented a successful autorotation, but both were within the capabilities of the aircraft.
- Density altitude was high but not excessive.
- Aircraft gross weight was high but not excessive.
- Although the turning radius was short, the resulting steep angle of bank did not exceed the aircraft's capability.

Now, let's inject some suppositions in a hypothetical situation by considering a pilot orbiting his aircraft to the right at low altitude, with his attention focused on some particular object on the ground. Should he fail to fly his aircraft by attitude, and instead fly by apparent ground speed, he may momentarily forget about the wind factor. Then, when he is headed downwind his indicated airspeed may be drastically reduced. In fact, if the wind were strong enough, he could conceivably be flying backwards with respect to the wind flow across his aircraft.

As the aircraft continues the turn, it will tend to weathervane on encountering a right quartering tailwind. Should this sudden action take the pilot by surprise, he may fail to apply left pedal until after the aircraft has completed a 270-degree turn. The tail rotor could then readily stall if he should jam full left pedal. This would render the tail rotor system totally ineffective, allowing the aircraft to continue to rotate because of engine torque.

When the nose of the aircraft swings through the original heading, the tail rotor will tend to come out of the stall. However, as the aircraft continues its turn into the wind and past it, the rotor could stall again. This cycle could repeat itself, misleading the pilot into believing the tail rotor has failed. Consequently, he may enter an autorotation. Since he is operating at a low altitude, the chances of his "bending" the aircraft are almost a certainty.

Going a step further, let's examine the events that take place when wind strikes a rotating aircraft from the left, flowing across the tail rotor. Let's suppose the velocity of the wind is 25 knots and the helicopter is rotating at 1 rpm, the equivalent of 6 degrees per second. Assuming the tail rotor blades to be in a neutral position, the angle of attack will be 3.5 degrees. Since the angle of attack of the blades can be varied approximately 17.5 degrees either side of neutral, if full left pedal is suddenly applied, the angle of attack will become 21 degrees (and these computations are figured for the blade tips). This means the entire tail

rotor system will be stalled since the inner portions of the blades will stall first.

In reviewing this hypothetical situation, we can pick out several important factors that collectively resulted in a premature autorotation and a mishap.

1. Operation at a low altitude.
2. Operation at low airspeed.
3. Failure to fly the aircraft by attitude.
4. Failure to consider wind direction and velocity which resulted in failure to realize why the aircraft suddenly wanted to turn around.
5. The sudden jamming of left pedal which led to a tail rotor stall.
6. Failure to realize the tail rotor had stalled and not failed.

Had any one or two of these conditions not been present, the mishap might have been averted. But instead of eliminating any of these factors, let's include two additional ones: a heavy load for the existing density altitude and a steep bank angle during turns.

If our hypothetical aircraft was already near its maximum permissible gross weight for the prevailing density altitude, flight at low airspeed would necessitate near maximum power. Banking the aircraft would then create a demand for even more power if airspeed and altitude were to remain constant. Yet, the engine was already producing nearly full power. The result becomes obvious. Under these conditions, something has to give–loss of altitude, airspeed, and probable loss of tail rotor control.

Relating this information to the numerous OH-58 mishaps that have resulted from loss of tail rotor control, we can readily see that even though no single aircraft limitation may be exceeded, control problems and mishaps can occur under certain conditions of flight.

Prevention of mishaps from these causes depends in great measure upon the pilot and his supervisor. For example, proper supervision during briefing can make certain the pilot is aware of the conditions he can expect to encounter during an assigned mission so that he may be forearmed. In addition, supervision can insure no greater demands are placed on man and machine than those actually required to complete a given mission. If low-level flight is not essential to accomplish the objective, then let's assign the pilot an altitude that will keep him within the height/velocity envelope. Similarly, if it isn't necessary for the pilot to confine his aircraft within a narrow parameter and to operate at a slow airspeed, then let's not place these restrictions on him. Instead, let's assign him an area that will permit a higher airspeed and a wider turning radius.

The pilot, in turn, needs to remain constantly aware of the prevailing conditions during any given phase of flight. He should fly the aircraft by attitude rather than by apparent ground speed, apply control inputs smoothly, and be aware of the approximate wind velocity and its direction. Should he then find himself with some control problem, he will be more likely to correctly diagnose the cause and take proper emergency measures. ■

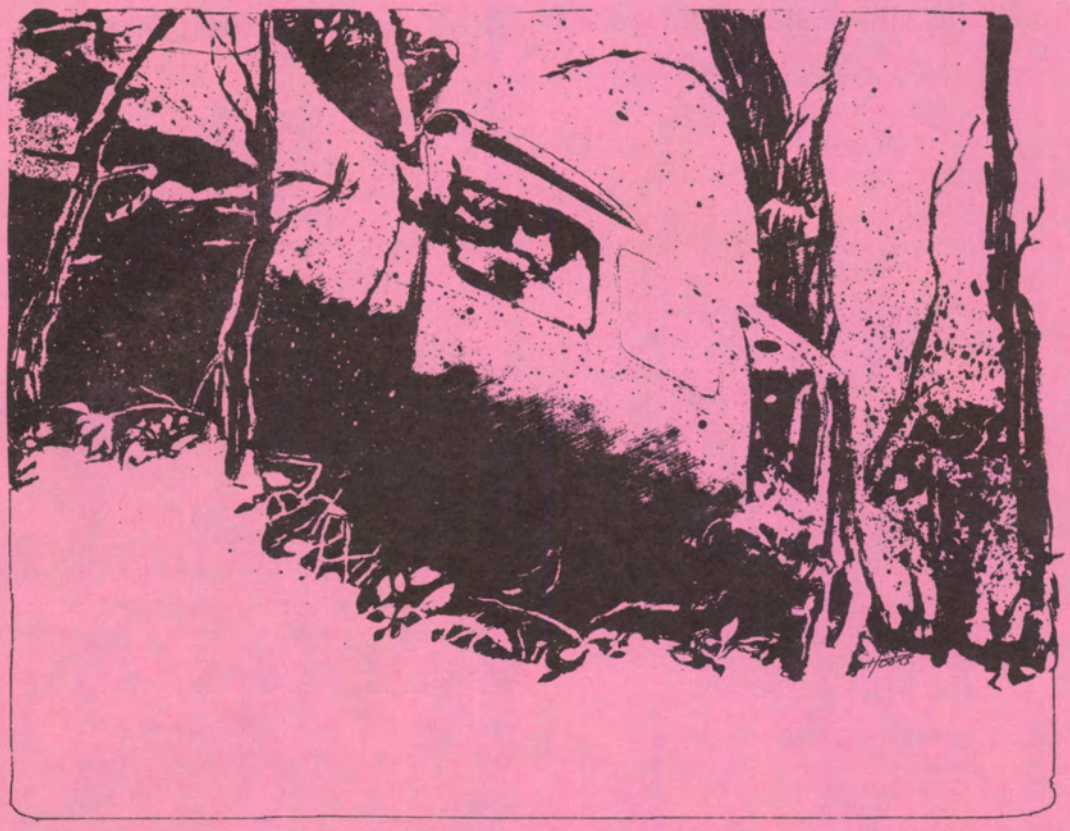
Accident review

Synopsis

The UH-1 was No. 1 in a flight of four engaged in a low-level, contour training mission. After the mission was completed, the flight leader led the flight through a valley to recon an LZ for a night mission. Evidence indicates that the copilot was at the controls when the No. 1 aircraft hit 3 sections of a power cable stretched across the valley. After hitting the power-lines, the aircraft entered a steep, descending right turn and crashed in a nose-low attitude. Two of the crewmembers were killed and one was seriously injured. The aircraft was a total loss.

History of flight

The mission was the second airmobile assault of the day. Four Hueys were to be used to transport three lifts of infantry. The mission was scheduled for an 1130 takeoff and the flight leader finished briefing the PICs assigned to the mission at 1120. The briefing covered the flight route from the PZ to the LZ and return, but did not cover potential or known hazards



along the route. There was also no mention of the flight altitudes to be flown. The PICs were told that after completing the mission the flight would "fly around" to recon an LZ for an airmobile assault scheduled for that night.

The four UH-1s took off at 1140 and completed the mission an hour and 10 minutes later. Flight altitudes during the mission varied from 25 feet to 100 feet agl. After the last troop insertion, the flight leader had the flight shift first to trail formation, then to staggered trail and finally to straight trail formation as he led them through a valley to recon the landing zone for the night airmobile. During this time, his copilot was at the controls and the flight leader was informally evaluating the copilot's ability as a PIC.

As the flight wound through the valley at about 100 feet agl and 80 knots, they passed over a large set of powerlines. The flight continued on the recon and as the formation of Hueys made a left turn and started back up the valley, the pilot of the No. 2 aircraft, flying straight and level about 2½ rotor discs behind the lead aircraft, saw a bright flash about 2 feet below the rotor head of the No. 1 aircraft. The lead aircraft pitched up suddenly, then crashed nose low into the side of a hill. The aircraft had hit the same powerlines the formation had flown over just minutes earlier. Evidence at the crash site indicated that the copilot was at the controls at the time of the wire strike.

Crewmember experience

The flight leader, who had just over 550 hours total helicopter time, was a fully qualified PIC. He had been in the unit for 9 months and had served as flight platoon leader for 7 of those months. This

was the first operational unit for this aviator since graduation from flight school. He had accumulated only 405 hours as first pilot in rotary wing aircraft. Because the unit commander wanted only commissioned officers to plan and lead training flights, this aviator was designated flight leader. He was then left on his own to plan the flight without any followup action by the commander.

The copilot had more than 1,100 flight hours, but had been in the unit for only 5 months and was not a designated PIC.

Witness accounts

Interviews with witnesses revealed a conflict between the flight leader and copilot. The copilot wanted to transfer to another unit and the flight leader wouldn't ►

release him from his platoon because of a shortage of pilots. The copilot also considered the flight leader as young and immature and "hated to fly with him."

The flight leader was described as a highly mission-oriented officer who believed strongly in mission accomplishment. He trained and flew constantly in the low-level/contour environment. He liked to fly lower than the rest of the pilots in the unit and was criticized by some for being too gung ho. He had been counseled on more than one occasion by the unit SIP about flying too low, often lower than required by the mission.

The copilot did not agree completely with the flight leader's low-level type of flying, but did exhibit a tendency to fly at relatively fast airspeeds. Three of the witnesses and the copilot had predicted some months before that the flight leader would be involved in an accident.

When asked if there was an aggressive safety program where safety was considered as important as the mission itself, one witness replied that their safety program was not aggressive and that nobody paid much attention to the opinions of the safety officer. Another witness said everything was secondary to mission accomplishment, even if aircraft and weather were marginal. In his words, "they don't care how you get it done; just get it done."

Commentary

"Supervisory deficiencies combined to create a general atmosphere conducive to aircraft mishaps. The unit had no formal PIC program. Individuals were evaluated by a program handed down by word-of-mouth from IP to IP and supervisor to supervisor.

There was no specific guidance on low-level route recons. The mission was conducted without adequate planning, crew briefing, high altitude recon, and hazard analysis. A hazards briefing was not conducted before the flight.

No action was taken to correct the flight leader's habitual tendency to fly lower than required.

Both aviators were familiar with the area, possibly to the point of over-familiarization in the case of the flight leader, and failed to remain alert to the hazard of the wires previously overflown and identified on the hazard map in the aircraft.

The flight was conducted at an altitude lower than necessary. The copilot was probably flying the aircraft in a manner deliberately designed to demonstrate his tactical flying abilities and satisfy his platoon leader.

The other aviators in the flight relied too heavily upon the preparations, perceptions, and judgment of the flight leader and failed to exercise caution and take precautionary action when doubtful flight conditions existed.

The guidance contained in FM 1-1 pertaining to terrain flight was not incorporated into overall mission planning and execution."

Selected mishap briefs

Rotary wing

UH-1

Accident □ Aircraft was on medical evacuation mission. During takeoff from LZ at 11,500-foot elevation, wind gust on tail rotor caused loss of rpm. Aircraft moved forward into downdraft, losing rotor rpm and left pedal. As pilot tried to set aircraft down, right rear skid settled on rocks and main rotor struck large boulder, causing mast separation. Aircraft settled back on tail boom and rolled onto left side. One crewmember sustained back and knee strain.

Forced landings □ As pilot picked aircraft up to reposition to parking area, banging and squealing noises were heard and power was lost. Inspection revealed one blade missing on first stage of compressor and inlet guide vanes chipped and bent. □ N2 bled off to 6000 rpm and low rpm audio and master caution light came on. Caused by fuel control failure.

Precautionary landings □ Crew smelled electrical odor during takeoff. Inspection revealed that the wire bundle running from the starter/generator to the engine deck had burned out at cannon plug. The intense heat fused the cannon plugs together and caused buckling of the underside of the engine deck for a 6- to 8-inch radius around the cannon plug mounting plate. □ Pilot felt vibration and noticed binding in pedals. Caused by worn tail rotor silent chain and sprocket. □ Tail rotor chip detector light came on. Caused by internal failure of tail rotor gearbox.

AH-1

Precautionary landings □ Fuel check en route disclosed abnormally high fuel consumption rate. Fuel leak was found around internal fuel filter on fuel control unit. O-ring was replaced. □ Pilot noticed medium frequency vibration on approach. Caused by No. 1 hanger bearing failure.

CH-47

Precautionary landings □ While flying low level at 100 feet agl and 80 knots, aircraft crossed tree line and passed through apex of water spray from agricultural watering system. Pilot made slight turn to avoid spray area. He stated that the water had gone out as far as it could go and appeared to be falling as a misty rain. As aircraft entered spray area, hole was knocked in right chin bubble. □ No. 1 engine chip detector light came on. Caused by excessive metal content in engine oil. □ No. 2 engine oil pressure dropped to zero. Caused by failure of oil pressure transducer.

OH-6

Accident □ Aircraft landed hard after completion of practice autorotation, severing tail boom.

OH-58

Accidents □ Pilot attempted a go-around at 30-50 feet agl during normal approach. As power and forward cyclic were applied, aircraft started spinning to right and became completely uncontrollable. Pilot rolled throttle to flight idle, almost stopping the rotation, leveled the aircraft and, at about 15 feet, pulled collective, using remaining pitch for cushion. Nose rotated 90° to right, skids hit ground, and aircraft rolled on right side. Suspect aircraft passed through translational lift

Selected mishap briefs

while out of ground effect. When go-around was attempted, sufficient antitorque control was not available. □ Aircraft crashed in trees. Main rotor blades were about 350 meters from aircraft. Cause unknown. Accident is being investigated. Three fatalities.

Incident □ Right passenger seatbelt was left outside of aircraft. Lower aft panel was damaged by seatbelt.

Precautionary landings □ Pilot felt slight bind in cyclic fore and aft movements. Caused by failure of magnetic brake assembly. □ Engine oil temperature went to 108° C. for 1 minute. Oil cooler was replaced.

TH-55

Precautionary landings □ Heater muffler retaining strap broke in flight. □ Radio was inoperative in flight. Inspection revealed antenna had been broken off.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

U-21

Precautionary landing □ (A series) Left fire warning system activated. Caused by faulty flame detector.

OV-1

Precautionary landings □ (D series) When power levers were moved from takeoff to climb position, sparks and smoke came out of power quadrant. Caused by loose wire to eyebrow light grounding out. □ (D series) No. 2 engine prop control failed during runup. □ (D series) Gear indicated unsafe when gear handle was placed in down position. Tower fly-by indicated gear was down. Caused by failure of down-lock microswitch.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ During preflight inspection, copilot noticed that battery terminal lug would not lock when inserted into battery female receptacle and that locking knob rotated. Inspection revealed locking studs within receptacle were worn. Condition was not noticed during preventive maintenance daily. □ Pilot felt binding in antitorque pedals on final approach. Wire to 42° gearbox chip detector was misrouted, interfering with tail rotor control cables. □ Right fuel boost pump light came on. Pump was clogged with sediment.

AH-1

Precautionary landing □ On takeoff, pilot noticed transmission oil temperature was slowly rising. Temperature passed through 100° C. during landing. Quick disconnect on transmission oil line to oil cooler was not fully engaged.

CH-47

Precautionary landing □ No. 1 flight hydraulic boost system dropped to zero pressure. Caused by failure of lock nut. Suspect overtorque.

OH-58

Precautionary landing □ Cruising at 1,200 feet, pilot felt high frequency vibration in pedals and floor. Tail rotor hub and blade

assembly were out of balance.

C-12

Precautionary landing □ (A series) When gear was extended, nose gear green light failed to illuminate. Gear was manually extended and green light came on. Malfunction of light was caused by improper adjustment of nose gear down-lock safety switch with nose gear striker plate.

U-21

Precautionary landing □ (A series) Right main gear green light failed to illuminate, but transit light, warning horns, and tower fly-by indicated gear was down. Green light came on before landing was made. Gear down-lock hook pivot post was sticking because it was too tight or because gear had recently been painted.

OV-1

Precautionary landing □ (D series) Left main gear indicated in transit and warning light came on. Emergency blowdown system was used to lower gear. Caused by improper adjustment of gear actuator.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Maintenance and technical advisory messages

■ 281702Z Aug 78, subject: Maintenance Advisory Message, NSN 4920-00-962-3097, Test Set, Indicator, Fuel QT-1 Gauge, P/N TF 20-1, Manufactured by Consolidated Airborne System Co. Bendix, on Contract DAAJ017300522 (GEN 78-13).

■ 291531Z Aug 78, subject: Technical Advisory Message Concerning Ground Operation of T53-L-13B Engines (UH-1-78-11 and AH-1-78-17).

Aviation-related

UH-1

□ Tug operator was ground handling aircraft. As aircraft was being backed, right synchronized elevator hit conex.

CH-47

□ Aircraft was being towed with APU running to prevent gyros from being damaged. Swivel lock switch was left in locked position. When aircraft was towed around a curve, swivel lock actuator broke.

OH-58

□ Helicopter was being hover taxied to parking area. Ground guide noticed main rotor blades on another helicopter were not tied down and sent someone to secure the blades. Individual opened left rear passenger door and climbed on top of aircraft to hold main rotor secure, leaving door unlatched. Hovering aircraft caused door to be torn off hinges. □ Tug was backed into right front side of OH-58.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

CH-54 safety-of-flight

■ 281945Z Aug 78, subject: Safety-of-Flight Message: One-Time Inspection of Two First-Stage 3000 PSI Hose Assemblies Installed in CH-54 Aircraft, TB 55-1520-217-20-11 (CH-54, 1978-1). **Summary:** Hose assemblies rated at 1500 psi may have been installed in the CH-54A 3000 psi flight control system at two locations because TM 55-1520-217-23P incorrectly shows them as field fabricated 1500 psi assemblies. The purpose of this TB is to inspect these two hoses to insure they are of 3000 psi rating. **Contact:** Mr. R. E. High, TSARCOM, AUTOVON 698-2722, commercial 314-268-2722.

Recap of TSARCOM messages

Following is a list of all AIG 8881 addressed messages transmitted by TSARCOM (DRSTS-M) from 1 January through 30 June 1978 for the OV-1, U-21, and U-8 aircraft, and GEN messages.

OV-1-78-1 Concerning All OV-1 Aircraft for Lubrication Requirements on the Splines of the A.C. Deicing Generator Shaft Prior to Installation on the Western Gearbox

OV-1-78-2 For OV-1 Mohawk Series Aircraft

OV-1-78-3 One-Time Inspection of All RV-1D and OV-1D Aircraft, TB 55-1510-204-20-29

OV-1-78-4 Safety-of-Flight Advisory Message No. OV-1-78-4

OV-1-78-5 One-Time Inspection, TB 55-1510-200-20-1, for OV-1, RV-1, U-8, RU-8, U-21, JU-21, and RU-21 Series

OV-1-78-6 For OV-1D, OV-1D(C), and RV-1D Series Aircraft Concerning 53C51-27 Propellers

U-21-78-1 U-21A/G Aircraft Aft Facing Seats

U-21-78-2 One-Time Inspection, TB 55-1510-200-20-1 for OV-1, RV-1, U-8, RU-8, U-21, JU-21, and RU-21 Series

U-8-78-1 U-8 Series Aircraft Engine Nacelle Inspection

U-8-78-2 Concerning Supercharger Assembly for All 0-480 Engines

U-8-78-3 U-8F Aircraft, Aircraft Aft Facing Seats

U-8-78-4 Aileron Inspection for U-8 Series Aircraft

U-8-78-5 One-Time Inspection, TB 55-1510-200-20-1 for OV-1, RV-1, U-8, RU-8, U-21, JU-21, and RU-21 Series

GEN-78-01 Painting of Rotating Components on AH-1, CH-47, OH-58, and UH-1

GEN-78-02 Reliability and Maintainability (RAM) Performance of AN/PRC-90 Survival Radio System

GEN-78-03 Magnetic Particle and Fluorescent Penetrant Inspections of Aircraft Parts

GEN-78-04 NSN 5120-00-337-2822, Multiplier, Torque Wrench

GEN-78-05 Concerning All Aircraft Which Are Not Flown Within Time Intervals Specified for Flyable Storage

GEN-78-06 Aircraft Restraint Harness, NSN 1680-00-169-0656, P/N 1680EG033

GEN-78-07 Aircraft Restraint Harness, NSN 1680-00-516-8427, P/N 51J3817

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Winter flying requires specialized techniques. The time to learn these specialized techniques is now . . . before the first snowfall.

USAAAVS

Blowing snow whiteouts

There are many hazards to operations over snow-covered terrain and one of the problems ranking highest in severity and producing most of aviation's winter mishaps is that of rotor-induced whiteout. Rotor-induced whiteout occurs during operations close to the ground, usually during takeoff or landing. Severe disorientation can occur during a whiteout condition with visibility reduced to zero.

KNOW THE SNOW

Knowing the condition of the snow will give you an idea of what to expect during takeoff or landing. The condition of snow will vary from loose and dry to well-packed. It may be crusted or melted and frozen to ice. Each condition will produce a different effect when overflying or landing. Use the following factors to determine the condition of snow:

■ Where the temperature is −20° C. or below, fresh snow will be loose. Any time a wind of 10 knots or more exists, you can anticipate blowing snow. Open areas may be blown clean of fresh snow deposits; however, huge snowdrifts will develop when terrain features such as trees and crevasses block the flow of air.

■ Loose snow that has been exposed to the sun for 3 days or more will form a crust. The depth of this crust will depend on the time it has been exposed to the sun. Overcast conditions will not cause the snow to crust. The rotorwash of an OH-58 may not cause a breaking up of the crusted snow, while operation of a CH-47 over the same area could cause the crust to break up in pieces.

■ Footprints of people or animals provide an indication of the snow condition. Deep prints indicate snow is loose and blowing snow will be encountered when landing. If a person is seen standing atop snow without sinking, you can anticipate crusted or frozen snow.

■ A low, slow pass will give an indication of the snow condition. If the rotorwash creates a snow cloud, you must initiate the proper flight technique for a safe landing.

TAXIING IN THE SNOW

The helicopter produces the greatest amount of rotorwash when hovering. This creates a very hazardous condition for taxiing skid-mounted aircraft. This hazard is not as serious for aircraft with wheels. These aircraft can ground taxi safely to the takeoff point with only minimum pitch, thus reducing the force of the rotorwash.

If you must relocate a skid-mounted aircraft from the parking area to the takeoff point:

■ Ground taxi the helicopter to a point where it can be flown to a hover and air taxied at a high taxi speed (approximately 10 knots to 15 knots). The reason for ground taxiing is to permit positive control of the aircraft when in close proximity to other aircraft and obstructions. At this low altitude, the rotorwash will produce an area within the snow cloud where forward visibility can be maintained with the

ground. The type of aircraft being flown will determine the size of the clear area. The air taxi speed should be slightly below effective translational lift airspeed. This technique allows the aircraft to be flown forward of the snow cloud where visibility is not restricted by blowing snow.

■ Avoid taxiing near another aircraft that is running up or taxiing. Sufficient time should be allowed for the snow cloud produced by another aircraft to dissipate before taxiing through the area.

TAKEOFF

The techniques used to take off from snow will vary depending on the type aircraft you are flying; however, the techniques for this type of takeoff are common to all helicopters.

■ Insure the skids are free from obstruction, e.g., tree roots and rocks, and not frozen to the ground. A visual inspection of the skids will reveal any obstruction that must be removed before takeoff. It may be necessary to get the aircraft light on the landing gear and apply small pedal pressure to insure the skids are not frozen to the ground. CAUTION: Avoid excessive antitorque control inputs.

■ Where the snow is only a few inches thick, application of pitch to the blades before takeoff may blow most of the snow away from the takeoff point, thus reducing the density of snow that will be lifted on takeoff.

■ After the above procedures have been accomplished, stabilize the aircraft on the ground until the snow cloud dissipates. When ready for takeoff, position the cyclic for takeoff. If there are no obstacles along the takeoff route, it should be positioned to achieve a maximum performance takeoff attitude. If the takeoff is to be made over an obstacle, a near vertical ascent should be made.

■ When ready for takeoff, make a continuous application of torque. The aircraft should have no forward movement until clear of the ground. Sufficient torque should be applied to insure a positive rate of climb. As the aircraft begins to climb, blowing snow will increase and reference to the ground will be temporarily lost. Maintain heading and flight attitude by reference to the flight instruments. When clear of the snow cloud, adjust flight attitude and torque so as to achieve normal climb airspeed and rate of climb. Throughout the maneuver, the copilot should monitor the engine and transmission instruments.

■ Prior to takeoff, you should discuss with the copilot what action will be taken in the event of an engine failure or rpm bleed-off while in the snow cloud. The normal procedure for single-engine aircraft is to maintain takeoff heading and to perform a hovering autorotation. The copilot's responsibility is to assist in identifying the failure and height above the ground during the descent. If flight is conducted in multi-engine aircraft, you must determine before takeoff if single-engine operation is possible based on gross weight. If it is determined the aircraft must be landed, the pilot should beep up the good engine to gain maximum power and position the aircraft in a landing attitude. Power is added during the descent to cushion the aircraft onto the ground.

LANDING

When landing a helicopter to snow-covered terrain, you can anticipate being ►

Blowing snow whiteouts

engulfed by a snow cloud unless the proper landing technique is used. This technique requires the aircraft be flown in front of the snow cloud until it makes contact with the ground. Although the specific technique will vary for each type of helicopter, the principle for snow landings is the same for all helicopters. Remember that no two snow landings are the same. You must always anticipate the unexpected and be prepared to cope with any condition that confronts you. Use the following techniques when landing to snow-covered terrain:

■ Before initiating the approach, you should learn as much about the touchdown area as possible, e.g., condition of the snow, slope of the area, obstacles. If the landing is made to an improved landing site, some forward airspeed on touchdown is desirable. However, when landing to an unfamiliar tactical site, forward speed should be dissipated upon touchdown. The approach should be planned so that only minimum power is required to terminate. If there are no obstacles along the approach path, a shallow approach is recommended. If an approach angle greater than a normal approach is required to get into a confined area, it is preferable to terminate the approach out of ground effect above the touchdown point and hover vertically downward. The rate of descent will depend on the condition of the snow. In very loose snow, a slow descent will blow the snow away, allowing you to maintain visual reference with the ground. This procedure permits greater control when in the snow cloud.

■ The initial position of an approach to the snow is the same as any other approach. The primary difference is in the last 50 feet. Instead of making the normal deceleration below effective translational lift airspeed, you must maintain this airspeed until just before touchdown. This technique allows you to keep the helicopter in front of the snow cloud until touchdown, after which the aircraft will become engulfed in the snow cloud. The approach angle of the last 50 feet deviates from the standard constant angle of descent. A slight leveling off is required to maintain airspeed. Forward cyclic must be applied to maintain speed. As the aircraft descends to an in-ground-effect attitude, blowing snow will develop to the rear of the aircraft. At this point, begin a deceleration. After the aircraft has begun to decelerate, it should be positioned in a landing attitude. If inadvertent ground contact is made due to poor depth perception, it will not be hard enough to damage the aircraft. Once contact is made, reduce torque until the aircraft is firmly on the ground. Never plan to terminate the approach to a hover as disorientation can occur easily in a snow cloud.

■ The most difficult aspect of the approach is determining your height above the terrain. Trees or other terrain features located in the near vicinity of the landing area provide good ground reference. If none of these objects are available, it may be necessary to drop an object, e.g., tire, tree limb, or smoke grenade, near the touchdown point. A technique used by UH-1 pilots is to position the beam of the searchlight between the antitorque pedals on the pilot's side. The beam of light forms a good ground reference as you

descend to make the landing. This technique is used during daylight only.

■ The crew chief should conduct a walk-around inspection to insure the aircraft is positioned securely on the ground prior to shutdown. If on a slope, precautions must be taken to insure the aircraft will not slide downslope after shutdown.

■ Night approaches to the snow are normally made to a reference point on the ground, e.g., tactical landing light or runway light. These devices provide a good reference for judging angle of descent and rate of closure. When executing a night approach to a tactical landing site with lights, always plan your approach to land short of the touchdown point. This technique insures that you will not overshoot and have to decelerate rapidly in a snow cloud. Additionally, by shooting short, it allows you to maintain airspeed after the level-off, thus keeping the aircraft in front of the snow cloud until touchdown. If the landing light or searchlight is used during the approach, position these lights so the beam is beneath the aircraft.

EN ROUTE

In a nontactical environment, aircraft will normally be flown at an altitude and airspeed where the rotorwash will have no effect upon loose snow. In a tactical environment, however, you must fly at terrain flight altitudes. When conducting NOE flight, rotorwash creates a signature identifiable for several miles.

■ To minimize the effect of rotorwash on loose snow, maintain an airspeed of 40 knots or greater. At this airspeed the rotorwash is displaced horizontally. Little or no blowing snow will develop, even at NOE altitude.

■ When flight is conducted below 40 knots, avoid flights over forested areas. Snow in the trees is more easily disturbed than snow on the ground. Also, the flight route can be easily detected by the signature left on the trees.

■ Avoid flying close formations over the snow. Depending on the nature of the terrain and the condition of the snow, 5 seconds' to 10 seconds' (approximately 200 meters) separation should be maintained while en route. Separation should be extended to 15 seconds to 30 seconds (¼ to ½ mile) just prior to arriving in the landing zone to preclude the possibility of having to land in a snow cloud produced by other aircraft.

■ When conducting multi-aircraft operations, avoid flying through narrow valleys or crevasses. Because of the limited maneuver area, aircraft must follow the same ground track, thus requiring trailing aircraft to fly through blowing snow. Also, the vibrations produced by helicopters are intensified in a small area and may cause avalanches.

■ Terrain features that served as good references for one mission may not be recognizable on the next flight. Snowstorms or winds can change the appearance of a snow-covered area in a matter of hours. An awareness of this phenomenon is essential to insure accurate navigation.

The specialized techniques listed above, along with much more valuable winter flying information, can be found in DA Training Circular 1-12 (Cold Weather Flying Sense). The time to learn these techniques is now . . . before the first snow. ■

Accident review

Synopsis

A flight of four AH-1Qs was making a discretionary landing because of a snowstorm approaching along the intended flight route. The first three aircraft landed safely, but both pilots of the No. 4 aircraft lost visual reference because of blowing snow and the skid hit the sod and embedded about 8 inches in the ground. The aircraft rolled right and the main rotor system hit the ground, separating the transmission, main rotor, and mast. The pilot and copilot escaped uninjured.

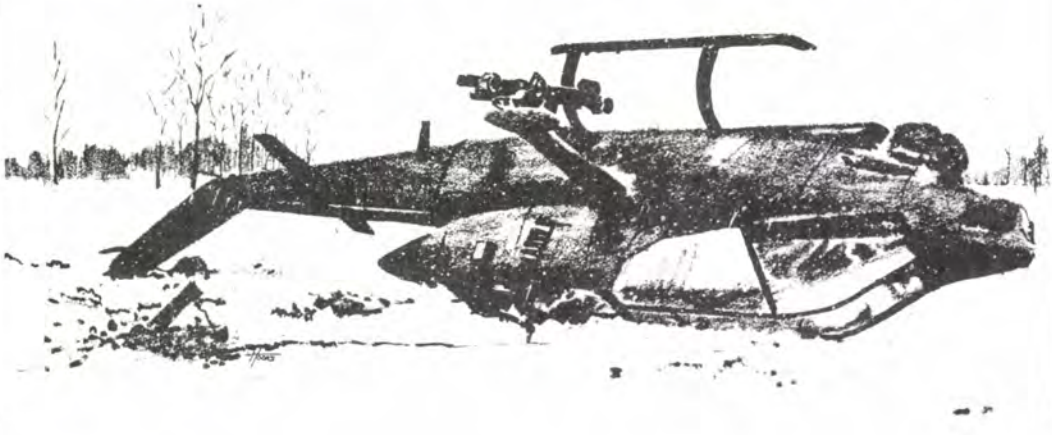
History of flight

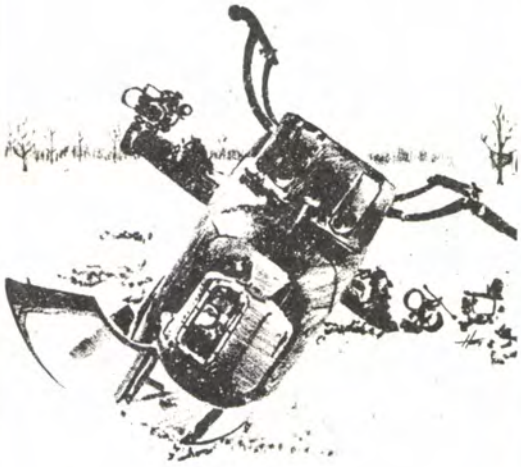
A 7-day field training exercise had just been completed. Bad weather had prevented a return to home base on the preceding day and threatened to prevent a return on the day of the accident. After the first weather briefing, the flight leader determined the flight would have to wait until the weather improved. Around lunch, the flight leader received another weather briefing and briefed the front seat copilot of each aircraft on the weather forecast, which called for snowshowers and one-half-mile visibility. The copilot of the No. 4 aircraft only heard part of the briefing.

The flight took off at 1300 hours. A few minutes later, the flight leader told the rest of the flight that the weather did not look good and they should return to their takeoff point. The pilot of the No. 2 aircraft, who was also the air mission commander, said he thought the flight should continue because they could always land if the weather worsened. Other members of the flight agreed and the flight leader decided to continue.

About 20 minutes later, snowshowers were seen a mile ahead and the flight leader decided to land, starting a left 180-degree turn. The landing area was a large plowed field which presented a smooth, even appearance from the air because of the 4 to 6 inches of fresh powder snow. The flight landed in a loose trail formation on a general heading to the southeast, with a left quartering tailwind of about 15 knots.

The pilot of the lead aircraft planned his approach to the east end of the field





and the pilot of the No. 2 aircraft planned his approach 300 meters to the rear of the lead aircraft. As No. 2 terminated his approach, a whiteout condition developed and the copilot in the front seat took the controls and landed. The No. 3 aircraft also entered a whiteout condition. The front seat pilot took the controls and made a go-around and landed in a field south of the one where the rest of the flight landed.

The pilot of the No. 4 aircraft followed the flight into the field and planned his approach to the rear of the flight. As he began to terminate his approach, the rotorwash caused a whiteout condition and both pilots completely lost outside visual contact. The toe of the right skid dug into the ground and the aircraft rolled right and crashed inverted.

Crewmember experience

The pilot had more than 2,800 flight hours and was an IP in the AH-1Q. He had no previous experience landing in snow.

The copilot had a little less than 1,000 flight hours and also was inexperienced in snow landings.

Commentary

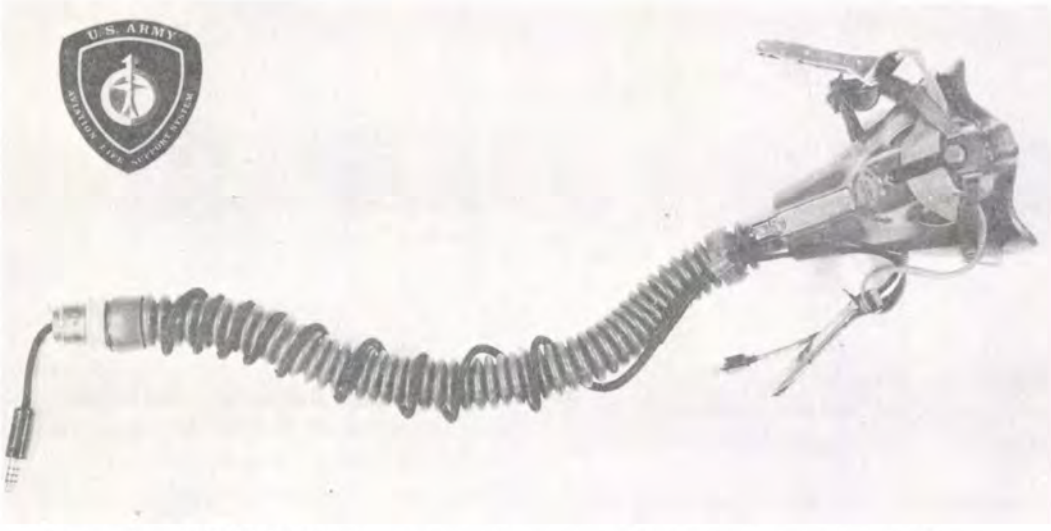
"None of the members of the flight had a full appreciation for the weather forecasted to be encountered. The flight leader, who received the weather briefing by telephone, did not completely understand or analyze the weather. He was not aware that the weather forecasted was below VFR minimums for the intended flight route. Not all of the crewmembers were present during the weather briefing. One of those was the air mission commander, who was the senior-ranking aviator in the flight. He failed to verify before takeoff that the weather was good enough for VFR flight.

The copilot in the front seat of the No. 4 aircraft never attempted to take control of the aircraft because he thought the pilot, being more experienced, could better handle the situation. Neither aviator had experienced whiteout conditions before and neither had been briefed on whiteout conditions associated with landing in snow.

Most of the aviators interviewed in the unit had never flown in snow before and had received little training concerning the hazards of snow.

An adequate flight briefing was not conducted before the flight on weather, terrain analysis, and hazards to flight. This may have been prompted by a desire to return home after a 7-day field exercise."

How to order the MBU-5/P oxygen mask



When ordering the MBU-5/P oxygen mask in assembled form the mask includes face piece, hard shell, valve assembly, delivery hose, hose clamps, cord and snap assembly, connector adapter, cable guides, and dust cover.

NSN and nomenclature for the MBU-5/P oxygen mask assembly are:

NSN	Nomenclature
1660-00-810-3223LS	Oxygen Mask, MBU-5/P, Size Regular Narrow
1660-00-811-5259LS	Oxygen Mask, MBU-5/P, Size Regular Wide
1660-00-810-3225LS	Oxygen Mask, MBU-5/P, Size Long Narrow
1660-00-810-3222LS	Oxygen Mask, MBU-5/P, Size Short Narrow

The only components that must be ordered separately to complete the mask are:

NSN	Nomenclature
1660-00-076-9962LS	Connector CRU-60/P (1 ea)
1660-00-137-5106LS	Suspension Harness, 4 pt (1 ea)
1660-00-066-2077LS	Bayonet Straight (2 ea)
1660-00-440-5553LS	Receiver Assy Bayonet (2 ea)
5965-00-854-0658LS	Microphone M-100 A/C (1 ea)
5995-00-890-8614LS	Cord Microphone (1 ea)
5965-00-509-9889LS	Mounting Bracket for Boom Microphone (1 ea)

Ordering should be hand processed (OFF LINE). Be sure to enter LS in the two spaces following the NSN.

The MBU-5/P oxygen mask should be maintained in accordance with Air Force T.O. 15X1-1 and T.O. 15X5-4-4-12.

Selected mishap briefs

Rotary wing

UH-1

Incident □ During pinnacle approach, aircraft encountered high sink rate. Collective was applied and mast bumping may have occurred. Mast was damaged.

Precautionary landings □ Engine oil pressure started to fluctuate and drop slowly. Caused by failure of quick disconnect lower engine oil reservoir. □ Grinding noise was heard during climb and master caution and hydraulic lights came on. Feedback was felt in all controls. Caused by leaking O-ring in irreversible valve. □ On short final to runway, tail rotor pitch control pedals locked in place. Pilot kicked pedals back and forth to release them and landed. Caused by worn bellcrank assembly bearing. □ Climbing through 6,000 feet agl, IP noticed N2 at 6500 rpm and rotor rpm at 335, with high rpm light. Caused by malfunction of main rotor tachometer generator.

AH-1

Forced landing □ Loud bang was heard from engine area and N2 fluctuated and decreased. Caused by failure of engine compressor assembly.

Precautionary landing □ Master caution and chip detector lights came on after landing. Plug had numerous metal chips. Engine had a history of oil sample problems and was on a special oil sample program.

CH-47

Forced landing □ Transmission oil pressure light came on, followed by failure of No. 2 engine. Single-engine flight could not be maintained because of high gross weight. Caused by failure of engine transmission.

Precautionary landing □ Flight engineer noticed hydraulic fluid spraying from area at right rear of aft transmission. Leak was caused by failure of O-ring in utility hydraulic system safety relief valve.

OH-58

Precautionary landings □ Cyclic jumped forward about one-fourth inch on takeoff. This happened five more times before aircraft could be landed. A bearing race was turning in the swashplate horn and a leaking servo was connected to the same bearing in the horn. □ Pilot encountered unforecast low ceiling and visibility in rainshowers and landed until weather improved.

TH-55

Precautionary landings □ Gearbox warning light came on. Caused by failure of oil pressure switch. □ Engine oil pressure exceeded upper limit. Caused by failure of oil pressure sending unit.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landings □ (A series) Pilot heard three loud bangs and saw flame coming from exhaust stack of No. 2 engine. Caused by ruptured diaphragm in low pressure bleed air valve assembly. □ (A series) No. 2 engine oil pressure remained at zero for about 6 seconds on start, then jumped to 200 psi. When condition lever was reduced to low idle, pressure dropped to 125 psi with slight ►

Selected mishap briefs

fluctuations. Caused by malfunction of engine oil pressure transmitter.

U-21

Precautionary landing □ When gear was lowered, crew heard loud noise and right main gear green light remained out. Gear handle red light stayed on and warning horn sounded when throttles were retarded. During recycling, right main gear would not retract. Crew in another aircraft noted normal gear extension and aircraft was landed. Positive down lock was not in place. Caused by thread failure of nut and tube assembly.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Crew chief did not secure his flight jacket and it blew out of cabin into main rotor blade, causing dent in blade. □ Master caution and inverter segment lights came on. Piece of safety wire was found lying across voltage regulator terminal relay, causing interruption of voltage output and causing circuit breaker to pop. □ During lineup for formation takeoff, crew of aircraft behind UH-1 noticed something sticking out of 42° gearbox cover. It was a paper shop towel. The towel had been put under the gearbox to absorb oil after an oil change and had not been removed. □ During engine runup, copilot increased engine rpm to 6600, checked torque and N_1, then increased rpm for maximum increase. Actuator was too fast and set improperly. Engine rpm increased to 7000.

OH-58

Precautionary landing □ Fuel filter caution light came on. Filter was clogged with dirt.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

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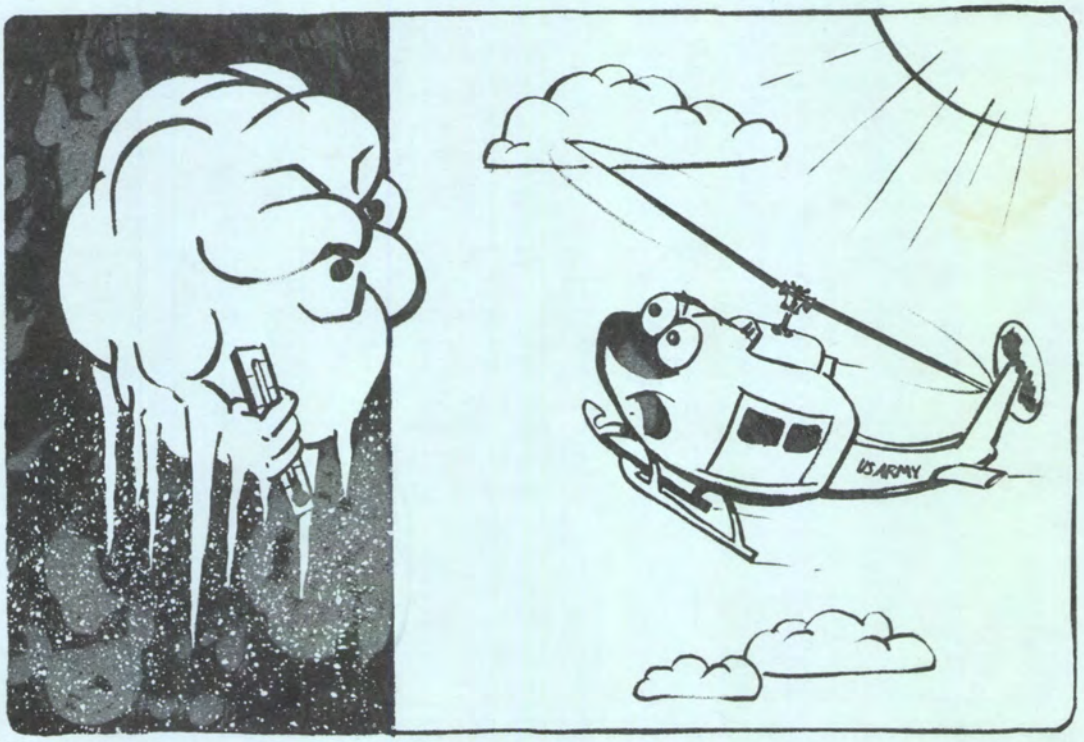
Snow warnings in September ?



For those stationed in the southern part of the United States, winter, even in September, seems very remote. But consider this: Within a month or so there will be snow in much of the land and temperatures will certainly be chilly. Much of the U.S. is already involved in winter in October . . . and winter requires some extra effort in planning and preparation . . . and the time to begin is now.

ICING CONDITIONS

Icing on an aircraft is one of the most serious winter hazards. Ice accumulation on an aircraft can be slow or dangerously rapid. Weather conditions normally associated with icing are:

■ Icing occurs when the temperature is at or below freezing and visible moisture, such as a cloud, drizzle, rain or wet snow, is present.

■ Icing occurs in stratiform clouds when air is stable and water droplets are present. Water droplets may become supercooled at or below freezing and still be in a liquid state. Supercooled droplets freeze on contact with aircraft and form layers of ►

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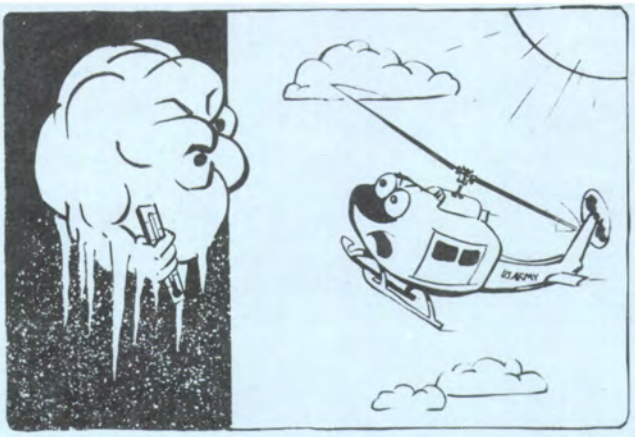
USAAAVS



Snow warnings in September?

ice. Stratiform clouds also may contain ice crystals which are not hazardous to flight because they do not adhere to aircraft.

■ Icing in cumuliform clouds, with high moisture content, can occur rapidly. Unstable air with vertical currents may carry very large supercooled droplets which spread before freezing and cause rapid accumulation of ice.

■ Icing in mountainous terrain occurs mainly when moist air is lifted over high peaks. Ice-producing areas are mostly on the windward side of peaks to about 4,000 feet above the peak and possibly higher when the air is unstable.

■ Icing in frontal inversions also can be very rapid. Air temperatures are normally colder at higher altitudes but when air from a warm front rises above colder air, freezing rain may occur. Rain falling from the upper (warmer) layer into a colder layer is cooled to below freezing but remains a liquid. The liquid freezes opon contact with the aircraft and accumulation can be very rapid.

Winter operations require special precautions from the planning phase to touchdown at destination. The following weather rules should be observed at all times.

PLANNING

Planning a flight in winter weather should always be done with the thought in mind that you would hate having to walk back. Obtain current detailed weather briefing and be certain you understand all weather conditions that exist or could occur en route and at destination and plan for an alternate airfield. It is essential that cold weather survival gear be carried at all times.

PRETAKEOFF

Check surrounding area before making runup so as not to blow snow and slush over other aircraft, runways or taxiways. Remember pitot heat, and use it. On reciprocating engines, apply carburetor heat on those so equipped in accordance with procedures prescribed by the dash 10 before takeoff–it is just as important before takeoff as during landing–when conditions warrant its use. Clear all frost from your aircraft before taking off. Frost increases drag and is hazardous at low airspeeds during takeoff. Frost also provides a surface that accelerates accumulation of ice.

TAXIING

Check condition of ramps and taxiways for ice, water, etc. Nose wheels and tail wheels are not effective on wet or icy ramps–EXCEPT AT SLOW SPEEDS. Use wing walkers when needed and allow yourself lots of space. Apply brakes smoothly, and avoid taxiing through deep water.

DURING FLIGHT

Avoid flight into icing conditions. Choose altitude below freezing level if possible. Remain VFR. Staying clear of clouds will keep you away from most icing situations.

For flights in vicinity of a warm front, determine if temperatures in cold air mass are in ice-producing range (0 to −10 degrees or −20 degrees C.). Determine altitude of inversion layer. Knowledge of these facts will govern necessary action in the event you encounter precipitation.

Rotor blade icing begins near the root and ice buildup causes loss of airspeed.

This requires an increase in power which leads to increases of exhaust gas temperature (egt) and rpm and causes vibration.

Ice on the windscreen of a helicopter will be the pilot's first sure sign he has entered icing conditions. Even in the worst icing conditions, side windows in a helicopter usually provide visibility.

Windscreen heaters can be effective in preventing ice from forming but are often ineffective for removing ice that has already formed. This also applies to pitot heat. Use heaters when icing conditions are anticipated.

Once icing begins, the pilot should take action to avoid further icing. Rotor blade icing causes loss of lift and increased drag. The pilot must increase torque to maintain airspeed. If torque must be increased as much as 5 psi (pounds per square inch), flight must not be continued into icing. Further icing would cause the aircraft to lose autorotational capability in a matter of minutes.

Asymmetrical shedding occurs when one rotor blade sheds ice, leaving the rotor out of balance. This can lead to severe vibrations. Shaking the stick is not a cure because this could place undue stress on the aircraft and may actually lead to even greater imbalance. Ice shedding can cause FOD (foreign object damage) from ice ingested into the engine.

When icing is encountered, descend to altitude clear of clouds. If icing is moderate to heavy, land. Remember that autorotational capability may be lost in a matter of minutes if flight is continued into clouds.

In freezing rain, it is vital to know the altitude of inversion layer and freezing level. If freezing level is at surface, landing is not recommended. Depending on circumstances, the best solution may be to climb through the inversion layer to the warmer air mass, where ice will melt off.

Be extra alert during morning flying periods for sudden weather changes. Morning flying periods are characterized by the poorest and most changeable weather of the day. The sun's heat does not have an appreciable effect much before noon. Consequently, nighttime fogs and low stratus clouds are slow to lift. Oftentimes, a temporary shift in the winds will blow a low stratus deck or fog bank away, only to have it come back in when least expected.

Be critical of visibilities reported as reduced by rain, drizzle or snow. Whenever a visibility of less than 6 miles is reported, the obstruction of visibility is included in the observation. (Thus the visibility will be reported "2 miles in rain, 1 mile in snow, 3 miles in light drizzle," etc.). Oftentimes, the significance of this information is overlooked. Rain and snow have an invalidating effect on vision from the cockpit. For instance, visibility as seen by a weather observer in rain is not realistic from the viewpoint of the pilot who encounters the rain at tremendous speeds—sometimes equivalent to directing a firehose at the window of the weather station. A weather observation wherein the reported visibility is obscured by precipitation should be viewed with some skepticism.

Exercise extreme care whenever the words "partial obscuration" or "obscuration" are contained in a weather report. The weather observer defines the ceiling and visibility by taking measurements in the vertical and horizontal. However, the ►

Snow warnings in September?

pilot on his approach is interested in a factor known as slant range visibility, a factor the weather observer is unable to determine. Therefore, whenever an obscuration is reported, the pilot should be prepared for the possibility that the conditions he encounters will be poorer than those reported by the observer on the ground.

Where snow is forecast or listed as a possibility at destination, select an alternate where snow is definitely not expected and, if snow is encountered, proceed to it without delay. When snow reduces visibility to below minimums, it also reduces the radar capabilities of ground control approach (especially wet snow) by blurring the scopes, and it lowers the ceiling by obscurations. Icing may be encountered. Snow intensity is difficult to forecast and heavy snow often persists for a long period of time.

When in fixed wing aircraft, check runway conditions closely and cancel flight when the destination has ice-coated runways and temperatures are near freezing and/or rain is falling. Also cancel flight if fresh snow is on the runway or forecast to be on the runway.

Ice and snow on runways are dangerous for landing and takeoffs. Snow is particularly slippery when temperatures are near freezing. Wet snow on runways offers little friction. Ice is always slick, and when it is wet with rain, it offers practically no friction.

Where weather at destination is reported below minimums in winter, proceed to alternate without delay. In summer, daytime weather deterioration such as stratus and rainshowers may quickly give way to improvement. In winter, the sun's heating is far less than in summer and often weather deterioration and then persistence of poor conditions occur in the daytime.

In regions of suspected icing, when climbing, letting down, or landing, keep a safe margin of airspeed and a minimum of extra exposed surfaces, such as wheels and flaps. Ice accumulation reduces dynamic lift and thus increases stalling speed. Extra exposed surfaces add to the amount of ice accumulation.

LANDING

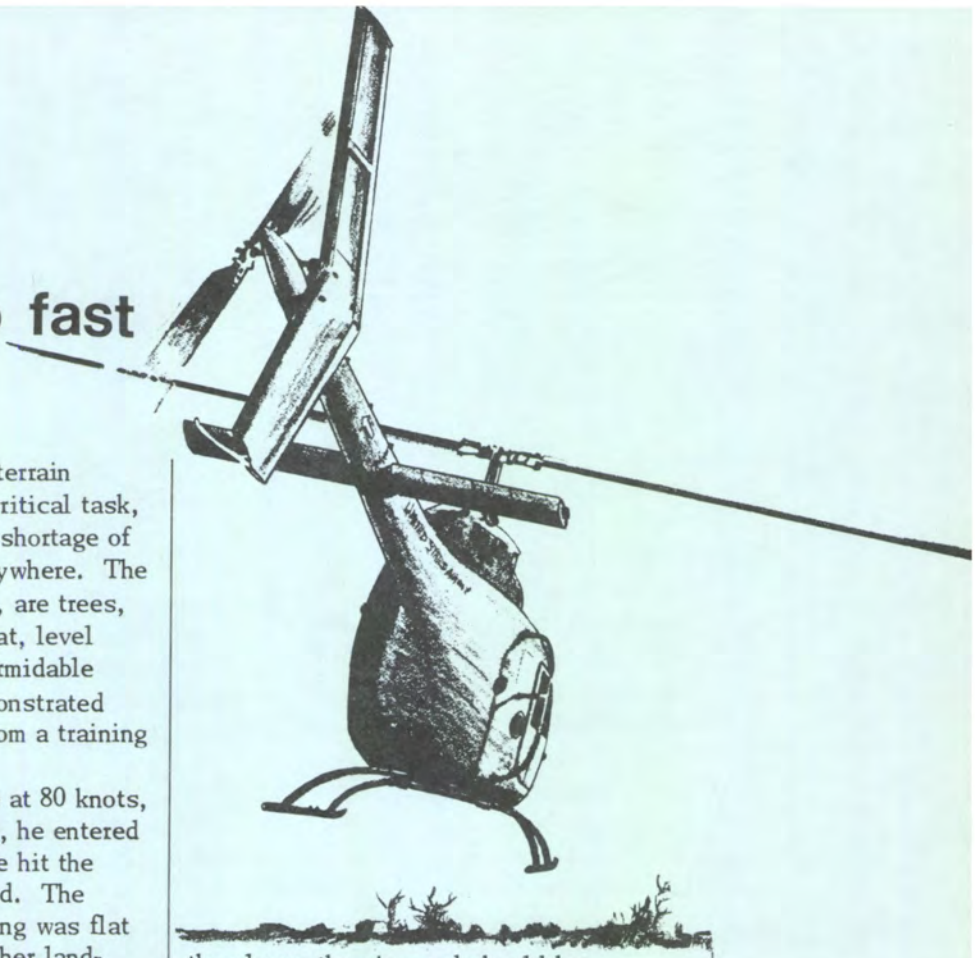
All anti-icing equipment should be on and everything warmed up before starting descent through clouds. On reciprocating engines, exposure to carburetor ice rises sharply when throttle openings are reduced. Lower powered descent in clouds and rain should always be made with carburetor heat on.

If you have flown through icing conditions, remember the effect on airfoils and carry an airspeed margin for unpredicted stall speeds. Also, landing on wet or icy runways requires longer runs. Crosswinds are especially hazardous in winter because they may be coupled with icy runways and blowing snow.

After a helicopter lands with ice on the rotor blades, ground crewmen should keep clear until rotor slows. Aircrew should remain in the aircraft until the rotor stops. Ice thrown from turning rotors can be extremely hazardous.

Ask your fellow aviators what winter means to them. If their answer is simply cold weather, tell them to think beyond the obvious because winter should have a special meaning to all of them. ■

Too low, too fast



Clearing obstacles during terrain flight—especially NOE—is a critical task, particularly since there is no shortage of obstacles. They abound everywhere. The most common ones, of course, are trees, wires, and birds. But even flat, level ground can itself become a formidable obstacle as was recently demonstrated by an OH-58 pilot returning from a training mission.

As he neared his field site at 80 knots, approximately 5 to 10 feet agl, he entered a left turn. A main rotor blade hit the ground and the aircraft crashed. The terrain over which he was flying was flat and devoid of vegetation or other landmarks. Although the pilot's error was one of judgment in that he inaccurately estimated the clearance available between the main rotor blades and the ground, other factors were also involved.

To begin with, the pilot had no mission requirements to fly close to the ground. In fact he was almost at his field site when the accident occurred. Secondly, while combat conditions may necessitate a pilot's making a quick dash across an open area, this pilot had no such need for high speed. In retrospect, it can be seen how low altitude and high airspeed over flat terrain can combine to cause an error in judgment and a major accident.

Although it is too late to prevent the two major injuries and more than $140,000 in damage costs that resulted from this accident, you can help stop additional mishaps from similar causes by keeping the following basic facts in mind:

■ Except when combat conditions or training missions require otherwise, the closer flight is conducted to the ground, the slower the airspeed should be.

■ Under daylight conditions, the pilot must become skilled in using his peripheral vision—his ability to see a large area to his side and rear without concentrating his vision in a particular area—and thereby maintain ground and obstacle clearance during terrain flight.

■ He must be aware of the size of the aircraft and "feel" the extent of it around him since he cannot see it all.

■ Both peripheral vision and depth perception are adversely affected during flight over large flat areas such as desert or snow-covered fields where few or no visual cues exist.

■ When rounding a hill, as opposed to turning over level terrain, the pilot must bear in mind the main rotor blades will come even closer to the ground as the aircraft turns.

■ Finally, altitude and airspeed should be dictated by mission requirements. When low-level flight is not required, a safe altitude and airspeed should be maintained that will insure obstacle avoidance. ■

Selected mishap briefs

Rotary wing

UH-1

Incident □ Aircraft landed hard on termination of practice autorotation, damaging saddle and cross tube tunnel area.

Precautionary landings □ Controls became stiff and hydraulic master caution light came on. Right cyclic servo pressure line failed 5 inches back from irreversible valve. □ Battery acid sprayed onto copilot's windshield from upper battery vent. Caused by overheated battery. □ Cargo door came open in flight and could not be properly resecured. Latching assembly was bent. □ Master caution and transmission chip detector lights came on. Water was found in dust cover.

AH-1

Accident □ Aircraft, on tactical NOE mission, was in downwind hover when it went into uncontrollable right spin. Pilot reduced throttle to flight idle and crash-landed in dense vegetation. Both crewmembers sustained minor injuries and aircraft was a total loss.

Precautionary landings □ Engine oil bypass light came on. Caused by failure of preformed packing. □ Hydraulic pump started squealing and No. 1 light came on. Pedals were stiff and cyclic feedback was felt at 50 knots. Running landing was made. Caused by failure of hydraulic cyclic accumulator O-ring. □ Engine oil pressure fluctuated during hover/taxi. Caused by faulty pressure relief valve. □ As 40mm turret weapon was being fired, the last two or three rounds detonated dangerously close to and beneath the flight path of the aircraft. IP suspects turret went below normal stow position when action/trigger bar was released. Small fragment knocked hole in right side of aircraft.

CH-47

Precautionary landings □ No. 1 engine chip detector light came on. Engine was replaced. □ Flight engineer noticed hydraulic leak from utility hydraulic oil cooler assembly. Utility pressure dropped to zero. Pressure line into utility hydraulic cooler fan motor was cracked at bend.

OH-58

Forced landing □ Crew heard loud explosion, followed by immediate loss of power. Caused by internal failure of engine.

Precautionary landings □ DC generator failed during start. Caused by broken starter generator shaft. □ Warning light flashed, but segment light did not. Engine chip detector light went to steady on in test position only. Caused by faulty wiring between transmitters and segment panel.

TH-55

Precautionary landings □ Rough-running engine was caused by failure of fuel injector. □ Belt drive clutch would not disengage during shutdown. Caused by failure of linear actuator. □ Longitudinal cyclic trim was inoperative during runup. Caused by failure of fore and aft cyclic trim motor.

For more information on rotary wing mishaps, call AUTOVON 558-3901/3913.

Fixed wing

C-12

Precautionary landing □ (A series) Right

engine oil pressure began fluctuating from 30 to 130 psi. Power reduction did not alter condition. Caused by defective oil pressure transmitter.

T-42

Precautionary landing □ No. 2 alternator gauge read zero in flight. Caused by failure of alternator drive belt.

U-8

Precautionary landing □ (F series) When pilot tried to raise gear on takeoff, it would not come up. Caused by failure of landing gear motor assembly.

U-21

Precautionary landing □ (A series) After level-off, crew noticed fuel siphoning from left nacelle tank. Fuel cap was secured improperly during preflight.

OV-1

Precautionary landing □ (D series) Right main gear failed to indicate safe down during landing. Gear was observed down and aircraft was landed. Caused by malfunction of landing gear switch.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Incident □ Holes were found in No. 2 tail rotor drive shaft cover during postflight inspection. A 13-inch torque wrench had scored the No. 3 drive shaft and punctured holes in the cover and support deck. Suspect torque wrench was left on tail boom decking when tail rotor retaining nut was retorqued.

Precautionary landing □ Tail rotor servo pressure line was found leaking excessively during runup. Hydraulic fitting at servo was cracked. Caused by overtorque.

OH-58

Precautionary landings □ Ammeter rose to 40 amps and cockpit filled with acid odor. Clogged vent line caused battery to overheat. Crew chief did not check vent line on daily. Blockage was too far in line for pilot to see on preflight. □ Cyclic binding was noticed in all quadrants during shutdown. Friction nut on intermixing bellcrank was overtorqued. Crew chief could not find torque value in TM and asked technical inspector for correct value. TI thought crew chief was talking about a different nut and gave him the wrong torque value. TI did not use TM.

OV-1

Precautionary landing □ (D series) Pilot, using oxygen in normal phase, realized he was feeling sluggish and TO was getting sleepy. Pilot descended to 10,000 feet using 100% oxygen and felt OK after descent. After landing, oxygen system was purged and refilled.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

OH-58 technical information message

■ 142038Z Sep 78, subject: Technical Information Message No. OH-58-78-20, OH-58A/B/C Tail Rotor Drive Shaft Installation. **Summary:** To reduce OH-58 tail rotor drive shaft wear and bearing failures, new bearings, collars, and drive ►

shaft cover kits are being issued. The approved draft MWO, either undated or dated 22 Feb 78, which has been packed in the drive shaft cover kit, is inadequate due to dimensional variations in the kit parts. Draft revisions to the MWO are completed and a revised draft will be published by 2 Oct 78. The final MWO and related TM changes will be released to TAG by 1 Jan 79. Installations should not be attempted without the new instructions contained in the revised draft MWO. Message OH-58-78-20 contains information that will be formalized as changes to TM 55-1520-228-23 and -20, and MWO 55-1520-228-30-24. ■

Aviation-related

UH-1

□ As engine was being flushed, fire started in starter/generator area. Crew had not used a starter shield as required by TM 55-2840-229-24.

CH-47

□ As aircraft was being towed to hangar, it hit vehicle parked on ramp. Individual towing aircraft was not the assigned driver. He was exceeding towing speed limits and made an improper turn. Only one wing walker was used. □ Crew chief was readying aircraft for maintenance personnel who were flying in to check a bushing on forward head drive arm. As crew chief was removing bolt and pin from drive arm, bolt slipped out, allowing swashplate to turn and damage several components. Locking pins were not installed.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

One more time

In the 23 Aug 78 issue of FLIGHTFAX, Vol. 6, No. 44, we published a "Caution" concerning gyros. However, we inadvertently left out an important bit of information—namely, the time element involved. The complete caution should read as follows:

Let your aircraft stay put for 25 minutes after you remove electrical power from the MD-1 displacement gyros and the CN-998/ASN-43 directional gyros. If you must relocate the aircraft within 25 minutes after shutdown, you should reapply power to these gyros for 5 minutes BEFORE repositioning the aircraft, WITH ELECTRICAL POWER LEFT ON. Failure to follow this procedure can damage the gyros, causing the attitude indicators to precess 3 to 5 degrees. A "caution" to this effect will be included in the next change to the dash 20 for each type aircraft.

If you need additional information concerning this matter, contact MAJ Billy M. White, AUTOVON 558-3901/3913, commercial 205-255-3901/3913. ■

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ARMY AIRCRAFT MISHAP PREVENTION DATA
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VOL. 6, NO. 5 □ 2 NOV 1977

The common cold . . . no minor problem

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. But while the discomforts may be relatively minor, the common cold can cause pilot incapacitation during flight which may result in an aircraft accident.

Two commonly held misconceptions can cause the Army aircrewmember 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 common 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. For example, the gradual change in atmospheric pressure at higher altitudes results in a difference of only 84mm Mercury in a 10,000-foot descent from 40,000 to 30,000 feet msl. Compare this to the 237mm Mercury increase in pressure when descending from 10,000 feet msl to sea level. The atmospheric pressure increase is almost three times as much from 10,000 feet msl to sea level as it is from 40,000 to 30,000 feet msl. Another contributing factor is that the flutter-valve-like construction of the eustachian tube which ventilates the middle ear makes it more difficult to keep the pressure across the eardrum equalized the faster the pressure increases.

The point to remember is that change in

(Continued on back page)

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Accident analysis

ANALYSIS 77-6
Type aircraft: UH-1H
Time: 2236
Classification: Major (substantial)
Injuries: 1 minimal
Estimated cost: $546,196 (aircraft, injury)
Mission: Training

	Grade	Age	RW Hrs	Tot Flt Hrs
IP	CW2	29	2,455	2,455
P	CW2	26	3,140	3,144

The accident

IP was terminating a night vision goggle training mission. While pivoting over the parking area, aircraft drifted to the rear. The tail rotor hit the main rotor blade of a parked aircraft and separated from the aircraft. The main rotor then struck the main rotor blade of the parked aircraft and the aircraft rolled to the left rear and crashed. Both sustained major damage.

The causes

■ IP removed his night vision goggles under blackout conditions before repositioning aircraft for parking. As a result, he had inadequate visual cues to maintain proper aircraft reference. Consequently, when the IP pivoted the aircraft to align it with the parking space, he unknowingly allowed it to drift backwards. Although the aircraft was operated with fuselage and navigation lights taped, an infra-red filter on the searchlights, and with other aircraft conducting NVG training thereby precluding the use of landing lights, there were no procedures prescribing that night vision goggles be retained until the aircraft was parked or prescribing other procedures that would facilitate safe training.

■ IP also removed the goggles before parking the aircraft because they were fatiguing.

The cures

■ Units should provide procedures for normal operation under blackout conditions required for night vision goggle training. These procedures should include: (1) a requirement to wear the goggles under blackout conditions until the aircraft is parked; (2) a requirement for parking pads to be adjacent to the active runway with unrestricted entry; (3) crew coordination to detect drifting; (4) the use of fuselage and/or navigation lights to detect drifting when the goggles are removed; and (5) the minimum parking separation of aircraft, in accordance with TM 5-803-4, on all pads used for night vision goggle training.

■ Revise chapter 8 of TC 1-28 to include guidance on both ground and air safety. Specific guidance should be directed towards (1) the physiological limitations of the crew, (2) special considerations for night operation when night vision goggles are used, (3) emergency procedures, and (4) administrative flight procedures such as wearing goggles during blackout conditions until the aircraft is parked.

■ Redesign the night vision goggles to reduce pilot fatigue. Design changes should center on weight reduction and a mount which more equally distributes the weight of the goggles.

Materiel failure/malfunction mishap analysis

77-4
Type aircraft: U-21A
Classification: Incident
Injuries: None
Estimated cost: $2,617 (aircraft)
Mission: Night training

The mishap

After receiving and troubleshooting an unsafe gear position indication, crew decided to land when they were unable to remedy the problem. On touchdown, right landing gear slowly collapsed and both engines were feathered and secured. Aircraft slid off runway to sod area, coming to rest with right landing gear fully retracted.

The cause

■ Landing gear actuator assembly, P/N 50-810164-16, had stripped and worn threads in the nut assembly, preventing the gear from fully extending. The actuator nut assembly was reassembled improperly during the last overhaul. The assembly has double lead threads. If the nut assembly is started in the wrong thread, excessive wear and stripping of threads result. This type of damage was evident in this actuator.

The cure

■ Improve supervision over maintenance overhaul activities to insure that the caution concerning the possibility of cross threading in TM 55-1510-209-23/1, page 3-51, is observed and heeded. This should be done by spot checks.

Photo 1

Photo 2

Photo 3

When gear was extended for landing a thud was heard in the right wing. The right main landing gear actuator screwjack threads stripped in an unlocked position on right main gear. No defects or damage could be detected on the exterior of the actuator (photo 1). Teardown of the actuator revealed that the actuator nut assembly threads were worn and stripped (photo 2). Six of the stripped threads were found in the worm gear (photo 3).

Selected mishap briefs

Rotary wing

UH-1

Forced landing □ Rpm bled off during formation flight. Pilot entered autorotative glide and then made power-on landing. Cause undetermined at this time.

Ground mishap □ Pilot was performing 7-day runup. At completion of runup, aircraft was run down to flight idle. After making communications check, pilot looked up and saw that rotor was slowly turning. Dual tachometer showed N2 needle was up and rotor was way down. As engine started to run down, aircraft suddenly yawed 20° to the right. Suspect sprag clutch malfunction.

Precautionary landings □ At 200 feet agl on final approach, copilot noticed vapor and liquid spewing from battery vent. Failure of two battery cells caused overvoltage charging condition in remaining cells. □ Failure of valve caused transmission oil overpressure at internal filter which resulted in failure of transmission oil filter gasket. □ Right fuel boost pump caution light came on. Boost pump failed internally. □ Pilot smelled hydraulic fluid during landing. Caused by failure of hydraulic line on No. 1 system. □ Internal failure of 90° gearbox caused illumination of master caution and tail rotor chip detector lights.

AH-1

Precautionary landings □ Oil was found on underside of aircraft after landing. Elbow tube to boss failed. □ During approach to out-of-ground-effect hover, thump was heard from vicinity of tail rotor. Aircraft yawed and shuddered. Yaw SCAS channel was out of adjustment. □ Smoke and fumes filled cockpit during hover. Caused by seizure of cockpit lower bearing fan.

CH-47

Precautionary landings □ Copilot made power change and No. 2 engine gave indication of high side beep failure. Pilot disabled normal engine trim and tried to gain control of engine. No. 2 engine chip detector light came on, N1 decayed, and PTIT increased. Pilot took control and copilot pulled No. 2 engine to stop. Running landing was made. Caused by failure of engine transmission. □ No. 1 tunnel cover was not properly secured by flight crew. Personnel on ground saw cover was open and notified crew. □ Transmission temperature gauge fluctuated from 30° to 110°. Faulty wire caused failure of temperature selector switch.

OH-58

Accidents □ Aircraft landed in blowing snow and slid to right. Pilot applied left cyclic to stop slide and skids separated. Aircraft came to rest on belly and tipped over. Main rotor blades struck ground and separated. Pilot and copilot sustained minor injuries. □ Engine chip detector light came on during gunnery training observation flight. Pilot attempted to land in burned-out area and ashes obscured visibility. Aircraft landed hard. Landing gear was damaged and 90° gearbox separated from aircraft. □ Transmission chip detector light came on during engine topping check. Power was reduced to cruise. Aircraft yawed right and severe cyclic feedback was encountered. Pilot

entered autorotation and aircraft struck wires on approach to open field. Aircraft was landed upright. Main rotor blades, transmission, and pylon were damaged.

Precautionary landings □ Popping sound was heard, torque gauge jumped to 75 psi, and TOT climbed to 950° C. Power was reduced and landing was made. Bleed air elbow assembly came loose in flight. □ Binding was felt in cyclic when collective was moved upward. Caused by defective magnetic brake. Weapons engagement scoring system wire bundle clamp worked loose and was being caught under cyclic control yoke. When collective was raised it forced yoke down on wire bundle, causing limited cyclic movement to the rear. Wire bundle was also rubbing and wearing fore/aft horizontal antitorque push-pull tube.

TH-55

Precautionary landings □ Malfunction of magnetic chip detector caused warning light to illuminate. □ Engine oil pressure exceeded upper limit. Caused by failure of oil pressure sending unit.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

T-42

Precautionary landings □ Crew smelled fuel fumes in flight and both alternators went off line. Crew was able to bring No. 1 alternator back on, followed by indication of full charge on loadmeter and odor of electrical fumes. Caused by failure of heater ignitor assembly. □ Fuel pressure dropped during climbout as power was reduced and engine ran rough. Engine was shut down before descent for landing. Caused by fuel leak at fuel metering fitting.

U-8

Incident □ Nose gear would not fully retract after takeoff and wheels-up landing was made according to published emergency procedures.

U-21

Accident □ After takeoff on transition training flight, SIP gave pilot simulated single-engine emergency. Pilot decided to return to runway and landed before gear was extended. Props, engine mounts, and fuselage skin were damaged.

Incident □ About 15 minutes after takeoff, large flash was seen near left engine and loud booming noise was heard. Three-inch piece of metal was missing from prop blade. Caused by lightning strike.

OV-1

Precautionary landings □ (C series) Gear would not retract after takeoff and emergency gear extension procedures were used. Suspect failure of hydraulic dump valve for gear actuator. □ Pilot was unable to restart No. 1 engine during test flight. Fuel control was replaced.

For more information on fixed wing mishaps, call AUTOVON 558-3913/3901.

Maintenance

UH-1

Precautionary landings □ Engine rpm

Selected mishap briefs

decreased to 6400 with power application during departure from pinnacle. Power was reduced and rpm increased to 6750. Autorotation was entered and governor placed in emergency position. Power recovery was initiated and aircraft was flown to base. Caused by failure of straight-headed pin due to improper rigging of collective control tube to governor control. □ Master caution and hydraulic segment lights came on, with complete loss of hydraulic pressure to control system. Hydraulics-off landing was made. Metal tube assembly failed due to work hardening. Crew chief did not know inspection requirements for clamp application on hydraulic lines to prevent work hardening.

U-8

Precautionary landing □ (D series) When landing gear switch was selected up, down-lock lights did not go out. Cockpit began to fill with black smoke, both ammeters indicated maximum load, and aircraft was landed. Gear motor circuit breaker did not open circuit. It was dirty, rusty, corroded, and missing a boot seal. Gear motor relay was apparently installed upside down. Access panel under right front passenger seat was installed in a direction that reduced clearance between panel and relay posts. Neither part has a prescribed direction of installation. Inspection panel was concave and bent from normal loads and wear. This condition further reduced clearance. A combination of the above factors apparently caused short of gear motor circuit.

OV-1

Incident □ No. 1 engine start was normal. About 15 seconds after No. 2 engine was started, inverter normal circuit breaker popped and No. 1 inverter and instrument power caution lights started flickering. Normal circuit breaker was reset and emergency circuit breaker popped. No. 2 and No. 3 inverter caution lights came on. Investigation revealed burned remote circuit breaker panel and a.c.-d.c. junction panel assembly. Piece of .032 safety wire about 4 inches long was inside a.c.-d.c. junction box. Safety wire showed signs of having contacted electrical connections, causing short circuit.

For more information on maintenance mishaps, call AUTOVON 558-3913/3901.

TSARCOM messages

□ 201525Z Oct 77, subject: Use of Chadwick-Helmuth Vibrex Equipment on UH-1 Series Helicopter Tail Rotor Systems (UH-1-77-19).

□ 211310Z Oct 77, subject: Maintenance Advisory Message Concerning the Return of Unserviceable T53-L-13B, 15 and 701A Engines (UH-1-77-20), (AH-1-77-24) and (OV-1-77-7).

Aviation-related

UH-1

□ Crew chief sustained back injury while lifting rotor head. No chain hoist was available.

AH-1

□ As aircraft was being ground handled from parking ramp to hangar, left ground handling wheel broke loose from left skid,

damaging skid and left inboard rocket pod. Wheel lugs were too loose to properly secure ground handling wheel to skid.
□ Individual towing aircraft from hangar applied brakes to stop tug, but his foot slipped off the brakes and onto accelerator. Tug lunged forward and tail stinger hit ramp. Main rotor blade flexed down and struck tail rotor drive shaft.

CH-47

□ Tug operator, towing aircraft onto flight line, decided to take a shortcut and towed aircraft off taxiway onto soft dirt area. Left landing gear sunk into soft soil and pivoted 90° as tug continued to tow aircraft, causing gear to collapse.

OH-58

□ Aircraft rolled off jacks and main rotor blade fell on mechanic's ankle.

For more information on aviation-related mishaps, call AUTOVON 558-3913/3901.

Oops!

The aviation safety award article in Vol. 6, No. 1, 5 October 1977, stated that nominations for awards must contain the unit identification code, the calendar period covered, and the hours flown during this period. This is not the case. Nominations need not contain the hours flown. Sorry about the goof! ■

Backplate for AN/PRC-90 survival radios

New AN/PRC-90 survival radios have a pressure-release membrane in the backplate which corrects an altitude-induced voice modulation problem. The new backplate is identified by a small vent hole in the upper left corner of the instruction plate. AN/PRC-90 radios procured under contracts F41688-72C-7887, Oklahoma Electronics, and F41608-74C-0720, MICROPAK, do not have this type backplate. Units should determine the number of radios that do not have the new backplate and notify the nearest ECOM field representative who will see that the new backplates are shipped to the units. When the backplates are received, the radios can be modified in the field at organizational level. If there are any problems with modification, write Commodity Manager, ECOM, Fort Monmouth, NJ 07703, or call AUTOVON 995-2661. ■

TOTAL MISHAPS FOR 14-20 OCT 1977

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	0	1	15	16
AH-1	0	0	0	5	5
OH-58	3	0	0	4	7
TH-55	0	0	0	2	2
CH-47	0	0	0	4	4
T-42	0	0	0	2	2
U-8	0	1	0	1	2
U-21	1	1	0	1	3
OV-1	0	1	0	3	4
C-54	0	0	0	1	1
Total	4	3	1	38	46

0 Fatalities, 2 Injuries
Estimated costs: $179,835

The common cold . . . no minor problem

(Continued from front page)
atmospheric pressure, rather than change in altitude, is the important factor. A pressure differential of only 60 to 80mm Mercury across the eardrum causes severe pain; 100-500mm will cause rupture of the eardrum. The increase in pressure experienced by these pilots in descending from 4,000 to 700 feet msl was about 80mm Mercury, more than enough to cause severe incapacitating pain. A rapid descent from 10,000 feet msl to sea level with a blocked eustachian tube produces enough middle ear pressure to cause temporary deafness, ringing in the ears, pain, and vertigo-conditions which have been known to cause fatal aircraft accidents.

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 and requires follow-up by him with an examination to insure ears and sinuses are clear before returning to flying duties. 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.

In truth, colds are with us, no matter what. 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. ■

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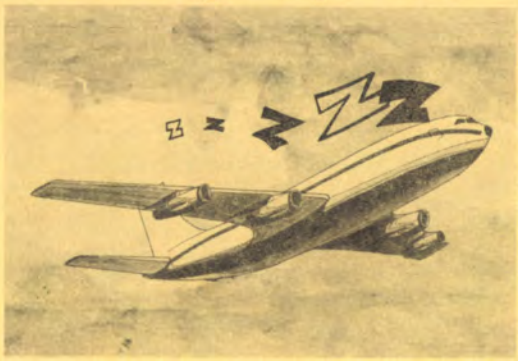
Sinking spells



Picture this one. A 707 freighter, passing Las Vegas at the end of an all-night JFK-LAX nonstop, continues westbound at FL390, ignoring the repeated descent clearances issued by LAX center. After considerable effort and anxiety, radio contact is established through Arinc when the aircraft is nearly 100 miles west of LAX. Fortunately, the SELCAL (Arinc selective callup) chimes are loud enough to awaken at least one of the three sleeping crewmembers, and there is enough fuel for a safe return to LAX. In another instance, a DC-6 crew spent half an hour circling Atlanta when they all fell asleep with the autopilot on and the turn knob out of the detent. Cockpit slumber parties are one of the more dramatic effects of severe fatigue. Some will say that such conduct is inexcusable. I wonder if that oversimplification serves to mask some very real physiological problems. Several things can contribute to those awful sinking spells, but some of these factors can be controlled.

Lack of sleep is the most obvious cause of pilot fatigue but sleep is a complex subject that scientists are only beginning to understand. Basically there are two significantly different types of sleep of interest to the aviator. Deep sleep predominates during the first half of a normal night's slumber and is characterized by very low electrical (EEG) activity in the brain. Rapid eye movement (REM) sleep begins after that initial three or four hours and is a totally different kind of sleep. During REM sleep, EEG activity is similar to that found in the waking state, plus there are rapid eye movements and evidence of dreaming.

Considerable research has established a clear need for both types of sleep. During several days of irregular working conditions, you may be able to satisfy deep sleep requirements and even maintain good efficiency while awake by napping for short periods. At the end of that time, your REM account will be overdrawn and that balance will need to be restored with at least one very long sleep. If, however, you miss an entire night's rest, you may be able to recover good vitality with a normal night's sleep plus one hour for the REM deficiency and an afternoon nap to balance the deep sleep account. I have found that 10 to 15 minutes of calisthenics after a short night's sleep is an excellent temporary substitute for lack of rest.

Another factor to consider is hypo- ►

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USAAAVS

Sinking spells

glycemia or low blood sugar, which can cause malaise, fatigue, disorientation, and even lapse of consciousness. It is controllable with some very simple dietary tricks, but it helps to understand the mechanisms involved.

When you awake in the morning, your blood glucose level will be low from the overnight fast. If you start with coffee and sweet rolls, or any other highly refined carbohydrates, you may induce reactive hypoglycemia.

It works like this. Your system converts refined sugars and starches into glucose so rapidly that your blood sugar level rises at an abnormal rate. When the homeostatic system that balances glucose levels senses the sharp rate and rise, it signals the pancreas to release insulin proportionately. In this case, the rate is abrupt and can only be sustained over the very brief time it takes for your body to convert the refined carbohydrates to glucose. The end result is that too much insulin is triggered to the bloodstream so that your glucose volume is soon driven well below the original, fasting level.

Proteins from a more normal breakfast are processed by the body at a much more steady rate so that appropriate quantities of insulin are metered out to stabilize glucose levels at the optimum point. Protein reduction and conversion continues for several hours and eliminates the peaks and rebounds induced by pure carbohydrate intake. Four dietary practices will prevent reactive hypoglycemia:

- Avoid refined carbohydrates (sugar and all refined starches).
- Eat protein-rich meals every four hours, especially when on flight duty.
- Use fruit or protein snacks for pick-me-ups at odd duty times.
- Substitute low-fat milk or fruit juice for coffee and soft drinks.

And speaking of coffee, I used to fly with a guy who drank gallons of coffee and never could stay awake. Turned out that he suffered from caffeine toxicity, a not uncommon problem that can cause poor sleeping, nervousness, headaches, and lethargy.

Coffee, tea, and cola, in moderate amounts, promote quick energy and clear thinking through the stimulant effect of caffeine. Above a certain level, caffeine ceases to be beneficial and becomes a hindrance to normal functioning. One cup of coffee or tea contains about 100 mg of caffeine. Twelve ounces of cola contain about 50 mg. Some doctors feel that 500 mg per day is enough, 750 mg is questionable, and 1,000 mg addictive.

Check your caffeine intake and be sure to include all the possible sources. Coffee, tea, and cola are obvious contributors, but caffeine is also present in chocolate and in many of the nonprescription headache and cold medicines, and over-the-counter stimulants.

Now about those cigarettes. One smoke raises the carbon monoxide in the blood to a level that equates to a state of hypoxia at 7,000 feet. Two cigarettes smoked consecutively raise the level to 10,000 feet, and these levels are further aggravated by actual cabin altitude. Smoking is unquestionably a contributor to fatigue.

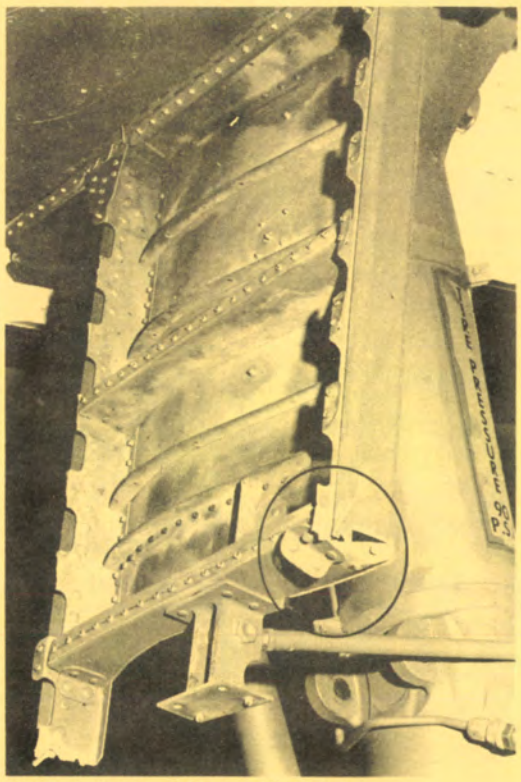
When you do get drowsy in flight, try a few exercises, eat some nuts, and try to recall the thrilling contents of this column. If that doesn't keep you awake, nothing will. **—Adapted from *Crossfeed***

Materiel failure/malfunction mishap analysis

77-5
Type aircraft: OV-1C
Classification: Incident
Injuries: None
Estimated cost: $3,500 (aircraft)
Mission: Maintenance test flight

The mishap

During 300-knot dive from 16,000 feet, left main upper landing gear door, P/N 134W10015-403, broke away from aircraft, struck fuselage, sheared ADF antenna, and bent fuel vent. Aircraft was landed with no further damage.



Circle indicates fatigue critical point.

The cause

■ Fatigue failure occurred at the drag brace attaching point. During high speed dives, airflow around the door causes vibration and eventual fatigue failure.

The cures

■ Require more frequent and detailed inspection during PMD of this area of the gear door to preclude fatigue from progressing to failure.

■ Require replacement of this series of gear doors with the improved 300 series gear door through normal attrition. The improved door has been strengthened in the area of the drag brace attaching point, preventing fatigue failures.

TOTAL MISHAPS FOR 21-27 OCT 1977

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	2	1	17	20
AH-1	0	1	0	2	3
OH-58	1	3	1	3	8
CH-47	0	0	0	3	3
U-21	0	0	0	1	1
C-12	0	1	0	0	1
T-42	0	0	0	2	2
OV-1	0	0	0	1	1
Total	1	7	2	29	39

0 Fatalities, 0 Injuries
Estimated costs: $46,889

Accident analysis

ANALYSIS 77-7
Type aircraft: U-8G
Time: 1055
Classification: Minor
Injuries: None
Estimated cost: $6,661 (aircraft)
Mission: Training (standardization)

	Grade	Age	FW Hrs	Tot Flt Hrs
SIP	CW4	55	7,108	13,089
IP	DAC	28	1,923	3,701

The accident

During initial climb SIP leveled aircraft at 2,500 feet. At this time, the No. 2 engine sputtered and started to quit. SIP switched the fuel selector for the No. 2 engine to what he believed to be the auxiliary tank and concurrently activated the fuel boost pump. Engine fuel pressure came back up, engine began running normally, and climb was continued to 4,000 feet. At this point, the No. 1 engine started to sputter. SIP switched to auxiliary tank and turned on the boost pump, but the engine failed to regain power. No. 2 engine started to sputter again so SIP switched fuel selectors between auxiliary and main and switched boost pumps but failed to get a restart. With both engines out, SIP was unable to reach an available airport, so he landed gear up in a plowed field.

The causes

■ Both engines failed from fuel starvation due to inadequate flight planning by SIP. He knew the main tanks were less than full but decided not to refill them.

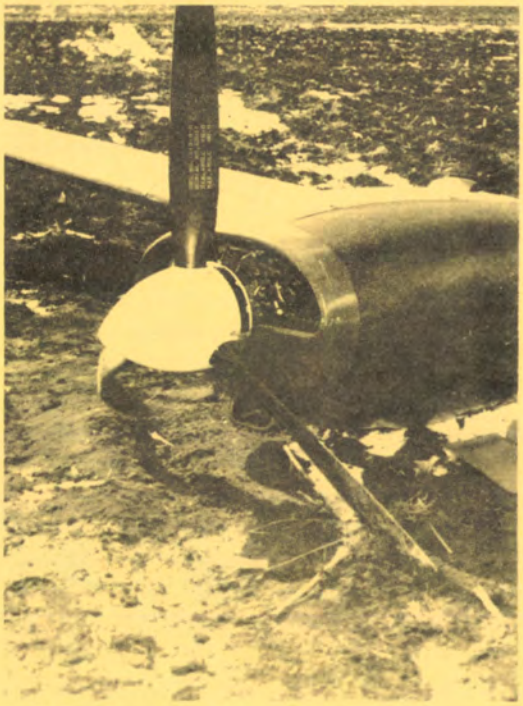
Knowing that fuel gauges are inherently unreliable, having visually estimated the main tanks as being about one-half full, and knowing his auxiliary tanks were full influenced the SIP's decision not to fill the main tanks.

■ SIP did not properly coordinate fuel tank selection with boost pump selection. The fuel system control panel is located on the left side of the cabin below the pilot's storm window, so to look directly at it, the pilot must lean forward and turn his head to the left. Fuel selector switch positions for the right and left engines have reversed positions for auxiliary and crossfeed. (Auxiliary tank is 90° position for the right engine and 270° position for the left engine. Crossfeed is 270° position for right engine and 90° position for the left engine.) Both boost pump switches have like positions, i.e., Off, Main, Auxiliary, from left to right. However, to confirm fuel pressure, the pilot must look to the top center of the instrument panel to two engine gauge instruments that portray oil temperature and pressure in addition to fuel pressure for each engine. The SIP switched the fuel selectors and boost pumps back and forth without confirming that fuel and boost pump selections were for the same tank or giving the switch positioning sufficient time to work properly before switching again.

The cures

■ Inform personnel of hazards resulting from inadequate mission planning and emphasize the need for proper flight planning.

■ Consider modification of existing equipment in the U-8 series aircraft so that fuel boost pump and fuel selector switch positions are compatible for each engine. (Rewire and relabel the fuel boost switch for the right engine so it will be positioned from main, at the 0°/360° position, right to the auxiliary position compatible with the fuel tank selector handle position for main and auxiliary for the right engine.) Also, consider relocating the fuel system control panel from its present position to a position in the approximate center of the instrument panel for better manipulation and observation of fuel system controls and ease of cross reference of the fuel pressure gauges and boost pump switch position.



Selected mishap briefs

Rotary wing

UH-1

Incident □ Trail aircraft in formation of four on troop insertion mission struck wires as formation was leaving higher altitudes to go tactical low level before landing at LZ. Right skid and cross tube were damaged. Air mission commander's (AMC) briefing did not include the fact that powerlines would be in the flight path. Wires were marked on the map used to brief all pilots. AMC decided to go low level just before crossing powerlines.

Forced landing □ IP, wanting to demonstrate maximum glide autorotation, leveled aircraft at 6,000 feet msl, entered autorotation, checked N_1 and rotor rpm, then retarded throttle to flight idle. N_1 stabilized at 72% with rpm in the green. IP then attempted to reduce rotor to 294 rpm and N_1 and N_2 decayed. Throttle was secured, emergency declared, and aircraft landed. Caused by internal failure of engine.

Precautionary landings □ Failure of toggle switch caused master caution light illumination. □ Smoke was seen coming from battery vent during touchdown. Caused by overheated battery. □ Crew noticed odor of hot electrical component and landed in field. MOC revealed no discrepancies. Pilot had left searchlight on while it was stowed, possibly causing it to overheat. □ After aircraft was landed, ground personnel asked pilot if aircraft was leaking fluid. Pilot found transmission fluid in hell hole. No oil was visible on sight gauge of transmission. Caused by failure of tube assembly. □ Master caution and No. 1 hydraulic pressure lights came on during hover, followed by loss of hydraulic pressure to antitorque pedals. Caused by failure of hydraulic hose assembly. □ Loud noise was heard, pilot got cyclic feedback, and master caution and segment lights came on. Caused by failure of locally manufactured tube.

AH-1

Incident □ IP demonstrated night touchdown autorotative landing. Landing appeared normal with some ground run. Aircraft was parked in grassy area and postflight was made. Subsequently, when aircraft was ground handled into hangar for sheetmetal work, bent fore and aft crosstubes were discovered.

Precautionary landing □ Series of shudders occurred and popping noises were heard during takeoff, followed by slight loss of power. Nos. 3, 4, and 5 axial compressor blades were excessively worn.

CH-47

Precautionary landing □ Crew chief noticed fuel coming from left aft fuel tank vent. Fuel system checks failed to correct malfunction. MOC revealed vent would pump fuel overboard only when tanks were

filled above 3,000 pounds. Suspect defective vent assembly.

OH-58

Accident □ Seatbelt left hanging out of aircraft after passenger dropoff caused damage to fuselage in fuel cell area.

Incidents □ Pilot was repositioning aircraft for refueling and landed on grounding stake. Stake punctured lower fairing assembly and floor of aircraft. □ Aircraft landed on bush, punching small hole in bottom of aircraft. □ Damage to main rotor blades was found on postflight inspection. Suspect yucca plant strike.

Precautionary landing □ Malfunction of thermostatic switch caused transmission oil hot light illumination.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

C-12

Incident □ (A series) Right brakes locked during landing rollout, resulting in two blown tires and damage to one rim and brake assembly.

T-42

Precautionary landing □ Internal failure of battery caused charge light to come on.

OV-1

Precautionary landing □ (D series) No. 2 fire warning light came on during takeoff. Caused by failure of O-ring in bleed air line.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landings □ Compressor stall occurred during power recovery from practice forced landing. Bleed band was out of adjustment. □ Rpm bled to 6200 as collective pitch was added. Varying collective pitch caused rpm fluctuation. Contaminants entered actuator cylinder during engine cleaning operations, causing erratic bleed band operations. □ Pilot had difficulty moving tail rotor pedals in cruise flight. Travel was limited to one-third of normal travel when applying right pedal and about two-thirds of normal travel when applying left pedal. Pilot was unable to override binding condition. Running landing was made. Duplex ball bearing failed inside race. Suspect bearing was not properly lubricated.

AH-1

Precautionary landing □ Master caution

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Selected mishap briefs

and No. 2 hydraulic pressure warning lights came on during hover firing. Pilot accelerated as he heard pump cavitate, and made running landing. Chute guard was apparently removed during maintenance at GS facility. Chute hit and broke hydraulic tube assembly.

CH-47

Precautionary landings □ No. 1 and No. 2 generators came off line during landing. Upper and lower hinge pins of aft support bracket of No. 5 tunnel cover were loose, allowing support bracket to bow inward and chafe against main generator wire bundle. This caused short in wire bundle. □ Crew chief noticed oil leaking from top of aft transmission during takeoff. Caused by loose oil line fitting to aft vertical shaft thrust bearing.

OH-58

Precautionary landing □ Loose wire on tail rotor chip detector plug caused chip detector light illumination.

U-21

Precautionary landing □ Fuel was siphoning from right nozzle on climbout. Cap seal ring was loose.

T-42

Precautionary landing □ No. 2 engine alternator and main inverter failed, and battery charge light came on during climb. "F" terminal connecting wire lug was improperly soldered, resulting in wire separation at terminal end.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

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ARMY AIRCRAFT MISHAP PREVENTION DATA
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VOL. 6, NO. 7 □ 16 NOV 1977

October lessons learned

As the first month of the new fiscal year drew to a close, seven aircraft accidents had been recorded. Four of these mishaps were major accidents and three were minor.

These accidents did not result from new cause factors nor from new problems associated with any particular area of aviation. Instead, they resulted from "old" causes found in a variety of areas.

Could these have happened in your unit?

■ A U-21 accident occurred during takeoff on a training flight after single-engine procedures were initiated. The student pilot lowered the nose of the aircraft and touched it down on the runway before the gear could be cycled down.

■ A UH-1 was making a night landing at a minimally lighted zone. When the pilot switched on his landing lights, he was unable to see because of glare caused by ground fog. The aircraft was landed hard.

■ The pilot of an OH-58 kept hearing a thumping noise during flight but could not locate its source. The source turned out to be a seatbelt pounding the side of the aircraft.

■ An OH-58 was being landed in blowing snow. On touchdown, the aircraft began sliding to the right, and the pilot applied left cyclic. The skids separated and the OH-58 tipped to the right, causing the main rotor to separate.

■ The engine chip detector light on an OH-58 came on and the pilot elected to make a precautionary landing in what appeared to be an appropriate clear area that had been recently burned out. However, ashes, dust, etc., stirred up by the rotor-wash caused the pilot to lose visual reference and resulted in a hard landing.

■ While on a test flight in an OH-58, the pilot saw the transmission chip detector light come on as he performed an engine topping check, and he reduced power to cruise. The aircraft then yawed right and the pilot felt severe cyclic feedback. He immediately entered autorotation. During the approach to an open field, the aircraft struck powerlines but landed upright.

If we are to prevent accidents from similar causes, everyone associated with Army aviation—pilots, mechanics, commanders—must apply lessons learned from past experience in every area of operation.

How many of these mishaps could you have prevented?

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USAAAVS

Selected mishap briefs

Rotary wing

UH-1

Incidents □ Right chin bubble was broken when aircraft struck bird. □ Aircraft was delivering equipment and troops to field location. Landing area was dirt road with scrub hardwood trees on both sides of road. As helicopter was just above the ground, underside of main rotor blade struck small bushes, creasing blade. High and low recon was performed and ground guide was used.

Precautionary landings □ Aircraft was being flown at 150-200 feet agl and 60 knots during training flight. Suspect overtorque occurred when pilot applied abrupt control movement of collective to avoid powerlines. Lines were not marked nor were they posted on any maps. □ Engine chip detector light came on. Caused by internal failure of engine. □ Right fuel boost pump caution light came on during hover. Caused by failure of boost pump. □ Crew smelled odor of fuel in cockpit and cabin. Aircraft was landed and checked for fuel leaks. None were found and odor dissipated. Some fuel had apparently been trapped in the fuselage from overfilling the tank after the preceding flight and the odor had gotten into the cabin area. □ Transmission oil pressure dropped to zero momentarily and then returned to 50 psi. Cannon plug was removed and one pin was found bent.

AH-1

Forced landing □ Three sharp bangs were heard from engine during NOE flight. Compressor continued to stall until aircraft was on the ground and all power was reduced. Engine and 42° gearbox replaced.

Precautionary landing □ Engine oil pressure light came on. Caused by failure of oil pressure switch.

CH-47

Precautionary landings □ Weather deteriorated from the reported forecast of 1,500 feet broken and 4 miles visibility in light rain to 200 feet overcast, less than 1 mile visibility, and heavy rain. Aircraft was landed to avoid inadvertent IMC flight because nearest approach facility was radar only. □ No. 1 engine high side beep failure occurred in flight. Caused by failure of electromechanical actuator. □ Loud bang was heard during climbout, followed by vibrations. After shutdown, crew inspected aircraft and found parts of No. 1 and No. 2 stage compressor missing on No. 2 engine.

Cargo handling mishap □ Aircraft was externally carrying three 500-gallon JP4 drums. Cargo hook inadvertently jettisoned drums onto road. Drums were destroyed.

OH-6

Precautionary landing □ Engine oil cooler bypass light came on, followed by increase in oil temperature and decrease in oil pressure. Suspect internal leakage in oil scavenger pump housing.

OH-58

Forced landing □ Low rpm audio activated. Rpm was regained by lowering collective. Throttle was checked and effort made to increase beep without success. Aircraft was over water and available power was

used to extend flight to reach land. Post-flight inspection revealed linear actuator required 23 seconds for full travel.

Precautionary landings □ Malfunction of hydraulic pressure switch caused caution light illumination. □ Pilot initiated straight-in autorotation to north end of runway behind CH-47 which had just landed on south end of runway. At approximately 45 feet agl, pilot encountered wake turbulence created by CH-47. Power recovery was made and pilot, suspecting possible over-torque, landed. Maintenance found no damage. Oil samples will be taken every 2 hours for the next 10 hours as an added precaution.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

TSARCOM message

□ Maintenance Advisory Message on UH-1 B/D/H Helicopters Regarding Swashplate Trunnion Bearing KSP9001-1 or -3 or -5 (UH-1-77-21).

Fixed wing

C-54

Precautionary landing □ No. 2 engine back-fired three times after takeoff. Caused by failure of No. 10 cylinder intake valve seat.

T-42

Precautionary landing □ Unsafe gear indication was noted when gear was lowered and warning horn sounded intermittently when throttles were retarded. Retaining link on nose gear indicator had slipped off due to clip coming off.

U-8

Precautionary landings □ (F series) Fuel was seen streaming from right wing during taxi. Fuel check valve had not seated properly. □ Pilot received unsafe indication for right main gear when he tried to lower gear for landing. Pilot manually lowered gear and received safe indication. Caused by failure of sensitive switch.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Precautionary landing □ After termination of approach, copilot noticed fumes and electrolyte coming from upper battery vent. Battery return vent line was clogged.

AH-1

Incident □ Forward battery access panel came off and went through main rotor system during climbout. Windscreen was scratched and main rotor blade dented. Battery cover was not properly secured before flight.

Precautionary landings □ No. 1 hydraulic caution light came on and pilot noticed odor in cockpit and stiffness in pedals. Running landing was made at airfield. Pressure line from No. 1 pump going to No. 1 filter chafed on No. 2 pump seal drain elbow. □ No. 1 hydraulic system warning light came on. Hydraulic line on lateral servo was improperly tightened.

Selected mishap briefs

CH-47

Incident □ Pilot's emergency exit door jettisoned in flight, striking and damaging two forward rotor blades. Suspect tapered pin was not installed in door retaining device during last PM, allowing door to work free.

Precautionary landing □ High frequency vibration occurred at cruise airspeed. Caused by insufficient lubrication of engine drive shaft adapter splines.

OH-58

Forced landing □ Engine flamed out when throttle was rolled to flight idle for autorotation during test flight. Caused by improper rigging of fuel control linkage.

T-42

Precautionary landing □ Broken field wire caused left alternator to fail.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ Aircraft was being pushed backwards off parking pad. Left ground handling wheel went off PSP taxiway and into mudhole. Left wheel stopped in mudhole, aircraft turned to right, and nose pitched up as right wheel continued to turn. Individual guiding aircraft was struck on the right foot by tail skid. Vertical fin struck him in the back as he turned to get away from the aircraft. □ Aircraft was being jacked for ground handling during scheduled aircraft maintenance when forward blade struck hangar structural beams, puncturing blade skin. Investigation revealed that downward pressure on the tail of the aircraft during jacking is sufficient to cause a momentary pitching up of the forward blade, capable of striking hangar structural beams.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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ARMY AIRCRAFT MISHAP PREVENTION DATA

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VOL. 6, NO. 9 □ 30 NOV 1977

Life support equipment

PRC-90 survival radio test equipment

First, the bad news. Reports from the field indicate that requisitions for the Radio Test Set, AN/PRM-32, and the Test Set, Battery, TS-2530/UR, are being cancelled because the items are not on the TOE of the ordering units. After checking with FORSCOM and DARCOM, we found this to be true. However, we never did find out how anyone expected the field units to test their radios and batteries without this equipment. Now, the good news. This problem has been recognized and TRADOC will include all applicable test equipment in appropriate TOEs in consolidated Change 300-64 due in April 1978. Upon receipt of TOE changes, all applicable MTOEs will be changed accordingly. ■

Aircrew survival sleeping bag

Bag, Sleeping, Aircrew Survival, NSN 8465-00-753-3226, has been replaced by NSN 8465-00-479-1792. This information is found on page 6-6 of the Aviation Life Support Equipment Pamphlet, dated Mar 77. ■

(Thanks to CW3 Harold Hintze, Ft. Bliss, TX, for the above information.)

Another fix for leaking survival firestarters

The 31 August 1977 issue of FLIGHTFAX carried plans to fabricate a refill kit by using a Scripto refill and modifying the adapter. Additional information has been received that by using a Zeus butane refill kit with the red adapter provided, no modifications are necessary. This kit is made in England and is stocked in some PX facilities. Be sure to tighten the lighter valve as illustrated in the 31 August issue before refilling. ■

(Thanks to CW3 Tom Wie, 55th Aviation Company, Korea, for this information.)

Nicad battery first aid procedures

The statement concerning "container of 3-percent solution of boric acid" on the inside front cover of TM 11-6140-203-15-1 and item 1d, page 30b, of the 7th Edition of the Guide to Aviation Resources Management for Aircraft Mishap Prevention should be deleted. The first aid procedures in the Guide and TM are not in compliance with current alkali chemical burn treatment procedures, as cited in the Emergency War Surgery NATO Handbook. First aid treatment should consist of immediate flushing with copious amounts of clean water, continuing for approximately 60 minutes, or until medical aid arrives. POC is Mr. J. Frost, ECOM, AUTOVON 992-4452. ■

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USAAAVS

Accident analysis

ANALYSIS 77-9
Type aircraft: UH-1M
Time: 2110
Classification: Major
Injuries: None
Estimated cost: $27,938 (aircraft)
Mission: Night gunnery training

	Grade	Age	RW Hrs	Tot Flt Hrs
IP	CW3	32	2,784	2,784
Pilot	CW2	34	1,677	1,677

The accident

IP and pilot on night aerial gunnery training mission were cleared "hot" across the start fire line. The first run downrange was conducted at about 5,500 to 5,700 feet msl (approximately 700 to 900 feet above start fire line elevation). The IP was then notified over the range radio that the commander wanted him to conduct the next run at a lower altitude. The IP decided that 5,100 feet msl would provide a minimum safe altitude for the run. Immediately after being cleared "hot" across the start fire line the IP began firing the miniguns downrange. He then told the pilot to begin firing the rockets. After the first pair of rockets was fired, the IP told the pilot to make a slight nose-up attitude change to adjust the impact point of the rockets before firing the next pair. After the second firing, the instruments indicated wings level, 5,100 feet altitude, 60 knots IAS, and a descent of about 300-400 feet per minute. Shortly afterwards, the aircraft struck the ground in a relatively level attitude, slid 67 feet, and became airborne again. The IP continued to climb straight ahead until positive terrain clearance was established, flew to an airfield 23 miles away, and landed.

The cause

■ IP selected a firing altitude too low to insure terrain clearance because of inadequate supervision. The range sloped 3 degrees upward from 4,800 feet msl at the start fire line to 5,200 feet msl farther downrange. The IP selected 5,100 feet msl for his firing runs after being told that his first firing pass was too high and that the commander wanted subsequent firing passes to be flown at low-level altitudes. The range, situated in a box canyon, was inadequate for firing the 2.75-inch FFAR during low-level night operations, but the commander insisted that the facility be used for that purpose. The canyon trapped smoke and dust from rocket detonations and mortar illumination rounds. These factors combined with darkness caused reduced visibility with the ground and loss of a visible horizon. The commander had no experience at flying aerial gunnery on this range during day or night operations, and had limited experience with aerial gunnery and low-level flying operations.

The cures

■ Insure range SOPs establish guidelines for range operation, personnel responsibilities, firing policies and altitudes, and safety procedures in accordance with par. 3-1 (C7), AR 95-5.

■ Higher commands improve monitoring of subordinate personnel and unit activities to insure that supervisory range personnel are familiar with and have practical experience in aerial gunnery. This measure could be implemented by periodic on-site inspections of firing units.

Materiel failure/malfunction mishap analysis

77-7
Type aircraft: UH-1H
Classification: Major (total)
Injuries: 3 (minimal)
Estimated cost: $618,055 (aircraft)
Mission: Tactical training

The mishap

Aircraft was hovered to a FARE system for refueling. About 100 pounds of fuel was taken on, but fueling was discontinued after a nozzle malfunction caused fuel to leak out of the handle and spray on the aircraft. The aircraft was repositioned to another point and refueling continued. About 200 pounds of fuel was taken on before the drum went dry. Refueling was resumed from a full drum at the same point. The contents of the drum and the sight gauge in the filter separator were not visually checked. Approximately 500 pounds of "fuel" was pumped into the aircraft. Two minutes after the aircraft left the refueling site, the low rpm warning system activated and the engine flamed out. The IP stretched the autorotational glide angle to a small clearing but, due to low rotor rpm, the aircraft landed extremely hard. Resultant damage to the engine and main transmission mounting structure made the aircraft uneconomical to repair.

The cause

■ Engine flameout was caused by water contamination of the fuel system. This contamination resulted from a drum of water that was placed in active use at a forward area refueling point. The error was not detected because the commander failed to outline adequate SOP controls to insure his units were operating in accordance with paragraph 2-10, FM 10-68, which requires all fuel to be sampled before it is delivered to FARE points.

The cures

■ Insure unit SOPs clearly state who is responsible for applying the guidelines set forth in FM 10-68, for (1) controlling access to the refueling area, (2) designation of separate areas for empty backhauled drums and drums containing tested, verified products ready for delivery to forward areas, and (3) delineation of requirements for inspecting, testing, certifying, and marking drums prior to delivering them to FARE points.

■ Improve supervision of subordinate units to insure compliance with provisions of the SOP and FM 10-68 pertaining to the handling of aviation fuels. This could be done by spot checks.

Selected mishap briefs

Rotary wing

UH-1

Accident □ Aircraft was at approximately 1,000 feet agl making approach to DZ with five parachutists. One passenger's reserve chute opened, streamed out of aircraft, and wrapped around synchronized elevator. Aircraft yawed right and rolled severely. Pilot entered autorotation and on touchdown chute billowed into main rotor system. Tail section was cut off by main rotor blade, skids spread, and push-pull tubes were broken. Crew chief sustained slight shoulder injury.

Precautionary landings □ Master caution and tail rotor chip detector lights came on. Caused by metal chips on 90° gearbox magnetic plug. □ Strange noise was heard during flight and pilots felt airframe vibration during hover. Caused by failure of oil cooler bearing. □ Twenty-minute fuel caution light came on, followed by illumination of left fuel boost pump caution light. Fuel quantity gauge indicated 280 pounds. Aircraft was landed and refueled with 161 gallons, indicating that 48 gallons remained at the time of the precautionary landing. Left fuel boost pump was checked by maintenance personnel and found to be operating normally. □ Short in electrical system caused illumination of fire light. □ Crew smelled smoke in cockpit. Battery relay was replaced. □ Loud noise was heard at 90 knots IAS and 1,000 feet agl in gusty wind with light turbulence. Two adjoining sides of pilots' greenhouse window separated from frame, causing 1-inch gap. □ Aircraft yawed right during shutdown. Inspection revealed No. 2 tail rotor drive shaft was broken. Suspect sprag clutch failure.

AH-1

Forced landings □ Engine failed during hover power check for stabilization of N_2 following replacement of fuel control. □ Compressor stall occurred during hover. Suspect failure of engine compressor. Engine will be submitted for teardown and analysis.

Precautionary landings □ Engine rpm surged between 5300 and 7000 during firing run. Caused by fuel control malfunction. □ IP was flying aircraft from gunner's station while pilot was navigating. IP glanced down to check map on his knee and rotor blade struck outer tree branches. Damage to rotor blade was within prescribed tolerance.

CH-47

Incident □ Copilot's jettisonable door came off during cruise flight. Cause unknown.

OH-6

Accident □ Aircraft began to settle during hover, spun right, and crashed. Damage included severed skids, severe compression

and torsion buckles on fuselage structure, and crushed right side of fuselage. Pilot, crew chief, and passenger were injured.

OH-58

Forced landing □ Aircraft shuddered and yawed right. Engine and rotor rpm decayed to low green. Pilot entered autorotation, rpm continued to decay, and aircraft shuddered again. Caused by failure of compressor.

Precautionary landings □ Tail rotor chip detector light came on. Metal chips were found on plug. □ IP was demonstrating pylon isolation mount check during maintenance test pilot training course when master caution and hydraulic pressure segment lights came on. Running landing was made. Caused by failure of hydraulic pump. □ Rpm warning system and engine-out audio/light activated. Caused by faulty warning system. □ Generator failed during cruise flight. □ Master caution and 20-minute fuel segment lights came on during approach. Aircraft had flown 2.4 hours. Fuel tank was not completely full before takeoff. Aircraft had been ground run a couple of times for operational checks and was not refueled. Pilot was aware of this. Eight-day clock was not installed in aircraft.

TH-55

Accident □ Student, checking throttle override during engine runup procedure, made proper throttle reduction, but followed with immediate and abrupt up collective pitch application. Helicopter pitched nose high as it became airborne and rolled to the left. Main rotor blades struck parking ramp and aircraft came to rest on left side.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

U-21

Incident □ Flock of seagulls flew in front of aircraft during takeoff roll at 85 knots. Right wing tip and left prop spinner were dented.

T-42

Accident □ Gear failed to fully retract after takeoff. Manual crank would not lower gear to locked position. Aircraft was flown approximately 4 hours to lessen fuel load and landed gear up on foamed runway. Minor damage to bottom of aircraft, landing gear, and landing doors. Suspect landing gear actuator failure.

U-8

Precautionary landings □ (F series) No. 2 engine quit during final approach. Caused by poor fuel management. □ (G series) Pilot saw fuel siphoning from right auxiliary fuel tank cap during climbout. Siphoning stopped when aircraft was leveled out. Postlanding inspection revealed fuel cap seal would not seat properly.

OV-1

Precautionary landing □ (C series) During climbout, No. 2 hydraulic pressure indicator decreased to zero, followed by No. 1 hydraulic pressure indicator. Emergency gear extension system was used and aircraft landed. No. 2 engine hydraulic pump drive shaft garlock seal failed and hydraulic

Selected mishap briefs

fluid was pumped overboard through hydraulic pump vent line.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Forced landing □ Burning smell and smoke during engine topping check were caused by overheated engine drive shaft. Suspect incorrect grease or misalignment.

Precautionary landings □ Hydraulic pressure dropped to zero. Hydraulic line had hole from chafing transmission oil line. □ Crew chief and passenger smelled fuel odor and crew chief found fuel running out of left side transmission panel in cargo compartment. Suspect improper installation of lines.

AH-1

Precautionary landing □ Engine oil pressure fluctuated from 65 to 85 psi during climb. Caused by loose wire on oil pressure transmitter.

OH-58

Precautionary landing □ Test pilot detected loud whine which varied in pitch with compressor speed. High frequency vibration was felt in airframe and flight controls. Teardown revealed spur gearshaft was loose and rubbing on No. 3 bearing housing.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

Aviation-related

UH-1

□ Mechanic, removing covers from top of aircraft, placed his knee on window assembly. When he shifted his weight forward to remove pitot tube cover, window was broken.

AH-1

□ Driver of jeep fell asleep and jeep ran into parked aircraft.

CH-47

□ POL driver refueled right side of aircraft and attempted U-turn to position POL tanker on other side of aircraft for refueling. Exhaust stack of tanker struck a blade of forward rotor head.

OH-58

□ Aircraft was shut down in POL refueling area. Rotors were stopped and crew chief was holding blades. Two CH-47s and 10 UH-1s hovered past OH-58. When one of the UH-1s parked next to the OH-58, right passenger door came open and was blown off. □ Tow bar had no wheels, so it was loaded on tug. As tug was being positioned to tow aircraft, projecting tow bar struck aircraft.

U-8

□ Hydraulic jack failed and nose of aircraft fell 6 inches. Impact of aircraft jacking pad with second level of telescopic jack caused structural damage to bulkhead in radio compartment and dented skin around jacking pad.

For more information on aviation-related mishaps, call AUTOVON 558-3901/3913.

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DIRECTORATE FOR EVALUATION AND STANDARDIZATION, USAAVNC, FT. RUCKER, AL 36362
STACOM 23 ■ 30 NOVEMBER 1977 COL CHARLES S. WINGATE ■ 558-2603/3514

Just what went right?

Do you know that Army aviation has just completed 15 months (FY 77 and 7T) with only one inadvertent IMC mishap? Contrast this with our previous two fiscal years' experience when we had ten inadvertent IMC accidents resulting in 22 people being killed and 18 injured. Granted the one period is nine months longer than the other, but clearly something has happened. Could it possibly be that we in Army aviation have finally recognized that the deadly hazard of inadvertent IMC really exists and have now taken steps to protect ourselves from it? It certainly appears that way. The root causes of Army aviation's tragic and costly experience with inadvertent IMC have invariably involved at least one of three factors: lack of supervision; lack of adequate training; lack of adequate procedures. Overlying these "lacks" has been the unfortunate attitude of many of us regarding the existence of this hazard. The versatility of the helicopter has allowed us to operate VMC in weather that would be marginal for a slow-flying duck. When things get so tough that the tip path plane can no longer be seen, it becomes an easy matter to zero the airspeed and land. The only trouble with this procedure is that it works. It works so well, in fact, that neither the aviator groping around in the murk nor the commander who sent him out there gives little if any thought to preparation for IMC flight. Consequently, when the occasional "blot out" happens, the mission is most likely to terminate with a quick twisting dive into the ground.

Discussion of the circumstances following the accident then generally centers around the theme of "well, he was asking for it, 'cause he shouldn't have been out there in the first place" or "whyinhell didn't he land when things started to go to pot?" So maybe he shouldn't have been out there—but he was. So, maybe he should have landed or turned back—but he didn't. The only thing relevant is that IMC was unexpectedly encountered, the pilot lost control, and the aircraft crashed.

In light of our experience in 7T and FY 77, it would appear that the possibilities of inadvertent IMC occurring despite the favorable weather flying characteristics of the helicopter are finally being realized. What is more important, we are doing something about it. Clearly, something is going right. ■

Weight and balance

Inquiries have been received concerning weight and balance procedures which indicate possible noncompliance with AR 95-16 and TM 55-405-9. It appears that some units are using the basic weight of representative aircraft (same model, series, and block number) to serve as the basic weight of all such aircraft of the command when computing DD Form 365F.

If the above procedure is being followed, it is in direct contravention with the intent of AR 95-16 and TM 55-405-9. AR 95-16, par. 2 (Basic Weight and Balance Data), indicates that all data is based on specific aircraft records identified by their respective serial numbers. AR 95-16, par. 3c(5)(d), clearly states that "Data from DD Forms 365C and 365F of one aircraft will not be used to directly prepare DD Form 365F for another aircraft of the same ►

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type." TM 55-405-9, section II, par. 4, states that "Aircraft manufacturers are responsible for furnishing basic weight and balance data for EVERY aircraft delivered to the Army." AR 95-16, par. 3d(1), states that Class 1 aircraft are to be weighed when overhaul or major airframe repairs are accomplished; when any major modifications have been made to basic airframe or when weight and balance data are suspected to be in error. According to AR 95-16, par. 3d(1), the above information also applies to Class 2 aircraft with the additional stipulation that this class aircraft will be weighed when the period since last weighing exceeds 30 months.

Weight and balance information must be accurate if it is to be of use to the operating unit. Too many Army aviation accidents have been caused by aircraft being operated out of their allowable center of gravity limits or above their maximum gross weight. The current AR 95-16, 10 Jul 74, and TM 55-405-9 (change 4), 22 Mar 71, contain all the information necessary for a safe and sane weight and balance program. Let's use this information!

A final note to all airplane drivers: Although all units operating Army aircraft are required to have weight and balance specialists designated in writing, AR 95-16, par. 2b, and TM 55-405-9, Section II, par. 4, state that the Army aviator in command shall be responsible for the correct weight and balance computations of his aircraft. As the old saying goes, "A word to the wise, etc., etc." ■

Position reports, questions and answers

We have received a request for clarification of our analysis of "Approach From a Holding Pattern."

"It appears from your STACOM 21, dated 14 Sep 77, that any procedure depicting a holding pattern in lieu of a procedure turn, the aircraft must execute, at least, his holding pattern entry. I believe that a clarification is necessary. If an aircraft is approaching the fix for the first time and is aligned on final approach course, and ATC clears the aircraft for a straight-in approach and fixes the aircraft position relative to the fix, there is no requirement to enter holding. If the pilot wishes to enter holding to lose altitude, review procedures, or for whatever reason, he must advise ATC of his intentions. AIMs, TERPS, and PART 91 all imply that you proceed straight-in. Right or wrong?"

You are right! However, clarification should not be necessary. The very nature of the question and answer in STACOM 21 presupposes a situation other than being set up for a straight-in approach! ■

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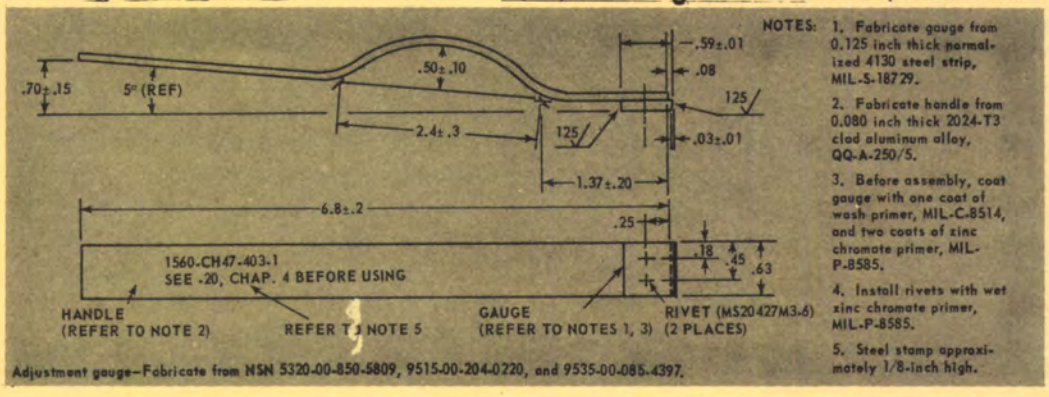
CH-47 cockpit doors

Just because a door is jettisonable doesn't mean it's supposed to come off on its own accord. Unfortunately, since July 1968, 36 jettisonable cockpit doors have inadvertently come off CH-47 aircraft during flight. In most instances, the doors took a downward path—away from the aircraft. However, in four cases the doors went upward, striking the rotor blades and causing damages of nearly $280,000. Obviously, these door losses pose a serious threat to the safety of the aircraft and occupants as well as to persons and property on the ground.

Unfortunately, when a door comes off, it's usually hard to pinpoint the cause of failure. But many failures have been traced to improper maintenance procedures during installation. Paragraph 4-198, TM 55-1520-227-20-1, and paragraph 4-256, TM 55-1520-209-20-1, contain six "cautions" concerning the importance of following installation procedures to the letter; and your failure to do so can readily result in door losses. Because of this serious threat to safety, it is important that you heed these cautions and make sure you install all doors by the book.

One special "caution" you should heed concerns the phenolic blocks located at the bottom of the jettisonable doors. **These blocks must be cut to fit each individual door assembly.** Instructions for installing these blocks can be found in paragraph 4-197A, TM 55-1520-227-20-1, change 29, and in paragraph 4-255A, TM 55-1520-209-20-1, change 19.

Subparagraph L of both paragraph 4-198, TM 55-1520-227-20-1, and paragraph 4-256, TM 55-1520-209-20-1, calls for the use of a special tool (gauge, 1560-CH-47-403-1) for measuring clearances between the upper and lower latch plate assembly and the upper and lower shaft. If your unit doesn't have such a tool, you can manufacture one by following the instructions provided here.



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USAAAVS

Accident analysis

ANALYSIS 77-10
Type aircraft: UH-1H
Time: 2215
Classification: Major (total)
Injuries: 3 fatalities, 1 major
Estimated cost: $1,088,955 (acft, inj, other)
Mission: Search and rescue

	Grade	Age	RW Hrs	Tot Flt Hrs
Pilot	CW2	38	1,872	1,872
Copilot	CPT	29	1,906	1,907

The accident

After a 2-hour search at night for a crashed UH-1N and eight injured persons, a UH-1H crew returned to home base because of bad weather. About 1½ hours later, weather at the accident site was reported by ground rescue personnel near the site to be improving. Status of some of the injured personnel was also received (three unconscious and three seriously injured), along with a request to "get a helicopter at least somewhere close to the scene." The pilot decided to make another attempt to get to the accident site. As the aircraft was en route to the site, radio contact was attempted by ground control personnel to tell the pilot that the weather at the crash scene was bad and he shouldn't attempt a rescue. It is not known if the crew received or acknowledged this information. When the pilot arrived at the staging area, an ambulance and doctor were there, but instead of landing he attempted to hover up the side of the mountain. Nearing the crash site, the pilot inadvertently went IMC, lost control of the aircraft, and crashed.

The cause

■ While hovering up the side of a mountain to reach the accident site, the pilot encountered visibility conditions below the minimums stated in table 4-1, AR 95-1. Instead of altering the flight to maintain visual flight conditions (a requirement of par. 4-16b(1), AR 95-1), he continued the hovering search because of excessive self-motivation. This excessive self-motivation is evidenced by: The pilot initiated a second attempt at rescue 1½ hours after the first (which had been unsuccessful because visibility at the accident site was limited to 50-75 feet due to clouds and darkness) in response to a request to get a helicopter close to the scene. When the helicopter arrived at the staging area an ambulance and doctor were there but visibility at the accident site was still below minimums. Instead of landing at the staging area, the pilot decided to hover up the side of the mountain to the accident site where he planned to hoist the injured (who he knew had been at the site for more than 2 hours) into the helicopter.

The cures

■ Unit commanders take positive action to discourage improper performance attributable to excessive self-motivation. To provide unit commanders with the expertise to detect and take proper corrective action for excessive self-motivation, USAAVNC COI 2G-F15, "Aviation Commander's Readiness Course," should include this as a training objective.

■ Inform personnel, through unit safety meetings, of problems encountered and hazards regarding improper performance attributed to excessive self-motivation.

Selected mishap briefs

Rotary wing

UH-1

Incidents □ Aircraft was lead in flight of six on training flight. LZ was overflown at 50 feet and as flight turned southbound, crew noticed they were headed toward restricted area (antenna farm). As climb was initiated, aircraft struck top of antenna, breaking right chin bubble. □ Main rotor tiedown was left hanging on main rotor blade while start was attempted, causing small dent in tail rotor drive shaft tunnel cover. □ Aircraft, involved in steep slope troop pickup practice, was hovering with skid toes into the slope. A second aircraft, above and to the side of the first aircraft, was coming into the same slope for a troop pickup. Rotorwash from second aircraft caused tip path plane of first aircraft to dip, and main rotor blades struck hillside. □ Aircraft was on NOE training flight. During slow forward flight, right turn rotor clearance was not maintained and bottom of both rotor blades hit top of tall tree. Both main rotor blades were replaced.

Forced landing □ Loud bang was heard from engine area during climbout, power was lost, and aircraft yawed to left. Caused by bleed band actuator failure.

Precautionary landings □ Internal failure of fuel boost pump caused illumination of fuel boost pump and master caution lights. □ Master caution and transmission oil hot segment lights came on. Caused by malfunction of sending unit switch. □ As aircraft was being flown down riverbed during NOE training, pilot and copilot saw wires at the same time. Copilot had control and pulled up. Wires were cut by skids. Postlanding inspection revealed no damage. □ Hydraulic line ruptured in flight at forward end next to bulkhead tee fitting in front right corner of transmission well. □ Pilot felt binding in pedals during takeoff. Caused by failure of magnetic brake.

AH-1

Precautionary landings □ Thermal runaway of battery caused smoke and fumes in cockpit. □ Fire detector light came on. Caused by failure of fire detector switch. □ Transmission oil pressure light came on and oil pressure indicator dropped to zero during hover. Caused by failure of transmission internal oil filter gasket.

CH-47

Precautionary landings □ Torque split, with no reduction in rpm, N1, or sound. Postlanding inspection revealed extensive damage to compressor section. Suspect inlet guide vane failure. □ Power was reduced for landing. When power was reapplied for termination, No. 2 engine would not regain power. Normal and emergency beep were activated with no response. Caused by failure of engine fuel control. □ Defective engine oil filter preformed packing on No. 1 engine caused illumination of oil low caution panel capsule.

Cargo handling mishap □ Aircraft landed in PZ to pick up passengers and truck and trailer. While pathfinders positioned load and completed rigging, rotor tachometer failed. Crewmember who was to work slingload left his position to attempt repair of tachometer and another crewmember took over the load. When load was hooked, crewmember on load announced "load hooked" on intercom, but this was heard only by copilot and other crewmember. ►

Pilot determined load could not be carried and elected to return to airfield for repairs. He told the crew to offload the passengers. Crewmember working hook pressed his release button to release the load and saw the hook open. Outside the aircraft, the pathfinder was holding tension on the sling to keep it from becoming tangled when the aircraft picked up. This tension prevented the sling from falling off the hook when the hook was opened. The pathfinder was unaware the aircraft was having maintenance problems. As he saw the passengers offloading, he laid down the sling and went to the aircraft to find out the problem. As he boarded the aircraft the crewmember in the rear closed the ramp and announced "crew ready." The pilot, just before takeoff, placed cargo release in safe position. As aircraft departed, pathfinder noticed load was still hooked up and signaled this to a crewmember. Crewmember told pilot to stop but pilot was unable to stop takeoff because of loss of visibility in blowing snow. Crewmember then told pilot to open hook. Pilot armed hook and released load.

CH-54

Precautionary landing □ Master caution and hoist oil segment lights came on during climb. Caused by rupture of hydraulic flexline from hoist makeup pump to oil cooler.

OH-58

Incidents □ On 2-mile final, aircraft struck duck. Duck entered lower left chin bubble and lodged in copilot's antitorque pedals. Pilot removed duck from pedals and landed. □ During landing in area with many small bushes, aircraft was set down on bush which punched hole in bottom of aircraft.

Forced landings □ Loud bang was heard and engine failed at 7,000 feet. Cause unknown. □ Engine failed at 300 feet agl. Suspect loose upper clamp on fuel supply hose inside fuel cell.

Precautionary landings □ Engine oil bypass caution light came on during termination of simulated antitorque failure. Caused by malfunction of reservoir float switch. □ Tail rotor chip detector light came on during landing. Caused by failure of tail rotor gearbox.

For more information on rotary wing mishaps, call AUTOVON 558-4198/4202.

Fixed wing

U-3

Precautionary landing □ Gear would not raise during takeoff and aircraft was landed. Downlock safety switch was deiced and aircraft released for flight.

U-21

Precautionary landings □ Three minutes after takeoff, No. 2 propeller secondary low pitch stop light came on, torque increased, and propeller rpm decreased to 1600. Pilot secured engine and landed. Locking lugs on box assembly failed and allowed cannon plug to work loose. □ Battery check in flight revealed battery was deteriorating.

U-8

Precautionary landings □ (G series) Aircraft was climbing out at about 200 feet agl when tower operator told pilot aircraft was trailing smoke from No. 1 engine. Pilot noticed loss of power and prop started to go to feathered position. Postlanding inspection revealed flow control thermostat

had blown out of oil cooler, resulting in complete loss of oil pressure. □ (D series) Right main tire blew out during landing.

OV-1

Precautionary landing □ (C series) Hydraulic pressure dropped to zero after speed brakes were extended. No-hydraulics landing was made. Caused by failure of tetrafluoroethylene hose assembly.

For more information on fixed wing mishaps, call AUTOVON 558-3901/3913.

Maintenance

UH-1

Other □ Aircraft was sent to support maintenance facility for completion of phase maintenance inspection. Starter generator was removed and replaced because of leaking seal. Aircraft was test flown and released to unit. Thirty-five days later, aircraft was returned to maintenance for tail rotor drive shaft output seal leaking at transmission. When drive shaft was removed, deep scratches were noted midway along No. 1 section drive shafting. Approximately midway on drive shaft, under starter generator, drive shaft tunnel was dented, causing it to rub against drive shaft, cutting four grooves from .004 to .017 inches deep about 3/16-inch apart around complete circumference of the drive shaft. Aircraft had flown 45.1 hours since release from maintenance facility.

For more information on maintenance mishaps, call AUTOVON 558-3901/3913.

TSARCOM messages

□ 171815Z Nov 77, subject: Maintenance Advisory Message on Lacquer, Low Reflective, MIL-L-46159, NSN 8010-00-083-6588 (GEN 77-19).

□ 232010Z Nov 77, subject: Maintenance Advisory Message Concerning AH-1S (Mod) and AH-1S (Prod) Tail Rotor Gearbox Installation (AH-1-77-25).

TOTAL MISHAPS FOR 18-24 NOV 1977

Type Aircraft	Accidents	Incidents	Forced Landings	Prec. Landings	Total
UH-1	0	4	2	17	23
AH-1	0	0	0	3	3
CH-47	0	0	0	7	7
CH-54	0	0	0	2	2
OH-6	0	0	0	1	1
OH-58	0	2	2	3	7
U-3	0	0	0	1	1
U-21	0	0	0	3	3
U-8	0	0	0	2	2
OV-1	0	0	0	1	1
Total	0	6	4	40	50

0 Fatalities, 0 Injuries
Estimated costs: $15,691

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