Flightfax

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Winter is shivering its way across many parts of the world where Army aviators fly. Extreme cold presents special challenges to safe flight operations—hazards that are more than inconvenient, hazards that can be deadly. As a result, it's good to review . . .

the COLD HARD FACTS

Icing can stop you cold

We Americans, more than any other group, depend heavily on ice for our creature comforts. If you don't believe it, try serving us a warm soda. But as fond as we are of ice, even in our water (to the amazement of Europeans), one place nobody wants it is on an aircraft. You don't have to know a lot about aerodynamics to know that an aircraft weighted down with ice isn't going to fly very well.

The more we know about where icing occurs and how it affects aircraft, the better equipped we'll be to avoid conditions where icing is a hazard.

Static electricity

During cold weather, static electricity can create serious problems, not only in flight, but also on the ground—particularly during refueling and rearming operations.

Static electricity can be generated in many ways, from brushing snow and ice from an aircraft to dragging steel grounding cables over the snow. During refueling and rearming operations, it is extremely important to ground the aircraft properly. In addition, personnel must always remember to touch a properly grounded surface to discharge static charges that have built up in their bodies.

As a further precaution during refueling operations, fuel nozzles should be fully inserted into the aircraft filler neck at all times.

Where icing occurs

Water droplets in the air may not turn into ice even when the temperature is below freezing. However, when an aircraft comes along and disturbs them, these droplets latch onto its surfaces and freeze. The funny thing is that icing isn't a big problem in extremely cold temperatures. Temperatures between 0°C and -40°C are most conducive to structural icing, but serious icing is rare in temperatures below -20°C. In addition, aircraft icing usually occurs in cumuliform or stratiform clouds from sea level to 15,000 feet, most often between 1500 and 6000 feet.

■ **Cumuliform clouds.** These billowy, heaped-up piles of clouds contain strong updrafts of air capable of supporting large drops of supercooled liquid moisture. When an aircraft flies into this type of moisture, the large drops hit it and spread out, forming a coating of clear, glazed ice. This type of ice accumulates rapidly, and its weight and the fact that it adheres firmly make it extremely hazardous to flight. It is encountered most frequently in temperatures from 0°C to -10°C.

■ **Stratiform clouds.** Droplets of supercooled moisture found in these horizontal layers of clouds are normally smaller in size and less numerous than those found in cumuliform clouds. When these drops strike an aircraft, they tend to freeze instantly, trapping large amounts of air between the drops and forming rime ice. Rime ice adheres less firmly than clear ice, but its rough surface reduces aerodynamic efficiency, and it is more likely to shed during flight. Rime ice is most frequently encountered when the temperature is between 0°C and -20°C.

Mountain flying

Aviators should be particularly alert for icing conditions when flying in mountainous regions. Upward air currents on the windward side of mountains support large water droplets. These currents, combined with the normal frontal lift as the frontal system crosses a mountain range, create hazardous icing zones, particularly above crests and on the windward side of ridges. This zone may extend to 4,000 feet above peaks and possibly higher when the air is unstable.

Frontal inversions

Icing in frontal inversions also can be rapid. 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 liquid. The liquid freezes upon contact with the aircraft, and accumulation may be very rapid.

Frost

There's another type of ice in addition to those that form on aircraft during flight. Frost usually forms on aircraft while they are parked outside in cold weather. This deceptive form of ice affects the lift-drag ratio of the aircraft; therefore, all frost should be removed before takeoff. Also keep in mind that frost may also form when a cold-soaked aircraft descends from subzero temperatures into warmer, moist air.

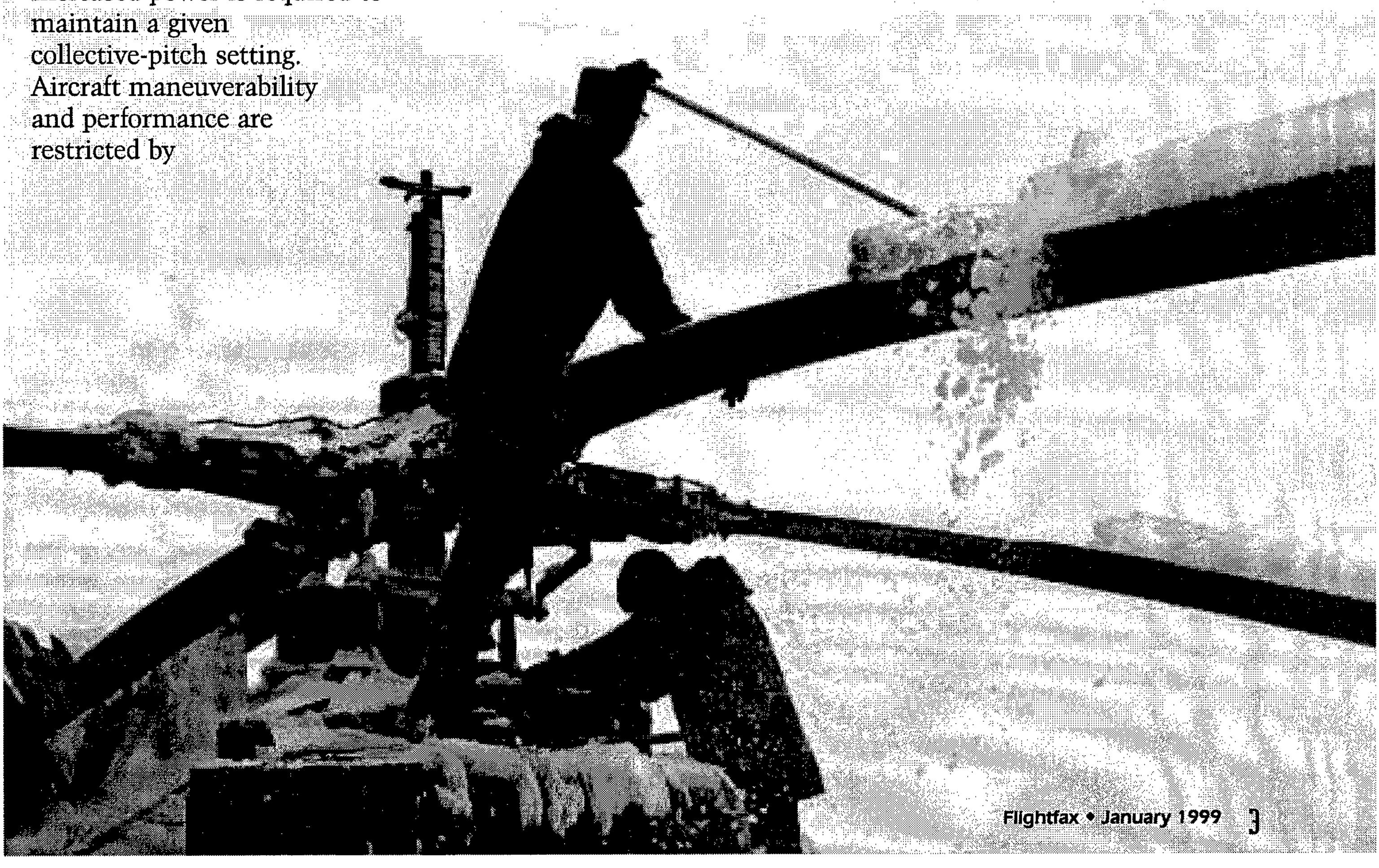
EFFECTS OF ICE ON AIRCRAFT

Even small amounts of ice on the leading edges of an aircraft's wings affect lift and increase weight and drag. Helicopters, whose rotor disk is just another kind of wing that moves through the air at different speeds and varying angles of attack, are even more susceptible to the effects of icing than are fixed-wing aircraft. Light helicopters, because of their limited power and faster rotor systems, are the most susceptible of all to the effects of icing.

■ **Rotor blades.** Most helicopters will continue to operate satisfactorily (although performance will be degraded) even with quite severe airframe icing. However, ice accumulations on main and tail rotors have an immediate effect on the aircraft's airworthiness. Because the blade is continually moving, there are high random-vibration loads and increased rotor-profile drag. Increased power is required to maintain a given collective-pitch setting. Aircraft maneuverability and performance are restricted by accumulations of ice, and the chances of blade stall increase. The negative effects of ice on rotor blades are not normally as severe if the accumulation is uniform.

■ **Shedding of ice.** Symmetrical shedding of ice from the blades can reduce weight and restore more efficient configuration, but such shedding must be simultaneous and affect all rotor blades the same way. If ice is shed from only part of the rotors (asymmetrical shedding), it causes one blade to take up a different rotational plane from the others. The resulting imbalance within the rotor head causes vibration and feedback through the controls. In severe cases, it overstresses components such as pitch change links and possibly swash plates and scissor links. Vibration from asymmetrical shedding of ice from a helicopter with two blades is more critical than for aircraft with multiple rotors because the imbalance represents a larger percentage of the total rotor mass. The effects of vibration can be lessened by reducing forward airspeed to 60 to 70 knots. ***However, shaking the cyclic to induce shedding should not be attempted.*** This could place undue stress on the rotor system and make the imbalance worse.

■ **Engine icing.** Ice shed from rotors or other parts of the aircraft may be ingested into engines, causing damage to the compressor's first stage. This hazard is more significant in large, multi-engine aircraft. Except in extremely cold, heavy-icing conditions, or when the aircraft is maintaining a high forward airspeed, helicopters with engine anti-icing systems



should be able to operate without danger of buildup and ingestion of ice into engines. In extreme conditions, it may be necessary to reduce airspeed to allow the anti-icing systems to recover and cope with ice accretion. Air starvation may occur when air inlet screens have accumulated ice. Air inlet screens have sometimes been removed before flight into forecast icing conditions. Screens on some aircraft, however, are not to be removed. Consult the operators manual before attempting to remove air inlet screens.

■ **Other aircraft parts.** Sometimes ice forms in parts of aircraft where it isn't easily visible. This can happen both while the aircraft is parked and during flight. For example, when high-pressure hoses are used to wash aircraft, ice can form in hidden places and go undetected until it causes damage.

SUMMARY

Maintenance personnel and aircrews should take the following actions to minimize icing hazards:

■ Ensure maintenance safety annexes to unit SOPs address use of high-pressure hoses to wash aircraft.

■ Remove all snow and ice from aircraft before takeoff.

■ Use all necessary anti-ice/deice equipment.

■ Avoid flight in clouds when the outside air temperature is between 0°C and -20°C.

■ If ice is encountered, climb or descend to an altitude where the temperature is colder than -20°C or warmer than 0°C.

■ If freezing rain is encountered in flight, land as soon as possible. When it is not possible to land, aviators flying IFR should request a higher altitude; those flying VFR should initiate a climb and contact the nearest air traffic control for clearance. Freezing rain is usually the result of a warm air mass overriding a cold air mass. Therefore, climbing after encountering freezing rain will normally result in the aircraft entering warmer air.

■ Refer to the appropriate dash 10 for operator and maintenance procedures during cold-weather operations.

Landing in snow

Operation over snow-covered terrain is difficult, even for the most experienced aviator. And landing is especially tricky. Let's review.

When landing, pilots should never plan to terminate the approach to a hover, as disorientation can occur in the resulting snow cloud.

The initial position of an approach to 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 (ETL) airspeed, airspeed greater than ETL should be maintained until just before touchdown. This procedure keeps the helicopter in front of the snow cloud until touchdown, after which the aircraft will become engulfed in the snow cloud.

The approach angle during the last 50 feet deviates from the standard constant angle of descent. A slight leveling off is required to maintain airspeed. As the aircraft descends to an in-ground-effect altitude, blowing snow will develop to the rear of the aircraft. It is at this point that deceleration should begin to position the aircraft in a landing attitude. Once ground contact is made, torque should be reduced until the aircraft is firmly on the ground.

Weather minimums and forecasts

Army aviation missions don't change just because the weather does. But rapidly changing weather is a huge hazard to cold-weather flying. Weather minimums must be established early in planning any mission to prescribe the least acceptable weather in which a commander will permit a mission to be attempted. Up-to-date weather forecasts are mandatory; factors that must be considered include temperature, density altitude, wind speed and direction, icing, visibility, turbulence, and snow and ice conditions.

One reminder: Forecasters give icing intensity (trace, light, moderate, or severe) based on conditions as they affect fixed-wing aircraft. Rotation of helicopter rotor blades amplifies ice accumulation, so reported icing conditions will be more severe for helicopter operations.

One more reminder: Intensity of icing is very difficult to forecast. Most of our IFR-certified aircraft are capable of operating in at least light icing; however, you can't always be sure that's all you'll get. So, even if you do get a forecast of light ice, be prepared to deal with moderate or worse. And by the way, don't shop around for less icing in a forecast. It can be extremely exciting to find yourself IMC picking up a lot more ice than you ever thought really existed.

Reminder: Aircraft parts get cold too

None of us will ever forget the Challenger space shuttle that exploded shortly after launch in January 1986. Severe cold that had reached into normally warm Florida had reduced the resiliency of rubber O-rings on the right solid-rocket booster, paving the way for hot exhaust gases to escape. Despite all the science and technology involved, the Challenger fell victim to the effects of cold temperatures on a simple O-ring. Is it any wonder that we want to remind you that cold weather can have adverse effects on the aircraft you fly?

Air and hydraulic fluid leaks are amplified as the temperature plummets. Hydraulic cylinders and actuators may leak fluid because O-rings, seals, and gaskets are less pliable and become deformed at lower temperatures. In addition, ice crystals in hydraulic fluid may cut seal materials. Air leaks develop as seals and line connections contract at different rates.

Mechanical and hydraulic controls become sluggish in cold weather. Unauthorized lubricants that seemed to work properly in warm weather will stiffen up and cause bearings to require added force to move as the temperature decreases.

Moisture condensation causes water to accumulate in fuel tanks, especially in tanks that are not kept full. If the water freezes, it may close filters, fuel lines, and valves.

Hydraulic accumulator pressure differs with ambient temperature, and rotor damper vent valves have temperature restrictions. These and other factors make by-the-book maintenance and operation mandatory.

Many of the procedures dictated in maintenance and operators manuals were developed as the result of lessons learned the hard way. Therefore, when units move from a warm environment to a much colder one, it is important that all personnel carefully review manuals to ensure adjustments for the new environment are made. Simple actions such as wiping down exposed hydraulic pistons and thorough pre-heating of the aircraft help alleviate problems associated with extreme cold weather. Most manuals contain specific guidance on how to do these tasks to standard.

In addition to maintenance and operators manuals, TM 55-1500-204-23: *General Aircraft Maintenance Manual* is an excellent reference for cold-weather operations. Chapter 10 (Arctic, Desert, and Tropical Maintenance) outlines steps to prevent the adverse effects of cold weather.

The key to successfully dealing with the negative effects of extreme cold temperatures is planning and preparation. Knowing what should be done and having the equipment to do it are critical to safe cold-weather operations.

POC: MSG Ruben Burgos, Aviation Systems & Investigation Division, DSN 558-3703 (334-255-3703), burgosr@safety-emh1.army.mil

AH-64 uncommanded flight-control inputs

The August 1998 issue of *Flightfax* contained a survey for AH-64 pilots who've encountered uncommanded flight control inputs. Completed survey forms were to be sent to Boeing for consolidation and study.

It is also important for all unit aviation safety officers to collect such AH-64 incidents as mishap data and forward through normal safety channels to the Army Safety Center. This will enable us to track incidents and identify trends involving uncommanded control inputs and possible backup control system (BUCS) discrepancies.

All AH-64-equipped units should collect data on all uncommanded flight control inputs. In addition to the Boeing survey, the information should be transmitted to the Safety Center using the AAAR (PRAM) worksheet. (Previous incidents where the information was not captured do not apply.)

—MAJ Mark Robinson, Aviation Systems & Investigation Division, DSN 558-1253 (334-255-1253), robinsom@safety-emh1.army.mil

Attention Kiowa Warrior users: DES looks at Task 1053

DES evaluations of OH-58D(I) crewmembers during installation visits along with a string of incidents over the past several years have highlighted a serious problem in Warrior flight-crew training. Since the prohibition of touchdown autorotations, Task 1053: *Perform simulated engine failure at altitude (SEF/A)* is the only maneuver available to give crews limited training on emergencies requiring autorotation. However, errors during execution of Task 1053 can outweigh any training benefit gained from performing the maneuver. In the worst cases, errors result in aircraft damage and crew injury.

Recent changes to the task description restrict performance of the task to improved areas and assign responsibility for throttle increase to the SP/IP initiating the maneuver. However, these changes have not had a significant impact.

Incidents

Most serious is the high number of incidents during SEF/A training. These incidents are caused by failure of the IP/SP to ensure that operating rpm is restored prior to termination with power. Late or non-recognition of this situation has led to overtorques, loss of control, and hard landings.

Loss of training value

Improper initiation of the SEF/A (lowering the collective prior to throttle reduction) robs the pilot of the sensations of an engine failure (left yaw, rapid Nr decay, low Nr warning message and audio). It also prevents the IP/SP from properly evaluating the pilot's response to the SEF/A.

Termination with power through early application of collective to slowly decrease rate of descent results in a smooth, controlled termination. Unfortunately, it also eliminates any resemblance to the termination of a touchdown autorotation.

When done in accordance with the ATM description, the SEF/A is NOT a "smooth" maneuver. Deviation from proper execution in an attempt to "smooth out" the maneuver eliminates any training value from the maneuver. Proper initiation WILL result in a strong left yaw and rapid decay of Nr. Proper execution of the termination with power should result in a noticeable reduction in rate of descent during a discernible deceleration and collective application ("initial"). This termination may even result in Nr droop under some conditions.

Challenges

DES has observed that, due to high OPTEMPO in divisional units, far more training time is spent supporting the ground-maneuver mission than in past years. Combine this with critically curtailed flying-hour programs, and it is painfully obvious that individual crew training is suffering greatly. Opportunities for an IP/SP to take a unit aviator out and conduct nontactical base task training are practically nonexistent. The result is that most PC/PIs will see an SEF/A once a year during the APART. In addition, unit IP/SPs may conduct an SEF/A only during the APARTs they administer and during their own APART evaluation. This is not enough to maintain proficiency in the maneuver.

Solutions

The "easy" solution would be to substantially increase unit flying hours; this may or may not occur in a time of constrained resources. In the interim, however, measures can be taken to help eliminate this problem. The solution must be a combined effort of both command and unit trainers.

Unit commanders (from division down to unit) must re-allocate hours to individual training. This will come at the expense of division support, but the benefits will be better-trained aviators and fewer accidents. Secondly, unit IP/SPs must make an effort to increase the frequency of SEF/A training and ensure they are executing the maneuver to standard. This can be done simply by adding one or two trips around the pattern at the end of a tactical flight.

Conclusion

Technology has greatly increased the reliability of modern aircraft engines, but aircrews still face the possibility of forced landing and other autorotation situations. We must be confident in our ability to deal with these occurrences. That confidence will come only through proficiency, and the key to proficiency is experience.

—CW5 Charlie Weigandt, Directorate of Evaluation & Standardization, Fort Rucker, AL, DSN 558-2532 (334-255-2532), weigandtc@rucker.army.mil

Extra ammo: Any gunbunny worth his salt would fire it all . . . right?

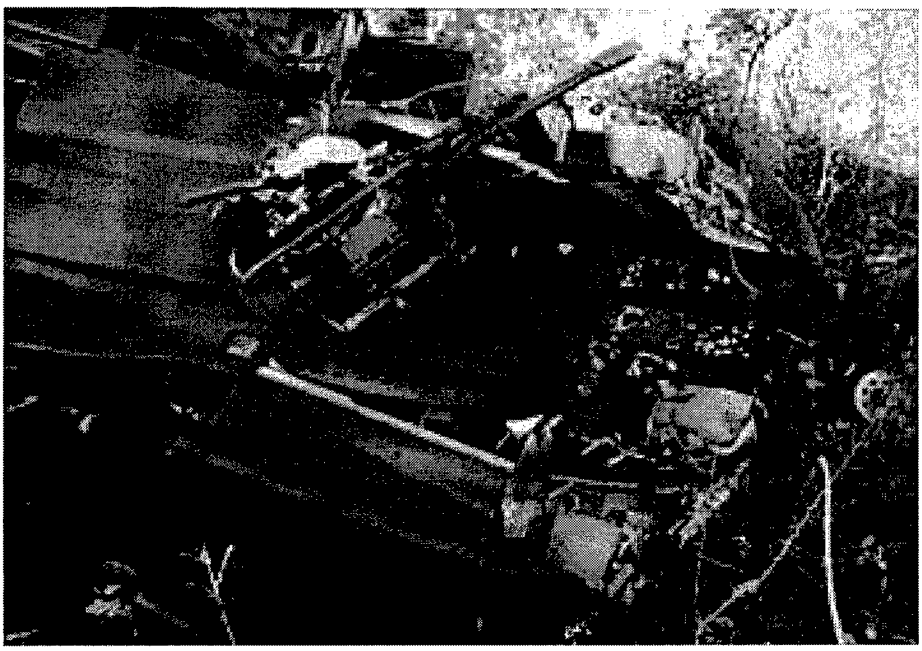
Any gun pilot will tell you that you never get enough ammunition to shoot. The tables in FM 1-140: *Helicopter Gunnery* never provide enough ammunition to enhance the high degree of weapons proficiency desired by the professional gun pilot.

Given a perfect world with unlimited resources, a gun pilot's dream is to have all the ammunition he could possibly fire. And, given all this ammunition, any gun pilot worth his salt would take maximum advantage of the situation and fire it all. Right?

Sometimes the opportunity does present itself to expend ammunition beyond the normal firing tables of annual qualification. Firepower demonstrations and CALFEXs occasionally give us the chance to expend a lot of ammunition within a short period of time. On even rarer occasions, excess ammunition is available from previous gunnery exercises.

With such a valuable resource, the prudent soldier matches training value and ammunition against range time and critical gunnery tasks. The tables in FM 1-140 provide a structured methodology for normal STRAC allocations, drawing maximum training value from minimum ammunition. Creative use of limited ammunition can further stretch scarce resources.

But, suppose we have the opportunity to shoot a significant amount of ammunition not programmed for annual gunnery? We have the chance to get additional training value. Although we have limited range time, the armament crew loads our aircraft. They, too, want a successful gunnery, defined as "all systems working properly and ammunition fired out." We want to fire it out; they want us to fire it out. It just plain makes sense. Right?



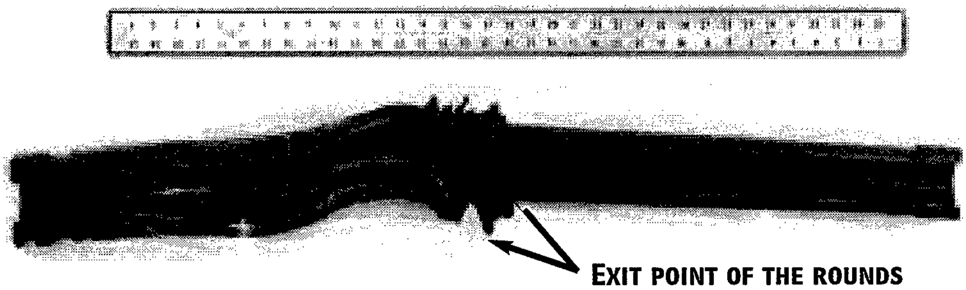
Rounds and fragments sprayed underside of front fuselage.

Let's look at the case of a crew who had just such an opportunity. It seemed perfectly acceptable to take on 990 rounds of 30mm, 20 rockets, and 3 Hellfire missiles to get through some critical gunnery tasks. Although they had been briefed that there would be 330 to 440 rounds per aircraft, additional unused ammunition was now available from a recent gunnery. Why not shoot it, get additional training, and save the armament crew the job of re-packing that ammunition?

Two aircraft had a total of 30 minutes to conduct the gunnery exercise. The burst limit switch was placed to 100 to allow maximum round expenditure. The guns were humming. Everything was progressing normally. However, disaster was just around the corner.

The gun ruptured, resulting in numerous rounds and large fragments penetrating the lower front fuselage, severing or damaging both mechanical and enhanced backup system (EBUCS) flight-control components. The aircraft descended out of control in a spiraling right turn until it hit the ground, resulting in extensive damage. The crew, fortunately, escaped injury.

Ask most Apache pilots what the gun duty cycle is, and you'll get the standard answer: "No more than six 50-round bursts with a 5-second pause between bursts, followed by a 10-minute cool-down period. For burst limits of other than 50, the gun duty cycle can be generalized as no more than 300 rounds within 60 seconds followed by a 10-minute



THIS GUN BARREL RUPTURED, RESULTING, IN EFFECT, IN AN APACHE SHOOTING ITSELF IN THE FOOT.

cool-down period."

The key term is "cool-down period." But what exactly does that mean? If we fire 250 rounds in 60 seconds, do we require a cool-down? What about firing 400 rounds in 90 seconds? If we exceed the cycle, what happens? Does this reduce gun life? Will the gun jam?

The physics of the 30mm gun gives us the answer. Each round fired raises gun temperature 1.4°F to 3.5°F, depending on how many total rounds have been fired. (During periods of non-firing, the weapon cools at a rate of 1° per second.) Therefore, if we fire the gun to the maximum severe gun duty cycle, gun temperature will reach 1000°F.

Is there a point beyond the gun duty cycle at which the gun will fail? Obviously, the gun will eventually reach a point at which the temperature will cause a misfeed, a lodged round, or other catastrophic failure. Indications appear as round dispersion and sinking round impact, all as the barrel heats and distorts. During the mishap described above, the 30mm reached an estimated 1939°F.

Unlike some other weapons systems, there is no temperature sensor on the gun. And, during normal operations, the gun duty cycle will never be exceeded. Tactically, except for rare air-to-air engagements or some very unusual circumstances in a low-threat environment, we would seldom expend large amounts of 30mm at any given time. And, during peacetime operations, we barely have enough ammunition to complete our qualification tables. So why be concerned with the gun duty cycle? If it were ***that*** important, it would be listed as a warning, caution, or limitation. Right?

The fact is that the gun has limitations. The experts at Picatinny Arsenal and AMCOM are currently developing clear and quantifiable limits to be published in the appropriate sections of the operators manual. In the interim, Aviation Safety Action Message (ASAM) AH-64-99-ASAM-01 (011326Z Dec 98) recommends following the existing guidance with the warning: "Failure to adhere to the published gun duty cycle as described in the operators manual may cause a catastrophic failure to the 30mm gun, resulting in loss of aircraft, injury, or death."

We all want to fire all the ammunition we're allotted, but an old gunbunny worth his salt will learn the "why" behind the gun duty cycle and, accordingly, respect the limits.

—MAJ Mark Robinson, Aviation Systems & Investigation Division, DSN 558-1253 (334-255-1253), robinsom@safety-emh1.army.mil

AN/AVS-7 HUD retrofit

Two retrofit efforts affecting the AN/AVS-7 heads-up display (HUD) are under way, and the project manager requests field assistance in completing the efforts.

The first is a retrofit of the SU-180/AVS-7 helmet display unit (HDU). This retrofit is required due to a manufacturing error and involves only some HDUs. Table 1 lists the serial numbers of HDUs that still need to be retrofitted. Units having AN/AVS-7 HDUs should check the serial numbers (located on the power supply calibration unit (PSCU)) to determine whether they are on the list. If so, units should contact the POC listed below for further instructions.

The second retrofit effort is based on ASAMs UH-60-97-ASAM-19 and CH-47-97-ASAM-10. These ASAMs directed inspection of AN/AVS-7 assets to find certain CV-4229/AVS-7 signal data converters (SDCs). Table 2 lists those that have not yet been returned for rework. Serial numbers located on the top of SDCs should be compared to the list, and any matches should be reported to the POC below for immediate resolution.

POC: Mr. Mark Salverson, AN/AVS-7 Supportability/Fielding Manager, DSN 645-9941 (256-955-9941), msalvers@logsa.army.mil

Table 1. Serial numbers of AN/AVS-7 HDUs needing retrofit

000
H00018
H00019
H00027
H00032
H00038
H00039
H00040
H00045
H00060
H00062
H00074
H00075
H00078
H00081
H00084
H00085
H00088

100
H00104
H00105
H00106
H00113
H00155
H00156
H00157
H00179
H00180

200
H00222
H00230
H00231
H00234
H00245
H00255
H00256
H00278
H00283
H00289
H00291
H00293
H00294
H00299

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H00313
H00315
H00316
H00317
H00318
H00333
H00339
H00350
H00353
H00360
H00371
H00372
H00373
H00377
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H00430
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H00474
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H00572
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H00575
H00579

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H00629
H00637
H00642
H00647
H00669
H00678
H00687

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H00704
H00716
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H00722
H00724
H00726
H00735
H00747
H00753
H00756
H00764
H00772
H00779
H00784
H00787
H00793
H00794
H00799

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H00806
H00810
H00812
H00813
H00815
H00816
H00818
H00820
H00887
H00891

900
H00920
H00953

2000
H02005
H02006
H02018
H02028
H02040
H02068
H02070
H02072
H02079
H02080
H02094
H02097

2100
H02102
H02105
H02113
H02114
H02115
H02116
H02117
H02119
H02121
H02122
H02126
H02130
H02137
H02141
H02150
H02151
H02152
H02158
H02162
H02165
H02180
H02183
H02186
H02190

2200
H02206
H02273
H02283
H02298

2300
H02300
H02301
H02302
H02309
H02314
H02341
H02343

6000
H06009
H06011
H06015
H06017
H06020
H06027

Table 2. Serial numbers of CV-4229/AVS-7 signal data converters needing retrofit

#	SDC SN	P/S CCA S/N#	DD250 Date
1	E00253	1358	05/30/97
2	E00374	1195	05/30/97
3	E01166	2352	12/20/96
4	E01171	2329	12/20/96
5	E01174	2304	12/20/96
6	E01175	2369	12/20/96
7	E01177	2320	01/31/97
8	E01180	2349	12/20/96
9	E01183	2344	12/20/96
10	E01184	2379	12/20/96
11	E01185	2343	12/20/96
12	E01187	2402	12/20/96
13	E01188	2299	12/20/96
14	E01189	2297	12/20/96
15	E01190	2296	01/28/97
16	E01191	2239	12/20/96
17	E01195	2337	12/20/96
18	E01196	2332	12/20/96
19	E01197	2335	01/31/97
20	E01199	2317	12/20/96
21	E01201	2340	12/20/96
22	E01206	2362	12/20/96
23	E01208	2371	01/31/97
24	E01209	2381	12/20/96
25	E01218	2380	12/20/96
26	E01219	2334	12/20/96
27	E01220	2383	12/20/96
28	E01223	2392	12/20/96
29	E01228	2350	12/20/96
30	E01232	2376	01/28/97
31	E01233	2386	12/20/96
32	E01238	2418	01/28/97
33	E01313	3054	04/28/97
34	E01461	2599	05/30/97
35	E01496	2668	05/30/97
36	E01599	2790	02/27/97
37	E01601	2794	02/28/97
38	E01615	2816	12/20/96
39	E01616	2787	04/28/97
40	E01617	2800	01/28/97
41	E01620	2786	01/28/97
42	E01622	2789	12/20/96
43	E01623	2805	12/20/96
44	E01625	2784	12/20/96
45	E01629	2815	12/20/96
46	E01632	2828	12/20/96
47	E01636	2831	12/20/96
48	E01637	2829	12/20/96
49	E01642	2783	01/31/97
50	E01647	2780	12/20/96
51	E01649	2833	01/28/97
52	E01650	2826	01/28/97
53	E01651	2821	12/20/96
54	E01666	3048	12/20/96
55	E01668	2836	12/20/96
56	E01669	2861	12/20/96
57	E01687	2913	12/20/96
58	E01696	2890	01/31/97
59	E01731	2976	04/30/97
60	E01734	2930	04/28/97
61	E01750	2852	01/28/97
62	E01762	2987	04/28/97
63	E01764	3024	04/28/97
64	E01765	2982	12/20/96
65	E01767	2989	12/20/96
66	E01771	3049	01/28/97
67	E01773	2947	12/20/96
68	E01774	2993	12/20/96
69	E01775	2971	12/20/96
70	E01781	2939	04/30/97
71	E01790	2969	04/30/97
72	E01793	2936	04/30/97
73	E01796	2996	04/30/97
74	E01805	3016	04/30/97
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76	E01878	3121	05/28/97
77	E01880	3116	04/28/97

P/S CCA S/Ns

Item #		P/S Serial #	DD250 Date
1		3015	04/28/97
2		3243	04/28/97

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class C
F series

■ Following two demonstrated hovering autorotations, PI initiated autorotation from hover. Upon contact with ground, aircraft again became airborne, at which time IP recovered and landed. Overtorque damage reported.

AH64

Class C
A series

■ Crew noted unusual popping noises during target engagement. Suspecting tree strike, crew monitored aircraft performance and instrument indications. Noting no deficiencies, crew continued mission. Upon mission completion and en route to assembly area, intermediate tail-rotor-gearbox temperature caution light came on. Aircraft landed at assembly area without further incident. Postflight inspection revealed damage to all main- and tail-rotor blades.

Class E
A series

■ On completion of first flight, No. 2 nose gearbox oil level could not be seen in sight gauge. Oil was found inside transmission area. Caused by deteriorated output seal.

■ During through-flight inspection, tail strut was found stoked. Tail-wheel strut was replaced.

■ Environmental-control unit (ECU) began to make loud grinding noise and surging sound during OGE hover. Aircraft was landed, and smoke and fumes began to fill cockpit. Doors were opened to ventilate, and aircraft was shut down. ECU turbine fan was replaced.

■ During flight onto aerial gunnery range at night, PI felt abnormal vibration and made precautionary landing. Maintenance pilot found abnormal rotor disk movement. Heading attitude reference system was replaced.

■ Aircraft had been in FARP on APU for 20 minutes when crew felt high-frequency vibration. After APU shutdown, inspection revealed transmission accessory gearbox input drive shaft seal was leaking and input clutch was locked. Cause of transmission lock-up is under investigation.

■ While conducting slope landings under NVS, pilot's helmet display unit (HDU) suddenly lost focus. Training was terminated, and aircraft returned unaided to home base without incident.

CH47

Class D
D series

■ During external load mission carrying M119 Howitzer, aircraft began vertical descent from high hover for landing. Descent was uneventful until approximately 5 feet, at which time aircraft rate of descent accelerated, accompanied by forward drift. Load contacted ground, was jettisoned, and consequently rolled over.

Class E
D series

■ No. 1 fire light came on during HIT check. No fire was visible and flight engineer reported no smoke from engine. PC performed emergency engine shutdown. Engine inspection found chaffed fire element loop near engine cowling.

OH58

Class D
D series

■ Aircraft was at OGE hover over tree during night live-fire with 2.75-inch rockets. IP in right seat directed PI to begin moving forward to engage targets. As PI hovered forward, both crewmembers became focused inside cockpit and did not notice their gradual loss of altitude. Just before aircraft settled into trees, IP noticed aircraft's close proximity to trees and took controls, stopping the descent with rapid collective application. Crew noted high torque and low rotor audio and visual warning on the MFD and landed without incident. Maintenance inspection found MFD and engine history of 132 percent for 1 second and three tail-rotor disk packs slightly spread. Main-rotor blades were not damaged. IAW OH-58-MIM-003, engine accessory gearbox was removed and sent to depot maintenance for technical inspection.

D(I) series

■ Tail rotor struck bush during landing from hover. Aircraft was moved then landed and inspected. Tail-rotor blade was dented.

■ During NOE flight, as PI initiated decelerating right turn, wind gust caught aircraft tail and aircraft began an uncommanded right spin. After attempting to arrest spin with left pedal, PI centered pedals to avoid overtorque condition. Spin rate increased, and aircraft completed three 360-degree revolutions. PI gradually reapplied left pedal, collective, and forward cyclic to arrest spin. Engine monitor showed mast torque at 123 percent for 1 second and engine torque at 117 percent for 0 second. Maintenance inspection revealed no damage.

Class E
A series

■ Engine N2 began to increase during cruise flight, and PI initiated emergency procedures for engine overspeed. PI landed aircraft on manual throttle without further incident. Month-old turbine governor was replaced.

C series

■ During shutdown, PC rolled throttle to idle position, but engine rpm remained at 100 percent. Aircrew alerted maintenance personnel, who found throttle linkage to N1 fuel control disconnected at fuel control. After shutting down aircraft, maintenance personnel found bolt and washer on engine deck; nut and cotter pin were not installed.

■ During touchdown phase of hovering autorotation, aircraft rocked forward excessively, allowing drive shaft to contact isolation mount. Aircraft was landed without further incident.

UH1

Class E

H series

■ Master caution light, but no segment light, came on during slope operations. Aircraft landed without further incident. Transponder was replaced.

■ Master caution came on during straight and level flight, and aircraft landed without incident. Voltage regulator and d.c. generator were replaced.

■ During cruise flight, bird struck battery compartment and windshield wiper. Aircraft landed without further incident.

■ During takeoff to hover, crew felt aircraft lurch and heard loud popping sound before discovering two tie-down chains still attached to rear tie-down points. Damage limited to one tie-down point and minor sheet metal damage.

■ During installation of tail-rotor assembly, mechanic failed to install cotter pin in retaining nut for tail-rotor control tab. TI failed to notice that cotter pin was missing. Retaining nut backed off during maintenance test flight, causing loss of tail-rotor control.

UH60

Class B

A series

■ Crew reported loss of power to No. 1 engine and executed forced landing. Aircraft landed hard on slope. Investigation under way.

■ Forced landing ended in hard landing after reported rotor underspeed on takeoff. Aircraft was equipped with ESSS and additional fuel. Investigation in progress.

Class C

L series

■ Blade tie-down had been left attached to one main-rotor blade and, upon engine runup, tie-down wrapped around tail-rotor assembly. Tail-rotor blade was replaced and antenna was damaged.

■ During shutdown, both engine power control levers (PCLs) were retarded to idle, and tgt decreased normally to 500°C. No. 2 engine then experienced a rapid rise in tgt to approximately 1000°C. Crew moved No. 2 PCL to off position and motored starter to reduce temperature reading. Maintenance inspection revealed faulty No. 2 engine cross bleed valve. Engine is being examined for damage.

■ Aircraft was set down in ditch 150 feet short of intended landing site during dust-landing training iteration. Landing gear and nose of aircraft were damaged.

■ During air-assault training, soldier fell 15 feet from aircraft to ground during takeoff. His injuries required 48 hours' hospitalization.

■ Main-rotor blades contacted small tree in LZ during infiltration training at night. All four main-rotor-blade tip caps were damaged.

Class E

A series

■ During maintenance test flight at cruise with degraded AFCS, transmission temperature reached 140° and smoke was detected in cabin. Transmission oil pressure was decreasing from 55 to 0 psi on landing. Upon shutdown, grinding noise was heard in cabin. Rotor blades came to a stop less than a minute after emergency engine shutdown. Smoke increased in cabin main transmission area. Cause not reported.

■ While conducting HIT check on No. 1 engine, No. 1 tgt was erratic, fluctuating $\pm$80°. HIT check was then attempted on No. 2 engine with same results. Aircraft was shut down without further incident. Caused by failure of No. 1 engine history data recorder, which was replaced.

L series

■ Approximately 1 minute after bringing engine power control levers to idle, crew heard popping noise coming from No. 2 engine. Crew shut down engines. CP saw that No. 2 engine tgt peaked to just under 900°C. Maintenance suspects that popping noise was compressor stall resulting from cracked bleed air tube, which was replaced.

■ When crew brought engine power control levers back to idle during engine shutdown, APU failed, indicating an underspeed. Inspection found that fuel manifold was broken in half, causing the underspeed.

■ During simulated engine failure, master caution light came on with no associated capsule light. Roll-on landing was performed with parking brake set, resulting in damage to both main landing gear tires.

■ Stabilator failed during IFR cruise flight at 2200 feet and 120 knots. Pilot pressed auto-control reset button once, and stabilator returned to normal. Three minutes later, stabilator failed again and was again reset. Three minutes after that, stabilator failed for third time and was reset but failed again 30 seconds later. Crew manually controlled stabilator and landed without incident. Inspection revealed faulty No. 2 actuator; stabilator actuator was replaced.

C12

Class A

K series

■ Aircraft crashed, killing both crewmembers. Aircraft was destroyed in postcrash fire. Investigation is under way.

Class E

F series

■ Postflight inspection revealed that inboard right main tire was deflated and hanging on rim. No visible flat spot was noted and minimal braking had been used during landing. Maintenance concluded that prolonged flight at high altitude and freezing temperature with low air pressure in tires caused tire and rim to separate. Tire was replaced.

H series

■ While leveling off for cruise flight at FL220, aircraft failed to maintain scheduled pressurization. Aircraft returned to base without further incident. Maintenance inspection revealed faulty flow-control valve in right-side flow pack. Engine flow pack was replaced.

O5

Class E

DHC-7

■ During approach, No. 1 a.c. generator hot light came on. Generator was turned off, and normal landing made. Maintenance found moisture on No. 1 a.c. generator harness.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785). Note: Information published in this section is based on *preliminary* mishap reports submitted by units and is subject to change.

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action message

AH-64-99-ASAM-01, 011326Z Dec 98, informational

During gunnery operations, an AH-64D experienced a catastrophic failure of the gun barrel. The suspected cause of the failure has been attributed to exceeding the duty cycle of the gun as described in the AH-64A/D operators manual. The purpose of this message is to emphasize to all AH-64A/D flight crewmembers the importance of observing the limits published in the operators manual and to add a warning that addresses the potential consequences of failure to follow published 30mm-gun duty cycle.

AMCOM contact: Mr. Howard Chilton, DSN 897-2068 (256-313-2068), chilton-hl@redstone.army.mil

UH-60-99-ASAM-03, 051849Z Nov 98, maintenance mandatory

As part of AMCOM's T700-series engine component improvement program, GE proposed a reduction in the service life limit of some rotating components in the T700-GE-700 engine. These recommendations are being evaluated as to the impact they would have on aviation customers. The purpose of this message is to direct reporting of specific data on the T700-GE-700 engine components listed in paragraph 7 of the message.

AMCOM contact: Mr. Ed Goad, DSN 897-2095 (256-313-2095), goad-er@redstone.army.mil

Safety-of-flight message

AH-1-99-SOF-02, 051442Z Nov 98, technical

During a fatigue test program, a swashplate anti-drive link assembly was found to contain cracks and other defects caused by the manufacturing process. The nature of the cracks and the environment that the part operates in could lead to a life reduction. The purpose of this message is to require a one-time inspection and removal of suspect swashplate anti-drive link assemblies manufactured by McGinty Machine (cage code 24543) installed on aircraft and from all stock.

AMCOM contact: Mr. Howard Chilton, DSN 897-2068 (256-313-2068), chilton-hl@redstone.army.mil

Maintenance-information messages

AH-64-99-MIM-01, 261620Z Oct 98

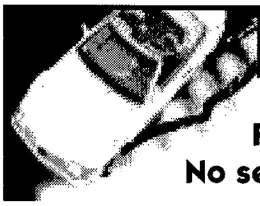
AH-64 APU clutch (P/N 3886200-1, NSN 2835-01-431-8327) was fielded recently. The purpose of this message is to provide removal, installation, and servicing procedures; 10-hour and 14-day inspection requirements; and phase-inspection requirements.

AMCOM contact: Mr. Ken Muzzo, DSN 897-4812 (256-313-4812), muzzo-kw@redstone.army.mil

AH-64-99-MIM-02, 231518Z Nov 98

Touch-up paint for the AH-64A TADS/PNVS boresight assembly was incorrectly identified in TM 1-1270-476-20. The purpose of this message is to provide correct information for obtaining the proper solar-absorbing coating required by technical publications.

AMCOM contact: Mr. Dennis Hediger, DSN 897-4913 (256-313-4913), hediger-dm@redstone.army.mil



Speed ⊙
Fatigue ⊙
No seatbelt ⊙

No new causes, just new victims

FY99	FY98
25	18

IN THIS ISSUE

Class A Accidents through November

		Class A Flight Accidents		Army Military Fatalities	
		98	99	98	99
1ST QTR	October	2	1	0	0
	November	1	1	0	2
	December	2		2	
2D QTR	January	1		0	
	February	1		0	
	March	1		0	
3D QTR	April	0		0	
	May	1		0	
	June	2		4	
4TH QTR	July	1		0	
	August	0		0	
	September	0		0	
	TOTAL	12	2	6	2

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Charles M. Burke
Brigadier General, USA
Commanding