Flightfax

ARMY AVIATION
RISK-MANAGEMENT
INFORMATION

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A new year's look at the numbers

I want to bring this to your attention: Statistically, after our holiday break, we experience a rise in accidents. Think about it.

BG Burt S. Tackaberry
CG, U.S. Army Safety Center

MONTHLY CLASS A FLIGHT ACCIDENT COMPARISON

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOT
FY92	1	3	1	3	1	4	1	1	2	2	1	2	22
FY93	6	2	0	1	5	1	4	1	0	0	1	2	23
FY94	2	3	2	1	2	0	5	0	0	4	1	1	21
FY95	0	0	1	1	0	1	1	2	1	0	2	1	10
FY96	1	0	0	1	0	2	1	0	1	0	1	1	8
FY97	0	0	1	2	0	2	2	1	3	1	0	0	12
FY98	2	1	2										5

Combined effort identifies PDP problems in Chinook

A Chinook crashed and burned, leaving no survivors to interview, no witnesses to question, and little wreckage to examine. What little evidence that was available at the time pointed to human error as the primary cause of the accident. However, uncertainties persisted, and the investigation continued. The combined efforts of the accident unit, AMCOM, Boeing, and the Army Safety Center ultimately uncovered information that shifted the focus of the investigation from human error to a materiel failure.

Accident review

The Chinook was on the return leg of an NVG navigation flight. The crew was operating in VMC when the SP requested an IFR clearance to 4000 feet msl. His intent was to return to the home airfield via the ILS approach. He did not request a weather update when he filed for the IFR clearance. Weather forecast prior to the flight included a scattered cloud layer at 1000 feet, broken at 2300, overcast at 4900, and forecast moderate icing from 2000 to 10,000 feet.

Approximately 18 minutes after granting the IFR clearance, approach control directed the crew to make a 15-degree right turn for a vector to intercept the ILS approach course. During the turn, the radar controller noted that the aircraft had tightened its turn radius and passed through its assigned heading. Moments later, radar contact with the aircraft was lost, and it was quickly established that the aircraft had crashed and burned.

The investigation

At the time of the accident, all available evidence indicated that the primary cause of the accident was human error on the part of the SP and PI. Since then, additional information became available, and the focus shifted to a suspected materiel failure. This new evidence led to the conclusion that the most probable cause of the accident was an electrical power failure that caused loss of aircraft control.

Let's look at this evidence.

From October 1992 through June 1996, seven Chinooks experienced varying degrees of electrical power failure. It was determined that heavy precipitation, aircraft washing, or extended overwater operations can result in water leaking into the cockpit area and entering the a.c. auxiliary power distribution panels (PDPs). When this happens, the water can cause the circuit breaker "bus ties" to short, resulting in either partial or complete power loss to both primary and standby flight instruments.

While it's impossible to know for sure that such a power failure occurred in the accident aircraft, that is a reasonable conclusion. Complete power loss to the cockpit of a Chinook can result in loss of all primary and standby instruments, the advanced flight control system (AFCS), and all avionics except the transponder and FM and SATCOM radios. It is reasonable to conclude that such circumstances would have made it impossible for the crew to maintain aircraft control.

In summary, it is now suspected that the crew was conducting a standard-rate right turn when a power loss occurred, resulting in the loss of, at a minimum, the primary flight instruments and the AFCS. With no visible horizon, it is probable that the pilot quickly became disoriented and the aircraft entered an unusual attitude that the crew was unable to recover from.

Lessons learned

Hazard: Water can enter the PDPs; once it does, it deposits dirt and salt deposits on the contacts, which creates a good conductor. At some point, the electrical connections short out, causing the system to overload and the multifunction displays to all go blank.

Controls: Changes have been initiated to protect the PDPs from water intrusion by either channeling water away from pilot doors and windows or designing and installing a cover for the PDP and circuit breakers. In addition, crews should inspect the PDPs and circuit breakers for corrosion on a regular basis and more often during periods of prolonged heavy precipitation and after aircraft washing.

Hazard: The "improved" generator control units (GCUs) currently installed on some Chinooks do not allow the PDP bus ties to operate as designed. As a result, both generators will be taken off line before the GCU can isolate the electrical fault.

Control: A circuit breaker has been identified that will work with the current GCU to allow for redundancy within the electrical system as designed.

USASC POCs: MAJ Harry Trumbull; Chief, Operations Branch; DSN 558-2539 (334-255-2539); trumbulh@safety-emh1.army.mil; or CW4 Keith Freitag; Aviation Systems and Investigations Branch; DSN 558-3262 (334-255-3262); freitagk@safety-emh1.army.mil

Reporting Class E's: What's the point?

Recently, SSG Matthew J. Morrison (see box below), the ASO for the 12th Aviation Brigade in Wiesbaden, Germany, called to tell me about a rash of engine failures among their UH-60Ls. SSG Morrison reported that there had been six failures, mostly in aircraft operating over water. At the direction of the brigade commander, SSG Morrison contacted the Army Safety Center to see if they were alone in the world with this problem. The folks who manage the Army Safety Management Information System (ASMIS) quickly identified a total of 11 single-engine failures for UH-60s in FY 97 alone. The Safety Center notified the USAREUR Safety Office and is conducting its own investigation.

This brings up a number of important issues:

■ The old saying, "You don't know what you don't know," applies here. Reporting Class E incidents directly to the Safety Center cuts out layers of safety officers who used to review PRAMs and were able to identify trends. Downsizing has reduced the ability to conduct statistical analysis in the field. Unit ASOs must ensure that courtesy copies of precautionary-landing reports are sent through safety channels to their MACOM Safety Office. Without them, it's next to impossible for the Corps or MACOM to know the event occurred.

■ Reporting non-accidents through appropriate mechanisms is essential. Unit personnel must know what to report to the ASO, and the ASO must ensure the event is investigated and the appropriate report is filed: AAARs (AR 385-40) for precautionary landings and aborted takeoffs, and Deficiency Reports (AR 738-751) for equipment failures and malfunctions.

■ The value of field units tracking trends cannot be overemphasized. The Safety Center and the Army Aviation and Missile Command (AMCOM) are not always going to spot a problem; it takes everyone.

■ Failing to report accidents and incidents can slow identification of trends, which can delay corrective actions, which can kill. Safety officers must educate their commander and every soldier in their unit that, by regulation, accident reports can be used only for accident-prevention purposes. This should be continually emphasized in safety meetings. Commanders must use a collateral investigation when punishment or administrative actions are warranted.

■ There may be a problem with T-700 series engines.

The point is that, thanks to the alertness of the 12th Brigade team (commander, maintenance officer, and safety officer), increased attention is now being paid to this potentially serious situation.

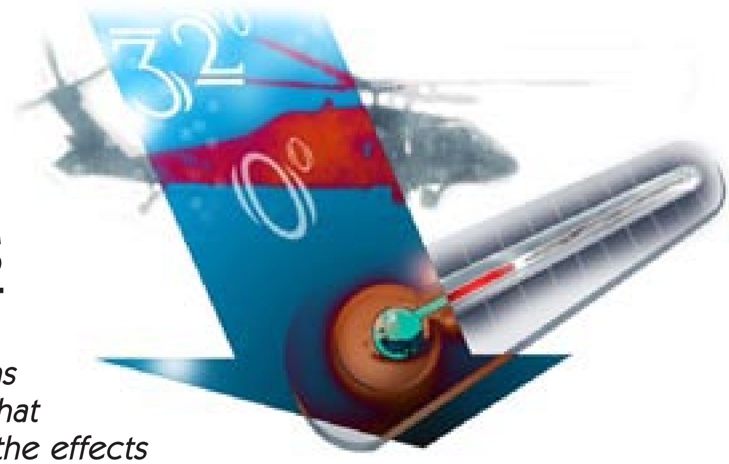
—CW5 Steve Rauch, ASO, Headquarters, USAREUR, rauchs@hq.hqusareur.army.mil

Did he say "SSG"?

That's right, SSG Matthew J. Morrison is the Aviation Safety Officer for the 12th Aviation Brigade. SSG Morrison has held the position since the DEROS of the last CW5. The reason for this mismatch is that the personnel system has trouble getting qualified CW5 ASOs to accept assignments in Germany.

The brigade commander could fill the position with a CW4 or CW3 ASO, but then PERSCOM would not have a vacancy to fill, and the brigade would go without a CW5 until the CW4/CW3 departed. With this in mind, the brigade commander has designated the senior battalion ASO to be the acting brigade ASO while holding the position open until a CW5 is available.

Preparation key to safe winter operations



Operating aircraft in cold weather or even in an arctic environment presents no unusual problems if you're prepared. Managing the risks requires that both flight-line and cockpit crews be aware of the effects low temperatures and freezing moisture can have on aviation operations.

Preflight

Preflight checks must be extra thorough when temperatures have been at or below 0°C (32°F). Water and snow may have entered many parts of the aircraft during operations or when the aircraft was parked unsheltered. Such moisture can form ice that can immobilize moving parts, damage structures by expansion, or occasionally foul electrical circuits.

Covers can protect against freezing rain, sleet, and snow if they're installed on a dry aircraft before precipitation begins. Since it's not practical to completely cover an unsheltered aircraft, parts not protected by covers, parts adjacent to cover overlaps, and joints require closer inspection, especially after periods of blowing snow or freezing rain.

Accumulations of snow and ice on aircraft must be removed before flight. Failure to do so can result in aerodynamic and center-of-gravity disturbances or introduction of snow, water, or ice into internal moving parts and electrical systems. Main and tail rotor systems and their exposed control linkages require particularly close attention.

Flight

Hovering helicopters produce a great amount of rotor wash, creating the potential for rotor-induced whiteout during operations over snow-covered terrain. The hazard is not as serious for aircraft with wheels as it is for those with skids. Aircraft with wheels can be ground-taxied safely to the takeoff point with only minimum blade pitch, thus reducing rotor wash.

Takeoffs pose a hazard in snow-covered terrain because of the lack of visual cues for peripheral vision. And landing can present a significant hazard unless aircrews follow proper landing procedures to avoid whiteout.

FM 1-202: *Environmental Flight* recommends specific techniques pilots should use when taking off from and landing on snow-covered areas.

Maintenance

Cold weather increases aircraft-maintenance requirements. Aircraft operation at temperatures below -50°F should not be attempted except in emergencies unless the aircraft is equipped with the appropriate winterization kit and auxiliary systems and has proven reliable at low temperatures. The following special precautions and equipment are necessary to ensure efficient aircraft operation:

- Reciprocating engines should not be started at temperatures of 10°F and below without using an auxiliary power unit for assistance.
- External heat applied to the engine accessory case, carburetor induction system, oil pump, and battery will ensure easier starting. Standard portable combustion-type heaters that include a blower and flexible hoses for application of heat to localized areas may be used to preheat components and systems before starting. These units may also be used to heat specific portions of the aircraft so that maintenance personnel can work without gloves. (Don't forget that touching cold metal with bare hands in below-freezing temperatures can tear the skin right off your hands.)
- For aircraft equipped with internal-combustion heaters, the heaters should be turned on at least 20 minutes before operating hydraulic systems to avoid damage to the systems.
- Some system gauges or indicators are unreliable until the system reaches operating temperature.
- In temperatures below freezing, aircraft batteries not in use should be removed and stored in a warm place.
- When transferred from a warm to a cold environment, some aircraft engines, transmissions, and hydraulic and landing-gear systems may require a different kind of lubricating oil or hydraulic fluid.
- Thickening of oil at low temperatures presents problems in operation and starting. Installing standard winterization equipment that includes baffles on oil coolers and engine cowl baffles can aid

in maintaining proper temperatures. Oil dilution units may also be installed, although it's normally satisfactory to drain the oil from engines at the end of the day's operations and to heat it before replacing it in the engine.

■ Aircraft with air-charged components such as accumulators and cargo hooks should be charged with nitrogen because air condenses and contracts in cold temperatures. Low pressure and moisture in the system may prevent the system from functioning properly.

■ Operation of aircraft in temperatures below-35°F results in a marked increase in metal fatigue. All metals become increasingly brittle as temperatures decrease. This will be evidenced by an increase in the number of skin cracks and popped rivets in stress areas. Careful attention must be devoted to these areas during all stages of maintenance operations.

Fortunately, most units are not subjected to severe cold weather during the entire year. But many units do encounter some snow and ice conditions during winter months. And a lack of recent experience in such conditions—skill decay—can lead to accidents. Field manuals and operators and maintenance manuals for your aircraft contain suggested techniques and procedures for flight and maintenance operations in cold weather. Be sure to follow them.

You can't eliminate all the risks associated with cold-weather operations, but you can learn to manage them.

And you can be prepared.

"It's Air Force; can we use it?"

Consider for a moment the following scenario: An aircraft crashes to the ground from an OGE hover. Given the energy-attenuating capabilities of modern aircraft, the crew is uninjured. However, an external fuel tank bursts on impact and ignites. The crew must negotiate a wall of flames as soon as the cockpit doors open.

Sound likely? From 1992 through 1996, 43 Class A, B, and C Army aircraft accidents involved fire. Could you escape? Are you wearing the proper clothing—correctly?

Two Army aviators were faced with just such a scenario one winter day. Both pilots received burn injuries egressing the aircraft. One pilot, who was correctly wearing authorized and serviceable protective clothing, recovered after a short hospital stay and quickly returned to flight status. The other pilot was wearing a CWU-23/P liner, antiexposure coverall as long underwear under his flight suit. He might have believed the CWU-23/P was an acceptable piece of ALSE because it was a valid Air Force issued item with an NSN label. However, it contained an insulating layer of Rochelle knit nylon, which melted into his extremities as he was exposed to the fire. The nylon had to be cut out of his muscle tissue. He was also wearing gloves with small holes in the fingertips, which resulted in severe burns and permanent partial disability. This pilot spent an extended period in the hospital and was medically retired.

The USAF CWU-23/P was specifically developed as a liner for the CWU-21/P antiexposure assembly and is intended for use only as part of that assembly. It is not authorized for wear as long underwear. (The CWU-21/P is authorized for wear when flying over water having a temperature of 60°F or less. In this case, the risk of hypothermia after ditching is greater than the risk of fire.) For a list of long underwear that meets the requirements of AR 95-1, see the January 1997 *Flightfax*.

Many Army aviators wear unauthorized ALSE with the belief that because it says "Air Force" it must be good. This misconception can have severe consequences when it comes to Army helicopter operations. Many of the ALSE products used by the Air Force were developed for fixed-wing applications where the injury risks during a mishap are substantially different than they are for rotary-wing aircraft. Before a component is approved for use by Army aviators, testing and risk assessments are performed to determine its suitability for Army operations.

If you are using a CWU-23/P or any piece of ALSE in a manner for which it was not intended, stop! If the right equipment is not available for the mission, consult the Program Manager, Aircrew Integrated Systems, for information on obtaining the proper equipment. If you cannot get the proper equipment, have your chain of command perform a risk assessment on the mission, using the hazards associated with the alternate equipment. Contact the ALSE School, the U.S. Army Safety Center, or the U.S. Army Aeromedical Research Laboratory for information on the hazards associated with alternatives.

—CW2 Douglas Denno, U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL, DSN 558-6889 (334-255-6889)

Moments from disaster

What are the consequences of rolling into a bank close to the ground? Too often, the answer to that question is, "Disaster."

Figure 1 illustrates how our apparent weight (G-loading) increases proportionally with the angle of bank when we maintain our initial altitude and airspeed by applying the required collective power. For example, a 10,000-pound aircraft in a 60-degree bank, maintaining altitude and airspeed, will have an apparent weight of 20,000 pounds. But what happens if we do not have the power available to lift twice our weight, or if we do not apply collective power immediately upon rolling into the bank?

Assume that we're flying along at 300 feet above ground level and roll into a 60-degree bank while maintaining our airspeed but without increasing our collective power. How long will it take before we hit the ground? Figure 2 plots the time to impact from various entry altitudes and angles of bank. Actually, the plotted time to impact corresponds to when the altitude-sensing port hits the ground; obviously, the main rotor will hit first.

This plot is independent of the type of aircraft or gross weight and is merely a function of angle of bank. Note that any partial application of collective power or reduction in airspeed will increase the time until you hit the ground; conversely, any power reductions or increases in airspeed will decrease the time. Also, an initial descent rate at entry will decrease the time; any initial rate of climb will increase the time.

Consider our example of starting at 300 feet agl and rolling into a 60-degree bank without any power adjustment while maintaining our entry airspeed. The time to impact is approximately 6 seconds, which is probably how long it took you to read this sentence. A moment's hesitation in applying collective power when rolling into an angle of bank at low altitude may result in a descent rate that may not be recoverable.

Even after you roll wings-level and start a dive recovery, the aircraft will continue to descend (figure 3). On any given day, we can determine our maneuvering envelope by reviewing our energy-to-maneuver and excess-power diagrams published in helicopter tactical manuals. The fixed-wing community has been using these diagrams for years, mainly as tools to compare their capabilities to those of their adversaries. The diagrams show an aircraft's ability to maneuver based on its excess power. Excess power is the difference between the power available and the power required for straight and level flight under a given set of atmospheric conditions, aircraft loads, and configurations. The excess power can be used to climb, roll into an angle of bank, or a combination of the two.

In some cases, maneuvering may result in too little power instead of extra power, causing a descent instead of a climb. For example, we decide during preflight planning that our mission must be flown at 100 knots. If we then roll into a bank more than 50 degrees and maintain our 100 knots, even while applying full collective power, we will descend (figure 4).

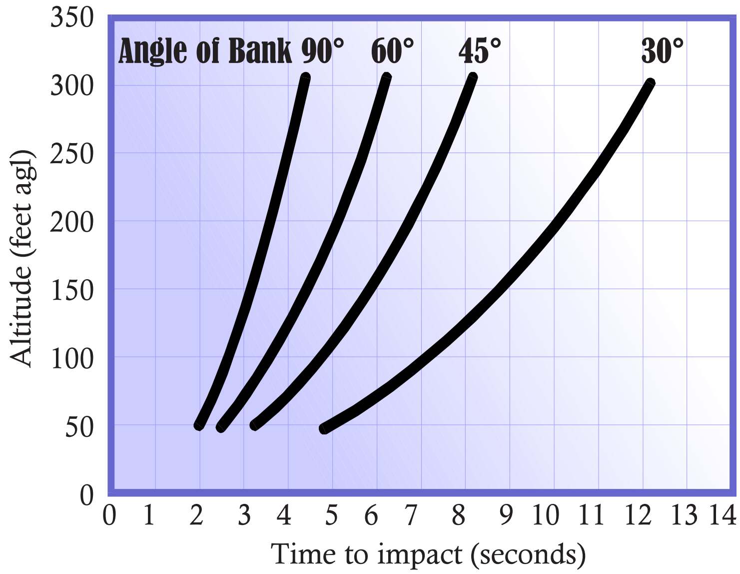
Planning can define what an excessive angle of bank is for the mission profile on that day and prevent another mishap with the same old cause factor.

—adapted from an article by LTC R.E. Joslin (Operations Officer, Naval Test Pilot School), in Approach

Figure 1. How heavy does your helicopter feel?

Angle of Bank	G Load	Apparent Weight (pounds)
0	1.00	10,000
10	1.02	10,200
30	1.15	11,500
45	1.41	14,100
60	2.00	20,000
75	3.86	38,600
85	11.50	115,000
90	∞	∞

Figure 2. How long until you hit the ground?



time to impact is . . . SECONDS

Figure 3. Dive recovery and G's

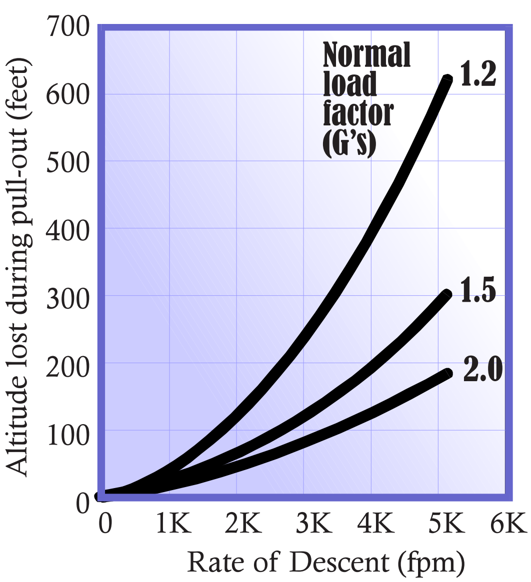
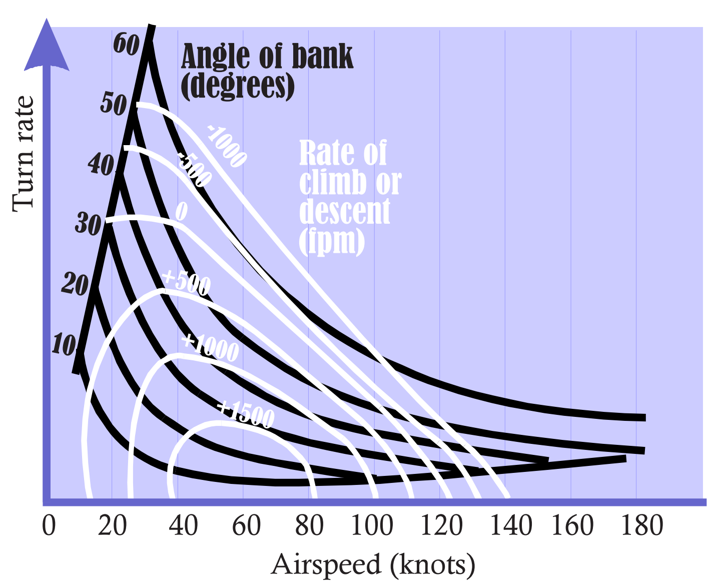


Figure 4. Representative energy to maneuver



"Back-seaters"

It has been my experience in Army aviation that we as enlisted crewmembers often tend just to float through the flying portion of our job. Our responsibilities include a huge variety of duties just to get that aircraft off the ground: maintenance, ATM training, forms and records—and don't forget those basic soldier skills. These things often preclude us from being pro-active as crewmembers.

It has become increasingly important for us "back-seaters" to become a more integral part of the crew team. We should be asking questions during crew briefings, in fact more questions than the front-seaters. We should make it our duty to learn everything we can about the aircraft we fly. We may not have the controls, but we should know the right switches to flip and the right buttons to push. We should know the capabilities and limitations of our aircraft, the temperatures, the systems, the emergency procedures. If we know these things, we might someday be able to provide that little bit of edge needed to save the aircraft and crew. Who knows? We could see a change in rotor speed, or a transmission temperature change, or a torque split a few seconds before the pilots and make a critical difference in living and dying.

So think about what it is you are really doing next time you go fly. If an emergency happens, will you know the right thing to do? Will you be able to help at all?

I have considered these things, and I know that I will do everything within my power to be a real crewmember and not just a "back-seater" collecting flight pay.

What about you?

—SPC Bryant W. Clark; B Company, 2nd Battalion, 1st Aviation Regiment; Katterbach Army Airfield, Germany; lightning06@compuserve.com

How big is my airplane?

I remember the first time I flew an Apache helicopter. As I walked toward the aircraft, it seemed to become a fire-breathing, towering monster. I had already logged hundreds of hours in the OH-58 and UH-1, but the Apache was in a whole new aircraft league. For one thing, it was huge, and I felt very small standing beside it. I felt intimidated by a machine for the first time in my life.

In the months that followed during the aircraft transition, I learned every inch of the beast. My hands-on flight training came from a very wise Chief Warrant Officer. We flew daily, weather permitting, and each day the aircraft became a little less intimidating and a little smaller. After the aircraft qualification course, my first assignment was as a platoon leader in an attack company. As my logged hours grew larger, the aircraft size grew smaller. Eventually, flying the Apache was no different than riding my motorcycle or driving my Porsche (would you expect any less from a young, single attack pilot?).

But nowadays, in my personal world and in the military training world, things are different. I got married and exchanged my Porsche for an Acura. I became a commander, then a staff officer. Military funding grew tighter, and I began to fly less and less. The Apache began to grow in size again. Each time I

approached the aircraft, it grew a little larger and a little more intimidating. I started feeling as though I were climbing into a large truck. The Apache had again become a beast.

I am sure I am not the only pilot who is experiencing this uneasiness. With reduced budgets, flying hours will continue to diminish. As this reduction in training occurs, I recommend that we all recalibrate our limits and watch for the warning signs of reduced proficiency. We should determine if our aircraft are growing in size and look a little larger as we approach them. Maybe we should fly just a bit higher or a little slower tonight and put a touch more space between ourselves and our individual wing men.

In the meantime, we can still remain intimate with our airplanes. We can sit in them in the hangar or on the flight line. We can review checklists and switchology. We can sit in a quiet room and visualize our flights and our actions. As we encounter reduced air time, let's each ask ourselves, "How big is my airplane?"

—CPT Michael Zapata III, North Carolina ARNG, 919-515-9807, mz3@mindspring.com

T-53 engine N2 accessory gear and shaft failures

I'd like to share the following information with as many UH-1 and AH-1 crewmembers as possible to prevent accidents from N2 accessory gear and shaft failure.

Symptoms of failure

The most noticeable cockpit indications of an N2 accessory gear or shaft failure will be the following:

- Change in engine noise as engine rpm increases.
- Engine rpm warning light activation.
- N2 tach needle drops counterclockwise to zero.
- Torque needle drops to zero.
- Rotor rpm increases.
- May or may not have an engine chip segment light and master caution light.
- Engine may or may not fail, depending on where the failed parts lodge.

Emergency procedure

The emergency procedure steps in the dash-10 (TM 55-1520-21-10, change 17) for N2 engine overspeed are as follows:

1. Collective—INCREASE to load the rotor in an attempt to maintain rpm below the maximum operating limit.

2. Throttle—REDUCE until normal operating rpm is attained. Continue with manual throttle control. If reduction of throttle does not reduce rpm as required:

WARNING: Land even if manual throttle corrects the overspeed since there is a chance of an impending engine failure due to the debris generated by the initial N2 failure.

3. EMERGENCY GOV OPNS.

Discussion

Specifics of this type of failure are not well covered in the operators manual and are not addressed in our normal training. The following information is based on our simulator tests and accident investigations.

A problem with step one of the emergency procedure is that the torque gauge is inoperative, and simulator tests have found that transmission overtorque (65 lbs UH-1 and 130% AH-1) is possible without knowing it. In step two, a throttle reduction of one-quarter to one-third turn will give manual control of engine rpm, but, because the N2 needle is at zero, the rotor rpm needle will be the only indicator of N2 rpm. Therefore, the pilot must fly the aircraft with manual control of the throttle, using the rotor rpm needle for both N2 and rotor operating limits and land as soon as possible, keeping in mind that the engine may fail at any time.

Simulator tests have shown that pilots who have not been trained or recently briefed about N2 gear and shaft failures respond to the N2 gear failure emergency with the procedure for a main drive shaft failure. The confusion appears to be with the N2 needle interpretation.

If the N2 needle is not being observed when the failure occurs, the pilot assumes that the needle moved ***clockwise*** to an overspeed indication (above the rotor needle), which is confirmed by his or her physical senses with the engine rpm increasing. With that conclusion, the pilot's visual picture is of the rotor needle dropping and the N2 overspeeding, which indicates a main drive shaft failure. The actual situation is that the N2 needle has moved ***counterclockwise*** to zero, and rotor rpm is increasing.

When responding to a rotor rpm needle, the bottom line is this: If the rotor rpm is ***increasing,*** apply collective; if it's ***decreasing,*** reduce collective.

I hope this helps.

—CW5 James D. Bankston, Minnesota ARNG, DSN 825-3419 (612-281-3419), bankstonj@mn-arng.ngb.Army.mil

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class E

F series

■ At completion of topping check, collective was lowered from 94 percent to 84 percent. There were four loud reports (indicating compressor stall), and tgt spiked to 900°. After gauges settled down, collective was further lowered to 75 percent. Aircraft shuddered and four loud reports were again heard. Once aircraft power was set to normal cruise, collective was lowered to 65 percent, which resulted in another compressor stall. Running landing was made to airfield without incident or damage. At no time did tgt rise above 900°C. Maintenance adjusted bleed band actuator and cleaned B-nut on customer bleed air line, which was leaking a small amount of air.

■ During maintenance test flight following autorotation with power recovery, transmission oil hot caution light came on at about 500 feet agl. Aircraft was landed in open field without incident. Caused by failure of switch.

AH64

Class A

A series

■ Aircraft reportedly crashed following inflight fire, killing both crewmembers. Accident is under investigation.

■ Aircraft hit trees during approach to LZ under FLIR while conducting night proficiency training. Crew sustained minor injuries; aircraft was destroyed. Accident is under investigation.

Class E

A series

■ During runup, fuel boost pump caution light remained on after completion of engine start sequence. Light did not extinguish even with both engines operating at 100 percent. Maintenance replaced fuel boost pump solenoid shutoff valve.

■ While taxiing for takeoff, crew noticed that environmental control unit (ECU) airflow stopped. No caution lights illuminated. ECU switch was recycled, but airflow did not return. However, within 10 seconds, crew compartment began filling with smoke and fumes. Crew conducted emergency engine shutdown and egressed aircraft without further incident. ECU bearing had seized, causing oil in casing to burn and smoke.

■ On base turn to final during maintenance test flight, crew heard loud bang and felt vibration from left side of aircraft. Aircraft was landed and shut down without incident. Postflight inspection revealed that No. 1 engine cowling door was unlatched. Cowling had been checked for security by both pilots and the crew chief prior to the flight.

■ During runup, CE saw hydraulic fluid venting from APU. Maintenance personnel determined that APU had been overserviced. During maintenance, hydraulic servicing system could not be pressurized because of a stuck valve. Solenoid valve was replaced.

D series

■ On runup, CE smelled fuel in cockpit. Maintenance inspected fuel system and discovered nitrogen inerting unit fuel hose leaking.

CH47

Class B

D series

■ Crew noted vibration on engine shutdown and rotor rpm rose to 120 percent. Crew shut down both engines. Both rotor heads will be replaced.

Class D

D series

■ During rehearsal for air assault demonstration, external load touched down before aircraft came to stabilized hover. External load, an M119A artillery piece, turned over before CE was able to release it. Forward movement of aircraft caused load to be pulled over.

Class E

D series

■ Crew felt severe vertical vibrations in cruise flight at 120 knots. Dual feedback transducer was replaced.

■ Right aft wheel rim split during four-wheel ground taxi, resulting in flat tire. Aircraft was shut down without incident.

■ During cruise at 500 feet agl and 95 knots on an NVG flight, aircraft was struck by two birds. Second bird crashed through upper panel assembly on copilot's side and came to rest by No. 1 power distribution panel. Aircraft returned to home base and landed with no further incident.

OH58

Class C

D(I) series

■ Suspected engine and mast overtorque occurred during climbout from field site. Maintenance evaluation substantiated engine torque at 139 percent for 1 second and mast torque at 140 percent for 2 seconds. Engine inspection is ongoing.

Class E

D(I) series

■ During Hellfire gunnery, crew received caution message for high engine oil pressure when aircraft came to OGE hover. Pressure registered 135 on MPD and aircraft was landed. Crew noted that every time collective was raised, message displayed. Maintenance replaced engine oil pressure transducer and flushed engine oil cooler, which did not correct problem. Free-wheeling unit aft seal was replaced and aircraft was released for flight.

■ During takeoff after rearming with Hellfire missiles, crew encountered brownout conditions. After applying power, crew observed low rotor and high torque time limit message. Review of engine history page indicated engine torque had peaked at 131 percent for zero seconds and mast torque peaked at 115 percent for 2 seconds. Maintenance inspected aircraft and released it for flight.

■ During runup, CE noticed smoke coming from aircraft at engine idle. Crew executed emergency shutdown and heard grinding noise while engine was spooling down. Crew reported that it had been a normal runup. During subsequent inspection, AVUM personnel determined that internal damage had occurred to compressor assembly, calling for component replacement. QDR was submitted on compressor assembly.

UH1

Class C

V series

■ At 700 feet agl following takeoff on medevac mission, crew noted N2 overspeed indications and engine chip light illumination. Aircraft was flown to nearest open field, and crew initiated steep approach to avoid power lines. Aircraft began an uncommanded right yaw, and crew initiated autorotation to ground. One main rotor blade was damaged when it hit a wire during the descent.

■ During night unaided approach to confined area, aircraft was engulfed in snow cloud, causing crewmembers to lose outside visual reference. Aircraft drifted forward, contacting trees with main rotor blades. IP landed aircraft in place and performed normal shutdown. Postflight inspection revealed damage to both main rotor blades.

H series

■ During cruise flight at 1500 feet agl, crew heard loud noise and engine chip light came on. As PC began right turn to perform precautionary landing, loud noise came from engine, and oil pressure light illuminated. N1 went to zero. During autorotation to rolling hayfield, aircraft touched down hard. Main rotor blade struck tail, and gear collapsed.

Class E

H series

■ During engine start and runup, N2 tachometer needle indicated zero and normal shutdown was performed. Maintenance replaced N2 tachometer generator.

■ After normal start, N1 failed to accelerate past 40 percent and actually decreased slightly. Transmission oil pressure light remained on, and egt suddenly increased to 800° before throttle was turned off. Once throttle was turned off, egt decreased to normal.

■ Crew detected fuel odor in flight and landed to inspect aircraft. Fuel leak was found on left side of engine compartment near fuel control. Maintenance replaced fuel line between cylinder 1 of the VIGV actuator and the fuel control.

■ Master caution and engine chip detector lights came on during takeoff. Aircraft was landed immediately with no further incident. During required engine runup, engine chip detector light again came on. Engine was replaced.

■ During cruise flight at 90 knots, crew heard loud whine from hydraulic pump accompanied by master caution and hydraulic segment light with loss of hydraulic pressure to flight control. Emergency procedure was completed, and hydraulics-off landing was made. Inspection revealed loss of hydraulic fluid was due to crack in check valve from overtorquing of hydraulic line.

V series

■ MOC was being conducted after installation of stainless steel fittings on engine. One start was aborted due to slow increase of transmission oil pressure. After concluding that transmission oil pressure was not a problem, a second start was attempted. Engine started very slowly, and battery power started decreasing. Shutdown was attempted at 8 percent N1, but throttle detent solenoid would not activate and throttle would not close. Fuel switch was turned off. At this point, egt was 450°C, but it increased to 650° for 30 seconds.

UH60

Class B

L series

■ Hard landing resulted in damage to all four main rotor blades and severing of main transmission drive shaft. Investigation is under way.

Class C

A series

■ During maintenance check for initial engine runup and track and balance, a main rotor tip cap contacted a tail rotor tip cap. Incident is under investigation.

L series

■ Aircraft was at 15-foot hover during air assault slingload training when M119 howitzer was inadvertently dropped. Howitzer barrel broke off on impact with the ground. Aircraft landed without incident.

Class E

A series

■ During cruise flight, No. 1 engine tgt fluctuated from 0 to maximum, causing torque splits when tgt limiting engaged. Aircraft returned to base and landed without incident.

L series

■ Aircraft was attempting to pick up M119 howitzer when one of the sling legs apparently got under the brake handle. As tension increased, sling leg dropped off brake and crew prepared to drop load. Howitzer was on ground when aircraft drifted slightly forward, causing gun to tip over on its barrel. Aircraft landed without further incident.

C12

Class E

K series

■ Aircraft lost mission equipment and a.c. power 1.5 hours into flight. Crew turned off mission equipment and returned to base. Caused by failure of the 400-amp combined current limiter.

■ During step-down for VOR approach, No. 2 engine surged when power was applied to stop descent. Engine recovered, but situation recurred during subsequent step-down. After second occurrence, No. 2 engine was brought to flight idle and uneventful single-engine landing was made. Caused by failure of engine fuel control unit.

O5

Class C

DHC-7

■ During taxi for takeoff after refueling, crew noted aircraft vibration. From cockpit, PC visually identified damage to right wing and returned to parking. Postflight inspection revealed damage to right wing tip and aileron and one antenna. Cause not reported.

Class E

DHC-7

■ No. 1 engine hydraulic pump caution light came on during taxi. Troubleshooting revealed faulty pump. Shortly before this failure, No. 2 pump had failed. Unit reports that, although these two systems are independent, they have on three occasions experienced failure of the second pump within a few flight hours of the first. Unit suggests possible cause is peak loading immediately after failure.

■ Hydraulic pump 4 failed during IFR flight at cruise altitude. Five minutes later, hydraulic pump 3 failed. Alternate gear extension was conducted successfully, and aircraft landed without incident.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action message

UH-1-98-ASAM-02, 181421Z Nov 97, maintenance mandatory.
Abrasions have been found on the spars of UH-1 elevators manufactured by Chem Fab Corporation. These abrasions were likely caused by a drilling operation used in attaching the skin to the ribs during elevator assembly. All Chem Fab elevators are suspect. The spar is the fatigue-sensitive component on which the 3600-hour elevator life is based, and abrasions can cause stress concentration points that can reduce fatigue life.

The purpose of this message is to require mandatory removal of elevators manufactured by Chem Fab Corporation when they reach their 3600-hour retirement life, but no later than 365 calendar days from the date of inspection, and to require reporting of serial numbers and operating times on all UH-1 elevators.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (205-842-8632), brock-rd@redstone.army.mil

Safety-of-flight messages

UH-1-98-SOF-01, 202124Z Nov 97, technical.
This message concerns two issues involving the UH-1 tail rotor slider.

(1) UH-1-91-ASAM-05 assigned a 3600-hour retirement life to the UH-1 tail rotor slider, P/N 204-010-720-3. Recent analysis of fatigue test results has shown that the correct life should be 3000 hours.

(2) UH-1-96-SOF-02 established a 170-hour retirement life for certain UH-1 tail rotor sliders (cage code 0H0W5) due to a thin tube outside diameter. Subsequent fatigue testing of these sliders has shown that their retirement life can be extended to 250 hours.

The purpose of this message is to reduce the retirement life on the UH-1 tail rotor slider from 3600 to 3000 hours and to extend the retirement life of sliders with cage code 0H0W5 from 170 to 250 hours.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (205-842-8632), brock-rd@redstone.army.mil

UH-1-98-SOF-02, 212257Z Nov 97, operational.
UH-1-96-SOF-03 imposed flight restrictions on all UH-1 aircraft due to numerous failures of the N2 spur gear cup-type retainer. A newly designed retainer was developed and installed on a large portion of the fleet. There have been additional failures of the T53 N2 drive train since the new design retainer was installed. These failures occur almost exclusively as a result of failure of the spur gear (P/N 1-070-062-04, NSN 3020-00-453-9441).

All failures of the spur gear have been contained in the engine. If the spur gear fails, the possibility exists for an accompanying engine failure. This could be caused by the spur gear falling into the accessory gear carrier assembly and severely damaging the other drive gears. This will likely be accompanied by severe vibrations and grinding noises. The carrier assembly also drives the N1 gearbox. If the carrier is no longer able to drive the N1 gearbox, the fuel control will stop operating and the engine will shut down due to fuel starvation. The correct response to an N2 failure is to initiate emergency governor operations, reduce throttle to control rotor speed, and make a powered precautionary landing.

The purpose of this message, which *does not* apply to T53-L-703 engines, is to alert users to this engine problem and provide procedures for corrective action. It also restricts certain aircraft operations for all UH-1 series aircraft.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (205-842-8632), brock-rd@redstone.army.mil

Maintenance-information message

AH-64-98-MIM-01, 131542Z Nov 97.
The time between overhaul of the AH-64 main transmission clutch assembly, P/N 7-311310003-9 only, has been extended from 1000 to 2500 hours. Assemblies with other part numbers remain at 1000 hours.

The information in this message may be used to change the main transmission clutch assembly historical record (DA Form 2408-16) to reflect the new time between overhaul.

AMCOM contact: Mr. Carl Duffner, DSN 897-4321 (205-313-4321), duffner-c@redstone.army.mil

IN THIS ISSUE

Class A Accidents

through November

		Class A Flight Accidents		Army Military Fatalities	
		97	98	97	98
1ST QTR	October	0	2	0	0
	November	0	1	0	0
	December	1		0	
2D QTR	January	2		2	
	February	0		0	
	March	2		1	
3D QTR	April	2		2	
	May	1		1	
	June	3		0	
4TH QTR	July	1		8	
	August	0		0	
	September	0		0	
	TOTAL	12	3	14	0

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