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RISK-MANAGEMENT
INFORMATION

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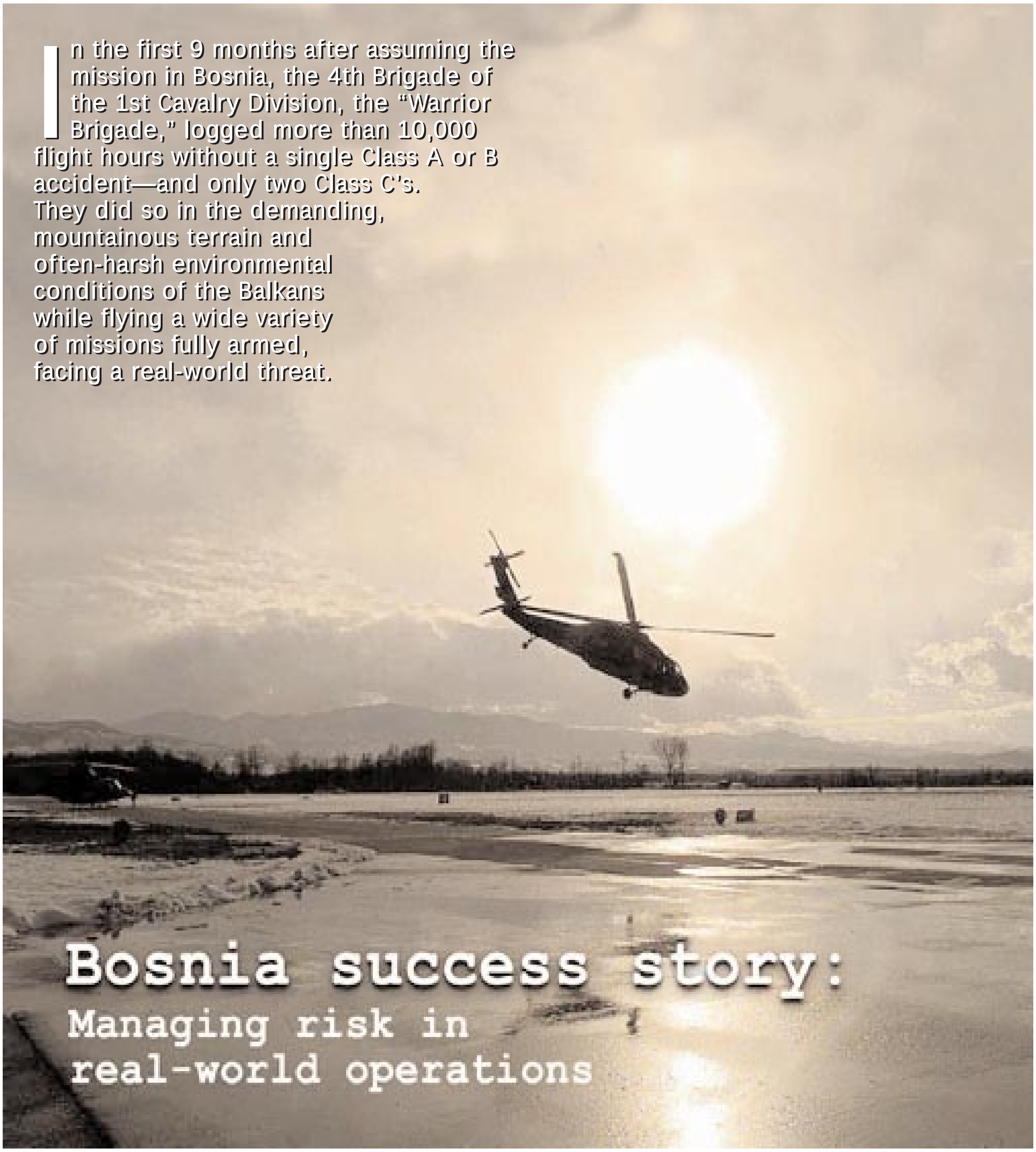

In the first 9 months after assuming the mission in Bosnia, the 4th Brigade of the 1st Cavalry Division, the "Warrior Brigade," logged more than 10,000 flight hours without a single Class A or B accident—and only two Class C's. They did so in the demanding, mountainous terrain and often-harsh environmental conditions of the Balkans while flying a wide variety of missions fully armed, facing a real-world threat.

Bosnia success story:

Managing risk in real-world operations

Bosnia success story: Managing risk in real-world operations

Flying 10,000 hours in 9 months with a great safety record while executing demanding missions doesn't happen by accident. It takes thorough planning, disciplined execution, and relentless application of risk management at all levels. The Warrior Brigade is doing just that. The brigade is mission-focused, has a strong safety program in place, is appropriately managing risk, and is accomplishing their difficult mission while maintaining an outstanding safety record. Let's look at how they're managing the risks involved in the special challenges they face.

Pre-deployment training

Extensive pre-deployment training is a requirement for all units preparing to assume the Stabilization Force (SFOR) mission in Bosnia. One of the real success stories has been development and execution of the Aviation Training Exercise (ATX) at Fort Rucker for units preparing to deploy to Bosnia.

The ATX uses a Bosnia-terrain database and real-time connectivity with the Brigade headquarters in Comanche Base, home of the Warrior Brigade. As a result, unit commanders, staff officers, and aircrews conducting the ATX plan and fly missions that are actually being executed in Bosnia. In addition, they are able to capitalize on the expertise of units already there. From planning for adverse weather and difficult terrain to accounting for wires and towers, time invested in the ATX is one of the best tools available to prepare units getting ready to "assume the mission."

Weather and terrain

The weather in the Balkans, particularly during the winter, is prone to change rapidly and dramatically. Even within Tuzla valley, home of both Eagle Base and Comanche Base, the weather can be significantly different. For example, an aircrew at Eagle Base told of receiving a weather brief by the forecasters on Comanche—only 2½ miles away—that was far above minimums. At the same time, however, they were unable to see across the runway at Eagle Base. For this reason, units will routinely supplement official USAF forecasts by calling outlying base camps to verify local conditions.

Because of the tricky weather, the brigade commander has mandated higher than normal weather minimums: 500'/1600m (essentially, 1-mile visibility) day, and 1000'/1600m night. The brigade commander alone retains authority to authorize flights below the minimums.

Another control measure involves development of special routes that take into account the weather and terrain. These low-level weather routes are designed to provide safe passage during the worst flyable weather conditions.

Wires and other obstacles

As is the case in most developed countries, wires and other manmade obstacles represent a real threat to aircrews. To mitigate the risks, a 300-foot-agl "hard deck" is established for most areas (it's 500 feet in some). Except in an emergency, aircraft are not authorized to descend below the hard deck until occupying a battle position or landing to an airfield or a planned LZ. To accommodate terrain-flight requirements, two training areas have been established to allow single aircraft to conduct terrain-flight training.

Command involvement

Controls are in place that ensure battalion-commander involvement in every mission. Due to installation of auxiliary fuel tanks on the AH-64s and some of the UH-60s, most mission briefings require the approval of the battalion commander.

Crew selection is managed in excruciating detail. In the 2-227th General Support Aviation Battalion (GSAB), platoon leaders and company commanders select aircrews, but the battalion commander must approve each selection. The bottom line is that aircraft don't fly in theater without the knowledge and approval of an O5 commander. Further, a crew change doesn't happen unless the battalion commander approves it.

The same battalion commander subscribes to the policy of alternating pilots among two or three crews. The philosophy is that flying together too much leads to complacency—and complacency can be deadly.

Complacency

Complacency is also addressed in planning. While units are doing a wide variety of missions, many of these missions are repetitive. It should be expected that a degree of complacency could develop. Deliberate, methodical, and well thought-out missions are the brigade's control to combat the growth of complacency in mission planning. In addition, every multiship mission is briefed, back-briefed, and rehearsed before it is executed.

Crew rest

While a sense of total mission focus contributes to the brigade's success, such total focus can very quickly result in fatigue. To reduce that possibility, the GSAB commander's policy is to ensure that all soldiers get a 24-hour period off each week—depending, of course, on the tactical situation.

Uploaded Apaches

For operational reasons, all Apaches remain uploaded at all times with a standard load of Hellfire missiles and 30mm rounds. To control the risk involved, the brigade SOP requires that crews remain more than one switch away from firing at all times. The absence of rockets from the standard load also reduces the risk of accidental discharge. In addition, because the aircraft remain uploaded (another control measure), personnel are not routinely handling ammunition, which also reduces the risk. To date, there have been no incidents involving armament or accidental discharges.

Proficiency

There is some concern regarding proficiency in armament switchology and IFR flight procedures. There are currently no UH-60 simulators or AH-64 Combat Mission Simulators in country. This, combined with the facts that the AH-64s remain armed and the hard deck prevents frequent terrain-flight training,

Warrior Brigade: Who they are, where they are, and what they're doing

The Warrior Brigade is approximately 1400 soldiers strong (including a two-ship AH-64 section from the Royal Netherlands Air Force). Prior to scheduled unit rotations in March, the brigade was composed of—

- Brigade Headquarters and HSD
- 3/229th Attack Helicopter Regiment (Fort Bragg)
- 2-227th General Support Aviation Battalion
- 615th Aviation Support Battalion (direct support)
- 126th Medical Evacuation Company (CA ARNG)

Comanche Base, home of the Warrior Brigade, lies in the Tuzla valley in the northeast corner of Bosnia-Herzegovina. About 2½ miles away, in the same valley, is Eagle Base, the headquarters of the 1st Cavalry Division, commanding the Multi-National Division-North. The 126th Medevac Company and the command aviation section of the 2-227 GSAB also reside at Eagle Base. In addition, Warrior Brigade has a medevac detachment located at Camp McGovern, near the contested border city of Brcko and positioned along the border of Bosnia-Herzegovina and Croatia.

The Warrior Brigade sustains an exceptionally challenging optempo. Their everyday activities involve a wide variety of missions, from the 3/229th's reconnaissance and security missions to the 2-227th's nonstop air movements to "on-call" coverage provided by the 126th Medevac.

means that numerous crew tasks cannot be practiced. To address the IFR flight training shortfall, the brigade sends selected crews to Germany on temporary duty to use the UH-60 simulators there. In addition to the training benefit, these infrequent trips also assist in the treatment of chronic fatigue.

Maintenance

An outstanding maintenance program reduces the risk of maintenance-related accidents in Warrior Brigade. In addition to enjoying the highest priority for repair parts, units are also wisely capitalizing on the availability of contract maintenance. The Brigade has maintained an 86-percent mission-capable rate while flying an extremely high optempo. In one month, the 15-aircraft UH-60L fleet averaged 43.9 hours per airframe, roughly three times the Army average.

Redeployment

Risk management cannot be focused only on the near term. In recognition that flight conditions in Texas are much different from those in Bosnia, pilots deployed from Fort Hood are required to re-certify upon redeployment. They complete a 2-week program of aviator familiarization with local airspace and procedures. This pilot-orientation course ends in a checkride.

Summary

Completing the mission while managing the risk, the Warrior Brigade has met the challenge in Bosnia. While the two battalions and the medevac company rotated back to CONUS in March, the Warrior Brigade will continue to execute the mission until August, when it is scheduled to be relieved by the Aviation Brigade from the 10th Mountain Division. With winter receding and spring rains approaching, the challenges will change. What won't change, however, is the dedication of the troops to complete the mission and the chain of command's application of sound risk-management principles.

—MAJ Joe Blackburn, Aviation Systems & Accident Investigation Division, DSN 558-9852 (334-255-9852), blackbuj@safety-emh1.army.mil

"Every day we conduct missions straight out of the brigade's mission essential task list. This is the absolute best way to determine if your safety program is on track. No unit can fly the optempo we've flown on pure luck; as all pilots know, luck runs out. The sustainment of this optempo is a testament to the professionalism of the pilots executing a solid safety program."

—MAJ Joe Kools, 4th Brigade S3

Shortfax

Keeping you up to date

DA Pam 738-751 update

The long-awaited update of DA Pam 738-751: *Functional Users Manual for the Army Maintenance Management System-Aviation (TAMMS-A)* has been published. Here's what you'll find inside:

- Policy and procedures for Unit-Level Logistics System-Aviation (ULLS-A).
- Policy and procedures for documenting component repair at AVIM and depot levels of maintenance.
- Aviation life-support equipment and night-vision goggle record-keeping procedures.
- Standard Army Maintenance System (SAMS) policy and procedures.
- Phase maintenance and periodic inspection documentation procedures.
- One new form (DA Form 2408-14-1) that replaces four (DA Forms 2409, 2408-15-1, 2408-5-2, and 2408-14).
- Incorporation of forms and records instructions previously published in TBs 1-2840-20-3, 1-2840-214-20-1, 1500-348-30, and 55-1520-238-23.

The new publication is making its way through normal distribution channels. If you don't want to wait, you can find it online at www.usapa.army.mil.

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Power available vs. power required

The saga continues ...

The mishap investigation report read: "The helicopter was operating near max gross weight when the rotor began to droop at the bottom of the approach to the unfamiliar mountainous landing zone (LZ). The crew was able to land safely, but, on takeoff, the pilots realized too late that the power required to depart the LZ was more than normally available at sea level. The aircraft impacted the ground."

Sound familiar? Though the relationship between power available and power required is recognized, it's often misunderstood. As a result, the lesson is often learned the hard way.

A solid understanding of the power relationship and exercising a little risk management would have prevented helicopter accidents in the past. We receive excellent instruction on the subject during flight training; however, knowledge and skill are both perishable. Even the most experienced aviators suffer from a lack of understanding. Let's revisit this issue by taking a look at what comprises the power required and power available charts and, of course, the main factors that affect both: gross weight and density altitude (DA).

All helicopters—whether with a single main rotor or a tandem rotor configuration—display a similar power-required curve. This curve is made up of three power requirements: induced, profile, and parasite. Each dominates in a particular airspeed range. Let's look at them separately, referring to figure 1 during the discussion.

Induced power

Induced power is what people are referring to when they say helicopters "beat the air into submission." This power requirement dominates at a hover or low airspeeds below ETL. During these regimes, the airflow pattern is through the rotor system, perpendicular to the rotor path.

Induced power is the extra power needed when this induced or downward airflow interferes with the normal streamlined airflow along the rotor path. (See figure 2 for depiction of airflow.) Because of induced flow, the relative wind changes, requiring a higher blade pitch angle to keep the same angle of attack. Remember, it is the angle of attack that directly translates into lift.

Seventy to eighty percent of power required in this regime is induced power; the rest is profile power.

Profile power

We have the profile power requirement to overcome all form drag and skin friction that occurs with a rotor blade at a zero-lift condition. In other words, it's the drag of the blade at flat pitch. Look at it as the resistance that results when an object (such as rotor blades and vertical or horizontal stabilizers) moves through the air, producing lift. It is proportional to forward flight speed (squared) and blade pitch, yet inversely proportional to density altitude.

Why? As density altitude increases, it means that less air molecules are available to resist the surfaces. This type of power is dominant in a very small speed range, but it consistently affects power required though all speeds.

Parasite power

Parasite power is the power required to overcome the "barn door" effect. Objects exposed to

Figure 1

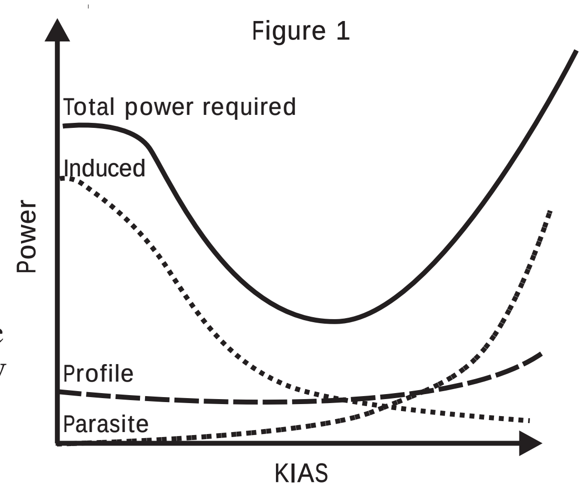
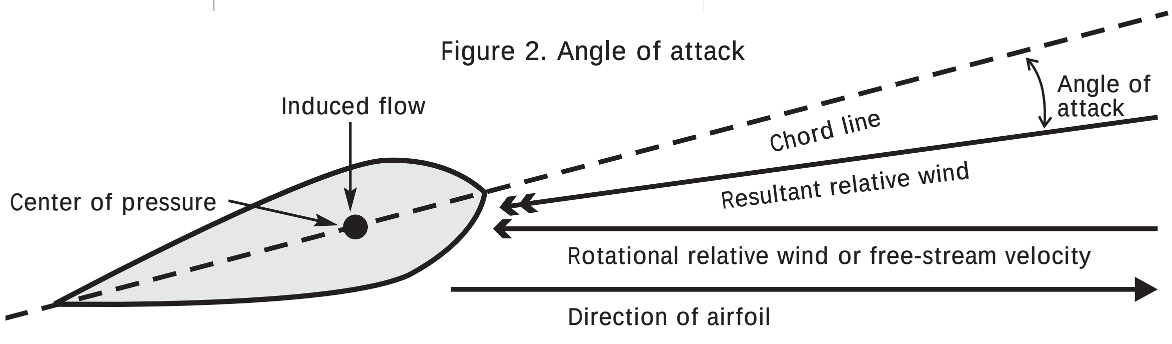


Figure 2. Angle of attack



relative wind that do not generate lift decrease our performance as airspeed increases. In a nutshell, it takes more power to move a non-aerodynamically shaped object through the air than one that is designed as a lift-generating surface.

Speaking of moving barn doors through the air, helicopter designers will work feverishly to reduce the nose-down attitude of an aircraft in high-speed flight in hopes of minimizing the area exposed to the air, thus resulting in less resistance.

This type of power required can be significant, especially at the upper end of our airspeed range due to its proportionality to flight speed (cubed). For example, in addition to the fuselage, our external fuel tanks, missile launchers, and slingloads all contribute to providing unwanted wind resistance. Air has a difficult time negotiating sharp turns as it passes around components on our aircraft. To decrease parasite drag doesn't necessarily require making an object smaller, but, rather, to shape it aerodynamically so that air moves around it with the least amount of turbulence. So it's not by coincidence that external fuel tanks are not shaped like bricks.

POWER REQUIRED

The total-power-required curve shown in figure 1 is synonymous with the torque-required curves that we find in chapter 7 of our operators manuals. These charts are normally represented as a family of curves corresponding to various aircraft gross weights, temperatures, and pressure or density altitudes. This is because these factors significantly affect the components of the total power required.

As we see in figure 1, induced power dominates the power required in low-airspeed regimes, including hover. It decreases as the airflow through the rotor system increases, providing for better rotor performance. As the helicopter progresses through translational lift, airspeed increases and profile power kicks in. Again, the lifting surfaces (the rotor blades) fight the resistance as they slice through the air, resulting in increased profile-power demand. As we continue to pull collective and approach cruise speed, the parasite power requirement takes off.

Why is there a certain airspeed that is optimal to conduct an autorotational descent? The answer should be obvious when we look at figure 1, total power required.

The power required to move a helicopter to velocity-not-to-exceed (VNE) airspeed is quite significant. It is usually greater than hover power—but not always. This discussion on the power requirement curves will now help us analyze helicopter performance in the worst of flight conditions—the high, hot, and heavy environment. But first, let's take a look at power available.

POWER AVAILABLE

Unlike jet engines on fixed-wing aircraft, helicopter turboshaft engines do not show an appreciable increase in power available as a result of the inlet pressure rise associated with ram air. Therefore, helicopters demonstrate roughly the same power available in a hover as they do at VNE airspeed. This is all well and good, but what happens with changes in density altitude and gross weight?

All jet engines need to balance a proper fuel-to-air ratio to ensure maximum efficiency at all torque settings. If the air gets thinner, as it will as DA increases, the amount of fuel introduced by our fuel management systems decreases, thus limiting the power available. Why? Because jet engines operate most efficiently when the fuel-to-air ratio is held constant for combustion. Therefore, at high altitudes and temperatures, most engines cannot provide all the horsepower the transmission can handle. That's why the power-available line in figure 3 shifts downward. This is occurring at the same time that the rotor system is requiring more angle of attack (air density decreases, so angle of attack needs to increase to maintain lift). The result is a higher collective setting—thus, more power required.

Figure 4 shows the power-required curve merging with the power-available curve. If the aircraft is flown at an airspeed below the left intersection (Vmin) or above the right intersection (Vmax) of the power-required and power-available curves, aircraft rpm will decrease. A descent will follow—a typical result when power required exceeds power available.

Power required is also directly related to bank angle. What these graphs don't show is how power required depends on bank angle. You could easily compute that your worst case for a mission may be a 5-percent power margin available. But are you sure? Didn't you compute that based on level flight? It's likely that you did. However, in a 60-degree bank, does your 5-percent power margin still apply? No. More than likely, you have produced a negative power margin. Remember, as bank angle increases, the lift component counteracting your weight decreases. In order to maintain altitude in a turn, you know you have to add power or trade speed for altitude. At a 45- to 60-degree bank angle, you will require a significant power increase to maintain altitude. You simply won't have that power in high, hot, heavy conditions. Therefore, power must be managed continually.

An extreme example of a high DA and gross weight situation is the Mount Everest rescue of 1996. A Royal Nepalese Army helicopter pilot, LTC K. C. Maden, volunteered to rescue climbers when area contract pilots refused to accept the mission due to altitude and poor weather conditions. He rescued an American and a Taiwanese at an elevation of 20,000 feet on the slopes of the highest peak in the world.

The Nepalese pilot understood very well the power requirements of his single-engine AS 350. He flew 2500 feet above the helicopter's 20,000-foot service ceiling to get over a ridgeline, where he located the climbers. After several landing attempts that resulted in a decrease in rpm and loss of altitude, he realized the need to shed some weight. So he continued down the mountain to a lower elevation and dropped off his copilot.

Figure 3

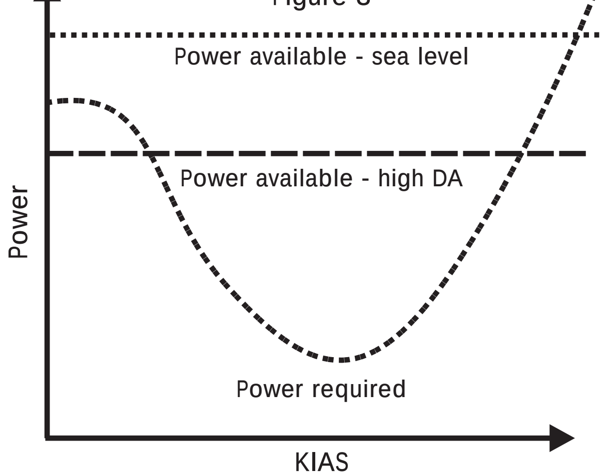
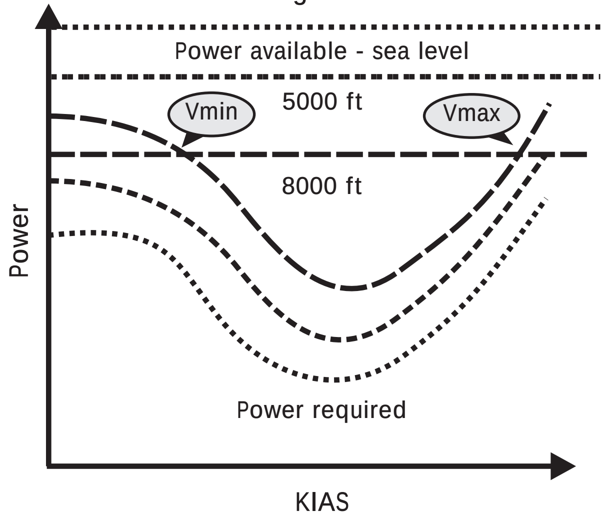


Figure 4



As the afternoon sun began setting, LTC Maden knew the helicopter would still have a difficult time hovering in ground effect, so he attempted a no-hover landing. Concerned with the firmness of the snow, he hoped for hardpack and got it. He stayed light on the skids and took one climber at a time, staying in ground effect until he could push the nose of the helicopter over to pick up airspeed while following the downsloping terrain. He successfully picked up the second climber in the early evening and is credited with performing the highest helicopter rescue in the world. Only through his familiarity with the austere flying environment and his precise understanding of power available versus power required was LTC Maden able to complete such a mission successfully and safely.

Summary

In conclusion, a change in aircraft configuration, gross weight, or environment (including winds or landing or takeoff direction) should activate a switch inside our helmet telling us to closely review the performance planning card and understand what these changes do to helicopter performance. We should know what our power margin is at all times. Proper performance planning and in-flight recalculations based on changing conditions is the only way to achieve this.

Why is this so important? The bottom line is that power-management errors are extremely dangerous. Take the UH-60 for example. In a study of FY94-98 Black Hawk accident experience, power-management accidents ranked number-one in cost, fatalities, and disabling injuries. And there's no reason to suspect that this is unique to the UH-60. We'll soon know for sure; the Army is in the preliminary stages of a study to identify the prevalent hazards for all aircraft. It's a pretty safe bet that power-management errors will show up as an accident cause factor across the rotary-wing fleet. We'll let you know once the study's completed.

In the meantime, here's some food for thought: Does your unit use the risk-assessment sheet to evaluate power margin available? If you don't, should you? And if you do, are you asking for the power margin in level flight or based on a bank angle? Either way, it deserves serious attention.

—adapted from an article by MAJ David P. Lobik, USMC, Naval Postgraduate School

USASC POC: CPT Stace Garrett, Aviation Systems & Accident Investigation Division, DSN 558-9853 (334-255-9853), garretts@safety-emh1.army.mil

UH-60 dual engine rollback

Numerous misconceptions exist within the UH-60 community regarding the phenomenon known as "dual engine rollback" (DER). This article will discuss the history of this phenomenon and clarify what is and what isn't a DER.

What it isn't

An engine failure that occurs when single-engine capability does not exist and exceeding power available are not dual engine rollbacks. In addition, maneuver-induced transient rotor droop is often wrongly perceived to be a DER. Pilots have induced transient rotor droop and believed they corrected a DER with the trim switch; in reality, the engine control unit corrected the transient droop.

What it is

A DER is a reduction of rotor speed (Nr) and the power-turbine speed (Np) of both engines from 100 percent to a lower value (during flight or on the ground) that was not maneuver-induced transient rotor droop and where trim switch activation is not considered likely. In some cases, incidents in which Nr/Np's fail to reach 100 percent on start-up are also considered by investigators to be DERs.

History

Since 1990, the Black Hawk fleet has had 15 substantiated DERs during flight and 12 on the ground. Two aircraft were damaged during precautionary landings performed in response to rollback events. During the same period, Army H-60s flew 1.5 million flight hours.

Teams from Sikorsky, General Electric, the Utility Helicopters Project Manager's Office, and the Aviation Research Development Engineering Center have conducted extensive testing and troubleshooting of the DER phenomenon. A correlation between transient droop and some reported dual engine rollbacks has been made, but no cause for the rollbacks has yet been determined. The investigating teams have never been able to duplicate a reported rollback.

Discussion

Typically, a dual engine rollback results in Np's and Nr decreasing simultaneously to between 94 and 96 percent. In some events, Nr/Np's as low as 92 percent were reported. In one event, Nr/Np's fell low enough to shut down instrument displays, but maneuver-induced transient droop probably caused the Nr/Np's to reach such low values.

In some substantiated DER cases, Nr/Np's were returned to 100 percent using the trim switch. In other cases, the aircraft was shut down while Nr/Np's were at a lower value. In one case, the Nr/Np's cycled between 100 percent and some lower value. In other cases, the Nr/Np's were observed decreasing faster than the trim system can move.

Summary

Prudence dictates that excessive maneuvering should be avoided when operating at less than 100-percent Nr/Np's. An emergency procedure for reduced rotor rpm will be included in change 3 to the operator's manual (estimated to be out in June). Change 5 to the operator's manual will include a section in chapter 8 explaining the mechanics behind transient droop that can occur on the UH-60A and conditions under which it can be encountered. Users with access to the Utility Helicopters Project Office web site can view these approved changes. In addition, improved dual engine rollback reporting procedures are being developed.

The Project Manager for Utility Helicopters, GE, and Sikorsky are committed to resolving the DER phenomenon. If you suspect that a dual engine rollback has occurred, contact your AMCOM LAR and your local Sikorsky and GE representatives.

—Douglas Denno, Science Applications International Corp., PM-Utility Helicopters, DSN 645-0355 (256-955-0355), douglas.denno@uh.redstone.army.mil

They know better!

What happened changed the way I would do business for the rest of my aviation career.

It was one of those nice, warm, sunny days in May. Three days earlier, our unit had deployed down to Myrtle Beach to conduct JAATs with the Air Force for a week. The weather was beautiful; we had not seen a cloud in 2 days. Everything had gone smoothly, and everyone was getting plenty of flight time. Our aircraft were in good shape, with very little maintenance down-time. There was plenty of work for all the pilots—both Army and Air Force. I remember hearing our commander comment about how smooth everything was going.

Maybe he shouldn't have said anything.

I guess that ***what*** happened next isn't as important as ***how*** it happened. It was a Thursday, about 11 o'clock in the morning. I was the IP of an OH-58C; my left-seater and I were conducting JAAT missions with jets out of Myrtle Beach. Our refueling site, located about 35 miles west of there, had been established to cut down turnaround time. The FARP consisted of two fuel handlers and one 49C refueling truck.

We were the first aircraft into this FARP that day. The fuel handlers appeared to be very professional until—well, let me tell you about it.

As I retarded the throttle to the flight-idle position, one of the fuel handlers approached the right side of my aircraft.

He asked for and received approval to walk under the rotor system to hook the grounding cables to the aircraft. When he got within 4 feet of the aircraft, I heard someone hollering. As I looked to the front of the aircraft, I saw the other fuel handler; he was patting his head, signaling to the other fuel handler. As I looked back at the fuel handler next to my aircraft, I saw him take off his Kevlar helmet. Before I could say anything, he had sent his helmet bouncing along the ground to the other refuel handler.

"No big deal," I said to myself. "They know better than to throw a helmet into the rotor system."

"I should get out and tell them not to throw things around the aircraft," I said to my left-seater. I was getting out anyway.

"No," my left-seater said. "They know better! They won't throw it into the rotor system."

"Sounds good to me," I said. "Let's finish up here and move out to let the other ship refuel."

We moved our helicopter off the refueling pad to a place where we could observe the refueling procedure. As we watched the refuelers approach our sister aircraft, I noticed that they had switched jobs. The guy who had been in front of us operating the pump was now approaching the side of the aircraft to operate the refueling nozzle.

What happened next changed the way I would do business for the rest of my aviation career.

The fuel handler next to the aircraft, which was at flight idle, removed his Kevlar helmet and ***threw it through the aircraft's rotor system.*** Well, not actually ***through*** it; if that had happened, I wouldn't be writing this article.

Anyway, this Kevlar helmet was hit by one of the main rotor blades and went flying about 75 yards into the woods. I couldn't believe my eyes. Then I realized that I had become something I had thought I would never be: the ***weak link*** in a chain of events that leads to an accident.

Here I had the opportunity to stop an accident before it happened, and what did I do? ***Nothing.*** This inaction on my part resulted in a lot of time-consuming actions: mission cancellation, aircraft recovery, and accident-reporting paperwork—not to mention the mark against our safe-flying record. Luckily, though, no one was injured.

If only I had gotten out of the aircraft and said something to the refuelers, this accident would have never happened. I mean, I knew better!

—CW5 Bill Ramsey, EUSA G-3 Aviation, ramseyw@usfk.korea.army.mil

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH1

Class E

F series

■ During takeoff, transmission oil pressure gauge indicated zero. Crew aborted takeoff and shut down engine without incident. Caused by failure of transmission pressure transmitter.

■ During hydraulic performance systems check, pilot in back seat moved hydraulic switch to No. 2, failing No. 1 system. Master caution and hydraulic pressure lights came on, and 10 seconds later, No. 1 hydraulic pressure light came on. Crew heard hydraulic pump cavitate and shut down aircraft. Inspection revealed severe leak on No. 2 hydraulic pump. Maintenance replaced pressure line, hydraulic pump, and various fittings.

■ During hover after landing, ground observer noticed something hanging from left skid tube. Ground crew confirmed that object was loose piece of wear bar from skid tube. Aircraft landed without incident. Skid tube wear bar is a locally manufactured part that is welded to skid shoe for running landings. During landing, a piece that had worn thin became dislodged from skid shoe.

AH64

Class C

A series

■ Aircraft experienced icing during planned IFR flight. Postflight inspection revealed broken FM antenna on vertical stabilizer. Subsequent inspection revealed damage to one tail-rotor blade.

■ Aircraft was Chalk 2 in flight of two on approach to LZ. While repositioning forward of Chalk 1, which had already landed, aircraft struck wires at approximately 50 feet agl. Aircraft was landed without further incident. Two main-rotor blades were damaged.

■ Blade-strike damage was discovered on preflight inspection. During previous mission, aircraft had descended during OGE hover until detected by PI, after which power was applied and aircraft repositioned. Crew detected no unusual indications that would indicate blade strike.

Class D

A series

■ Crew heard and felt something strike canopy during cruise flight. Postflight inspection revealed bird remains on canopy. Tip cap assembly on one main-rotor blade was damaged beyond repair. Tip cap was replaced.

Class E

A series

■ After landing, left forward avionics bay access door was found to be open with latches in locked position. Door was cracked in half and could not be repaired.

■ During standard autorotation, electrical odor and fumes entered cockpit through environmental control system. Double generator failure followed, with associated loss of systems. After landing and emergency shutdown, No. 1 generator was smoking significantly through catwalk area. Generator was replaced.

■ During short final, crew smelled smoke coming through ENCU vents. Just before landing, shaft-driven compressor caution light came on. Crew set aircraft down and performed emergency shutdown. Postflight inspection revealed charred and smoking SDC, which was replaced.

■ During climbout from confined area at night under the system, aircraft was transitioning to NOE flight in a left turn with 80 feet on radar altimeter. Aircraft struck tree on right side. After incident, crew flew approximately 4 kilometers to airfield. Maintenance made sheet-metal repairs to stabilator and wing.

CH47

Class C

D series

■ Crew noted 35- to 40-percent split in torque readings during cruise flight. In-flight adjustments were unsuccessful, and aircraft was landed. With rotor rpm still set for flight, crew noted rapid increase to 115 percent but not more than 120 percent before engine condition levers could be reduced to ground idle. Suspect engine or transmission limitations could have been exceeded.

Class D

D series

■ Flight engineer closed upper half of cabin door in flight while aircraft was above max airspeed for door closure. Door departed aircraft and fell on side of mountain.

Class E

D series

■ At 150 feet agl just after takeoff, load released from aircraft. Inspection revealed that C-clamp used to couple two 1-inch cables came apart, causing load to fall. Nonstandard rigging had been used for the nonstandard load (connex to be used for targets by Air Force).

■ Loud, high-pitched whine was heard in forward transmission area during slingload operations. In addition, an unusual vibration was detected in vicinity of flight control closet. Aircraft was landed and shut down without further incident. Maintenance inspection revealed that one flight hydraulic pump was unserviceable. Pumping unit was replaced.

■ While hovering with external load at 135 feet agl, aircrew experienced trouble setting load on ground in the LZ due to blowing snow. As crew placed load on ground, load turned over on its side. Crew landed next to load, shut down aircraft, and inspected load. There was no damage.

OH58

Class C

D(I) series

■ During autorotation, aircraft touched down slightly tail low, and tail skid hit runway. Inspection revealed damage to vertical fin at attaching point area of tail skid.

■ RSP was performing standard autorotation from altitude when IP noted insufficient rotor rpm to complete maneuver. He took controls and attempted to terminate with power, but aircraft landed hard.

Damage reportedly sustained by landing gear, one FM antenna, and one main-rotor blade.

Class D
D(I) series
■ Simulated engine failure at altitude resulted in hard landing. Landing gear WSPS was damaged.

Class E
A series
■ Transmission oil pressure low light came on during engine runup. Pilot got out of aircraft to inspect transmission oil level and found oil flowing down side of aircraft. Aircraft was shut down. Caused by broken transmission oil line.

C series
■ When increasing throttle after simulated forced landing from hover, crew heard series of pops coming from engine and noted corresponding rise in TOT. Caused by failure of bleed valve.

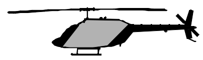
■ Aircrew had stored logbook on top of dash, wedged under GPS mount. During takeoff, aircraft encountered light to moderate turbulence while in a right turn. Logbook dislodged and fell into pilot-side chin bubble, knocking hole in Plexiglas. Chin bubble was replaced.

■ During student change, door was blown open by another aircraft hovering nearby. Door hinge required replacement.

D series
■ High rotor rpm audio alarm sounded while aircraft was en route to field landing site in heavy rain. At the same time, the rotor rpm analog gauge increased to 124 percent (no time). As PI increased collective to rotor system, he visually verified that Ng and Np were both in limits. Incident is still under investigation; however, electrical short due to heavy rain is suspected.

D(I) series
■ Simulated engine failure at altitude resulted in hard landing. Landing gear and WSPS required replacement.

■ Aircraft was at hover, performing day aerial gunnery .50-cal qualification. As aircraft was engaging target, copilot door opened in flight. Copilot tried to grab the door handle, but door was caught by rotorwash and swung open and began to separate from door frame. At this point, door was penetrated by a single .50-cal round. Door then separated completely, coming to rest on ground. Maintenance inspection revealed no other damage.

TH67


Class E
A series
■ Aircraft struck bird during cruise flight. Crew landed without incident.

■ Smoke began emitting from air conditioner intake during hover. Maintenance replaced blower motor.

UH1


Class D
H series
■ While on ground with engines running, crew heard loud noise followed by airframe vibration. Aircraft was shut down without incident. Postflight inspection revealed that Bishop plate (bearing cover) departed aft portion of engine and penetrated tail-rotor drive shaft cover, striking tail-rotor drive shaft and tail rotor.

Class E
H series
■ Aircraft experienced complete hydraulic failure and numerous hard-overs during cruise flight. Crew performed emergency procedures and completed run-on landing and emergency shutdown. Crew noted empty hydraulic fluid sight gauge and fluid under aircraft. Maintenance replaced hydraulic hose assembly.

UH60


Class C
A series
■ As flight of four UH-60s was landing, trail aircraft landed to undetected sloping terrain. Three main-rotor blades contacted ground.

Class D
A series
■ Main-rotor droop stop slipped during runup. As main rotor began to gain lift on low blade, moderate vibration was noticed in flight controls with both engines at idle. During shutdown, main-rotor blue droop stop failed again. Postflight inspection revealed blue main-rotor conical elastomeric bearing had separated from main-rotor hub spindle assembly. A Category II QDR was submitted on the elastomeric bearing.

Class E
A series
■ Parking brakes were set during simulated No. 1 engine fire. During roll-on landing, crew heard loud noise and smelled burning-rubber odor. Brakes were still set when aircraft touched down. Postflight inspection found that right tire was flat and left tire was rubbed bald in one spot.

■ Aircraft experienced uncommanded right yaw during takeoff. Aircraft landed with lateral vibration, causing tail pin to bend. Maintenance test flight could not duplicate uncommanded right yaw. Tail wheel pin was replaced and aircraft released for flight.

L series
■ During cruise flight, crew saw flock of birds in and below flight path. One of the birds suddenly flew upward and hit aircraft. Postflight inspection revealed crack in upper flight control cowling.

■ Unusual noise was heard during runup but quickly went away, and no other indications were noted. During postflight after 3-hour training flight, ALQ 144 cover was discovered in the oil cooler compartment. Two fuel lines were damaged.

C12


Class C
K series
■ Crew heard thump during final approach phase of landing. Suspecting a bird strike, crew continued their approach and landed without further incident. Postflight inspection confirmed damage (12-inch crack) to right wing pod.

Class E
K series
■ During step-down on 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.

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 messages

AH-64-99-ASAM-03, 081119Z Mar 99, maintenance mandatory

Several incidents have been reported of night- and day-side shroud assemblies separating from the aircraft during flight. This has been attributed to improper tension on the clamps or improperly sized clamps. The purpose of this message is to check for correctly sized rim-clenching clamp and to ensure that proper tension is applied to the clamp and the jam nut.

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

AH-64-99-ASAM-04, 151234Z Mar 99, operational

Recent investigation revealed that AH-64-98-ASAM-07 erroneously required a change to AH-64D technical manuals. The changes addressed in that ASAM do not apply to the AH-64D. Therefore, no changes were required for the AH-64D operators manual, checklist, or maintenance test flight manual. The purpose of this message is to direct all AH-64D series aircraft flight crews to correct the errors, which are outlined in the message.

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

CH-47-99-ASAM-04, 151843Z Mar 99, maintenance mandatory

Two instances have been reported of bushings being left out during installation of longitudinal cyclic trim yokes. The first was corrected before any damage occurred; the second, however, resulted in damage to the yoke assembly mounting lug on the forward transmission. Review of the maintenance manual confirmed that two bushings are not sufficiently represented in the text or diagrams. The purpose of this message is to inspect both forward and aft yoke assemblies to ensure proper bushing installation and to annotate changes to the maintenance manuals.

AMCOM contact: Mr. Robert Brock, DSN 788-8632 (256-842-8632), bob.brock@redstone.army.mil

OH-58-99-ASAM-03, 171230Z Mar 99, maintenance mandatory

A certain PC filter tube used in some OH-58A/C helicopters has been identified as the suspected source of several cases of loss of engine power due to the tube cracking. The tube cracking is resulting from handling and overtorquing of the tube during maintenance. A replacement tube with a thicker wall and improved routing configuration has been identified in the supply system. The purpose of this message is to alert users and to initiate recurring inspections with part replacement not later than 31 January 2000.

AMCOM contact: Mr. Ron Price, DSN 788-8636 (256-842-8636), ron.price@redstone.army.mil

UH-60-99-ASAM-07, 111827Z Mar 99, maintenance mandatory

UH-60-97-ASAM-01 imposed a visual inspection for an edge break (deburred) condition and fluorescent penetrant inspection for cracks on the inside surface of the hub. Recently a hub that had been previously inspected was found to have a crack in the same location in a more critical direction. The purpose of this message is to implement a recurring inspection of the main-rotor hub assembly (P/Ns 70103-08112-041 and -045) for cracks in specified areas. This message also supersedes paragraph 9d of UH-60-97-ASAM-01. Note that this message does not apply to the P/N 70103-08112-047 rotary hub assembly.

AMCOM contact: Mr. Ron Price, DSN 788-8636 (256-842-8636), ron.price@redstone.army.mil

POV fatality update through March

Speed
Fatigue
No seatbelt

No new causes, just new victims

FY98	FY99
58	59

IN THIS ISSUE

Class A Accidents

through March

		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	1	2	0
2D QTR	January	1	1	0	0
	February	1	4	0	2
	March	1	0	0	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	8	6	4

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