HUMAN A.D.
Heliprops
HELIcopter PROfessional Pilots Safety Program
Volume 15 ★ Number 4 ★ 2003

# Take it Serious. Take it Personal.

As of this writing, the National Transportation Safety Board statistics show that we have suffered fifty-eight fatalities in thirty-one accidents in U.S. Civil Helicopter operations thus far in calendar year 2003. This is significantly greater than in either 2001 or 2002. This is a terrible number. It is unacceptable to tolerate, regardless of the good that helicopter operations have provided in the saving of lives and property, and contributing to the overall welfare of the country.

To most of us, these 2003 fatalities are just numbers that come from distant places and unknown operators. They are sterile numbers devoid of emotion. Few of us are directly connected with these accidents; and few of us personally knew the pilots and passengers who perished. In addition, the current accident reporting systems are such that the names of those involved in fatal accidents are not published. Consequently, the reading of accident reports becomes impersonal.

**"Imagine if you will, the impact of the loss of your life in a helicopter accident. Imagine the grief in your family, friends, and colleagues. Imagine your home without a spouse or parent..."**

Those who are directly connected to the persons involved in fatal accidents know the anguish and loss. Real tears are shed. Genuine grief is inflicted. Loving parents, spouses, children and friends are left empty. Companies suffer substantial financial losses. Every fatal accident is a traumatic event to those who are close.

Imagine if you will, the impact of the loss of your life in a helicopter accident. Imagine the grief in your family, friends, and colleagues. Imagine your home without a spouse or parent. Imagine the financial impact to your company. If you can see these you will agree that you must make your continued activity in the overall helicopter industry a personal and serious matter. You have got to bring this home, and you must take it seriously.

### How can you prevent an accident?

There are many things that we can do in the effort to prevent accidents. But for starters, there are two things that every one of us can do without any further assistance or additional resources. We can all exhibit **discipline**; and we can all **stick with the basics**.

*Discipline has two sides.*

One side is the discipline demanded or imposed on us by our managers. In the ideal situation management would clearly define the rules and expectations, and the line pilots and mechanics would willingly follow those rules. Alert management would create systems that could monitor for adherence to the expectations, and react to exceedances appropriately.

The other side of discipline is self-discipline. Many pilots operate away from the direct supervision of managers; and many other pilots are independent and have no supervisors. In cases like these it is up to the individual to have the integrity to follow the rules without being told; and to have the assertiveness and innovation to know when it is appropriate to violate a rule. And yes, it may be appropriate to violate a rule. In some cases the benefit of violating a rule or exceeding a limitation is the right thing to do–such as in over-torquing your 206B to extract

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## INSIDE HELIPROPS

the six firefighters from the LZ that is about to be overcome by a raging fire.

Deciding to violate a rule or exceed a limit requires a pilot to assess the situation, correlate the ingredients, and decide if it's the right thing to do.

Self-discipline is something that we can all subscribe to. We don't need our bosses to continuously look over our shoulder or somehow monitor our actions to make sure we are following the rules. We can commit to following the rules. We can exhibit the integrity to follow the rules because it is the right thing to do. As stated by Kern in *Redefining Airmanship*, McGraw-Hill, p.29, "Flight discipline is the ability and willpower to safely employ an aircraft within operational, regulatory, organizational, and common sense guidelines– unless emergency or combat mission demands dictate otherwise."

## *Sticking with the Basics.*

What are the basics? Well, most of them are the things we learned in flight training whether it was for an initial pilot rating or for some advanced rating such as Instrument or Instructor. This includes doing things the way our flight instructor showed or told us. There is no question that many incidents and accidents could have been avoided simply by following the basics.

How many dynamic rollovers could have been avoided by an adequate preflight check and the patience to pick the helicopter up to a hover by the simple two-step procedure of getting it light on the landing gear and then gently raising it vertically off the ground? How many over-torques could have been avoided by knowing the gross weight, and the hover-in/out-of-ground-effect capability before making that takeoff from or landing to a high elevation?

How many uncontrolled passengers getting out of the helicopter immediately after landing and going back to the baggage compartment and toward the spinning tail rotor could have been avoided by an adequate pre-flight briefing?

How many hard landings could have been avoided by making a normal takeoff or normal approach and landing into the wind?

How many low-fuel-light precautionary landings, or engine failures due to fuel exhaustion could have been avoided by checking the weather, and using the winds to conduct proper flight planning?

How many main rotor or tail rotor strikes could have been avoided by taking the time to perform an adequate reconnaissance prior to landing in an unprepared field?

***Why don't we stick with the basics?***

Several reasons.

**One** – ***we forget 'em.***

Forgetting is a natural human characteristic. We tend to forget things if we did not learn them well at first, if we haven't used them recently, or if they are not important to us. Helicopter pilots are as susceptible to forgetting as anyone else. Basic helicopter aerodynamics and procedures can easily drift into foggy memory if they are not considered occasionally or refreshed via periodic training.

Many experienced pilots rarely pick up their flight manual to check performance charts, or work a weight and balance, or look at and understand the critical-wind azimuth chart, or know the H-V Diagram high-hover, low-hover, and knee values.

**Two** – ***we ignore 'em.***

Familiarity, confidence, and complacency lead us to take short-cuts.

As pilots become experienced with their operations, and intimate with their aircraft's features, performance and characteristics they become comfortable. This comfort is often accompanied by a lowering of their usual standards and acceptance of minimal performance while still being able to accomplish their missions.

Few pilots conduct a preflight check of their aircraft the same way they did when they first flew it, or the way they do when it comes out of major maintenance. Why? Familiarity. They know the aircraft. If it has been a reliable aircraft, and flown safely many times with a minimal preflight check, then the likelihood that minimal preflight checks will continue is quite high.

Many pilots will occasionally, or perhaps often, make takeoffs and landings that are a bit "hot." A quick collective pull and rapid acceleration can be exhilarating, and impressive to watching passengers or bystanders. A close-in, steep turn to final, with a nice flare to stop it at the bottom can save a few seconds compared with a long straight-in and normal approach to a hover.

A substantial number of wire-strikes, hard landings, and over-torques are preceded with such types of takeoffs and landings.

***Well, what do you say?*** Will you subscribe to Take it Serious, and Take it Personal. Will you be an advocate of self-discipline? Will you adhere to the basics?

**Your life may depend on it.**

# REVISED SPECIAL AIRWORTHINESS INFORMATION BULLETIN

Aircraft Certification
Service
Washington, DC

U.S. Department of Transportation

**Federal Aviation Administration**

No. SW-03-08R1
November 10, 2003

*We post SAIBs on the internet at www.airweb.faa.gov*

*This is information only. Recommendations are not mandatory.*

## Introduction

As a result of continued accidents due to loss of power from snow or ice ingestion on turboshaft powered rotorcraft, we are reissuing this Special Airworthiness Information Bulletin (SAIB) and are urging you to follow our recommendations.

This SAIB alerts you, owners and operators of turboshaft powered rotorcraft, of the possibility of in-flight engine loss of power, due to the ingestion of ice and snow. Accumulation of ice and snow can occur in the area of the airframe engine inlet while the rotorcraft is on the ground or in the air. This SAIB describes procedures to reduce the probability of engine in-flight shutdown due to ice and snow ingestion.

## Background

We have determined that ingested ice and snow accumulation in the airframe engine inlet while the rotorcraft is on the ground can cause the engine to loose power. This has resulted in accidents and fatalities. Snow and ice can build up in the engine intakes and plenums when the rotorcraft is on the ground without the engine(s) operating or when the engine is at a low power setting on the ground for extended periods. When a pilot increases engine power during takeoff, the accumulated snow and ice can separate from the airframe inlet surface and be ingested into the engine resulting in decreased power or complete engine failure. Some of the early turboshaft engines with axial inlets are particularly susceptible to loss of power due to ice and snow ingestion.

On the ground with the engine(s) operating at a low power setting, ice and snow can accumulate on the airframe cowl forward of the inlet, on the inlet lip, and inside the inlet. Under extreme conditions, usually when the rotorcraft is on the ground waiting for clear weather, the buildup of ice and snow can be enough to cause the engine(s) to lose power or fail completely if it is ingested.

On the ground with the engine(s) not operating, proper use of inlet inserts (pillows) or inlet covers can eliminate the accumulation of snow, but these measures cannot fully guarantee non-formation of ice in the inlet. Ice can also develop in the inlet area when water seeps into the inlet from rain or snow melting on a warm cowl, even when you use proper inlet protection.

## Recommendations

We highly recommend and strongly urge you to perform the following:

- Review the aircraft Flight Manual for Limitations and Operations guidance in falling/blowing snow and/or icing. Many aircraft are prohibited from operating in known icing and/or heavy snow.
- Perform Basic Airmanship in the appropriate evaluation of current and predicted weather briefings from the area Flight Service Station.
- When the aircraft is on the ground without the engines operating install inlet and exhaust inserts or covers.
- Prior to engine start, after removing the inlet/exhaust inserts or covers, perform a complete inlet/exhaust inspection (using a flashlight). The inspection should include surfaces inside the inlet, the cowl area forward and around the inlet, and the area behind the particle separator or screen (if installed). Remove all accumulated snow or ice.
- CAUTION: DO NOT remove ice or snow by chipping or scraping! Use heated air or deicing fluid as necessary. In freezing temperatures, pay particular attention to sheet ice on the bottom and forward of the inlet. This ice can also form behind particle separators. Engine preheating may be required.
- If it is necessary to keep the rotorcraft on the ground for an extended period (i.e. waiting for clear weather), you should shutdown the engine(s). Prior to takeoff, you should accomplish a detailed pre-flight/inspection, removing any snow/ice build-up. You should perform the inspection even if the rotorcraft is fitted with some form of inlet protection such as screens or baffles.

## For Further Information Contact

Matthew Rigsby, Continued Operational Safety (COS), FAA Rotorcraft Directorate, Standards Staff, Fort Worth, Texas 76193-0110; phone (817) 222-5125; fax (817) 222-5961; email: matthew.rigsby@faa.gov

# There I Was... *Accounts sent to us by readers*

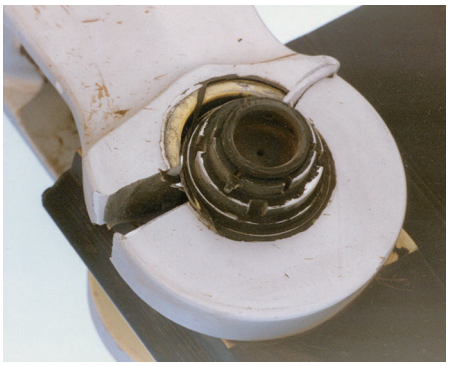
## Bell 212.

"In 1994 I was flying for a Middle Eastern aviation company that had won a contract to place TV translator towers on mountaintops throughout the Sultanate of Oman. We had nearly finished the project and were doing some last minute testing to wrap things up when my problem occurred. The aircraft was a

Bell 212. I had just taken off from our base helispot heading for a 7,500 foot peak. Climbing through 300 feet at 60 knots, I heard a loud bang. I had a 55 gallon drum of fuel lashed down in the cabin (fueling points being few and far between…). My initial thought was that somehow this drum had fallen over. That thought lasted a nanosecond (well, maybe two), as the aircraft started shaking violently in all axes. I simultaneously lowered the collective, looked for a place to land, and got off a call to Muscat Approach Control. As luck would have it (this part of Oman is mountainous), there was a nice piece of terrain just off my nose and into the wind. I ran the aircraft on just above translational lift, rolled the throttles all the way off as the aircraft came to a stop, and applied maximum rotor braking (no cool down for this guy)! The thing was trying to shake itself apart! I could now breathe. There were no cockpit indications of any sort (caution or warning lights, horns) throughout the event. Tip path plane on touchdown was plus or minus 12 inches (maybe more)! Note the skid marks the aircraft made on touchdown as an indicator of the lateral forces involved.

The flight mechanic with me got out first and climbed topside. I shortly heard his exclamation "Holy Cow"! As I started to get out of the aircraft, the VHF radio came alive…it was a 737 that Muscat Control had vectored over to see how we made out. We assured them that we were okay, and affected our own recovery efforts by cell phone.

Subsequent investigation revealed that the lower tang on one of the main rotor grips had failed catastrophically through the bolt hole. The upper tang held together long enough the get the bird on the



ground (love that redundant feature). I doubt that we'd have been successful if the event had occurred later in the flight (on a 7,500 foot pinnacle). The main rotor blade had also begun to fail from the excessive flapping. The drag brace was attempting to constrain the flapping, but this caused a large crack to emanate from the blade end-plate out toward the training edge. Again, it didn't propagate to the failure prior to landing. We were lucky.

The operator dispatched additional engineering staff to affect a field repair, which consisted of removing and replacing the entire rotor head and blades."

## 206B3

"In the spring of 1982, I flew the boss and a couple of others in our 206B3 to a meeting in northwestern Ohio. We had had a wet spring. I picked a landing site at the very corner of a corn field, still brushy with corn stalks from the previous fall harvest, but close to our meeting site. I made my approach, hovered to a good, fairly dry and level spot and landed. As I slowly settled down on the ground, I wiggled the tail with the pedals to get a good feel for how stable the ground was. It felt good and I shut down.

After about an hour and a half, we came back from the meeting to board the JetRanger and fly home. To our surprise, it had sunk, heel first, into the soft ground and the stinger was on the ground and in the mud! (Note we had high skid gear, so it was really tilted backwards). Well Captain…what are your intentions? Better yet, how am I going to get the tail out of the mud and get the thing fired up– SAFELY? I devised a plan. We

lifted the tailboom up gently and one passenger held it up. The other two passengers got on the front of the skid gear for weight/balance and to ease the load on the guy under the tailboom (he was in front of the horizontal stabilizer). It all looked good to me, so I climbed in and started up. No problems. I pulled some pitch to keep us in a stable and level attitude on the ground and the "crew" climbed in. We made an uneventful flight back home, but I had a lot of mud to clean off the aircraft at the end of the day."

## R22

"I was prepared to solo a student for the second time in a brand new R22BII. We departed our ramp toward the airport's helicopter practice area. Upon entering the right crosswind, the tower instructed us to make this first landing a full stop rather than our normal "cleared for the option." While lecturing my student, I overheard the tower say something about an over-flight and a "break." I listened for the reply, but didn't hear anything (I now realize they were on a UHF channel). We turned right base while descending to 400 feet AGL, and were about to turn final when I noticed an F/A-18 Hornet at the same altitude over the south parallel runway doing at least 200 knots. I enthusiastically said, "Hey, check that out!" Less than a second later–abeam our position –he started a fast right break and came right at us. I slammed the collective down and entered a right 180 degree autorotation to get under him. It appeared that he tightened up his turn to avoid us as well. We were less than 1/2 mile apart. Had we both not taken corrective action, a collision, or jet blast could have taken us out of the sky."

## R22

"During the day we hover and park our helicopters fairly close to the office located on a busy Fixed Base Operation. We have a water spigot and hose which the line service crew frequently uses to wash the FBO's cars. One day I was warming up an R22 with a student aboard and all of a sudden, a car pulls up about three feet off our skid. The kid-driver hopped out and proceeded to spray the car off all UNDER THE SPINNING ROTOR!!! After some nasty hand signals and yelling, he moved the car."

## 500D

"Flying a heavy lineman and about 400 pounds of hardware on an external platform in a 500D all day/all month working on power lines in Florida, summertime. Last day at this job site we were using an LZ in the power company right-of-way strip directly below the wires, which in itself was not unusual. After about 20 trips in and out of the LZ that day, I was almost habitually pulling limit torque to pick up and hustle forward, up and out with full loads on this hot, humid and windless day. It was very late in the day and long into my hitch (maybe day 27 of 30)… lots of danger factors and plenty of fatigue caught up with me all at the same time…(warning signs that we often miss).

Last landing at the LZ was with about 20 minutes of fuel left. The lineman got off and unloaded all the remaining gear and offered to hot-fuel me before I repositioned (solo) to the motel for the night. I figure…"naw…only a ten minute flight over there"… and waved him off because I was really beat and wanted some air conditioning, a shower, a beer (or six), and the motel pool ASAP. Figured I'd get fuel later or in the morning. I was now "really light" to say the least…maybe 800 pounds lighter than my last 20 takeoffs from this spot.

So, last step was to pull some pitch and head for the barn. Like I had done all day without much thought, I pulled that collective up into my armpit to launch… and launch I did. As I rocketed straight up, I noticed (in that weird "I am about to die" kind of slow motion) about three linemen that were watching me suddenly duck down while covering their heads with an arm (like hitting the deck and cowering). In some kind of split-second sequence of trying to figure out what the heck their problem was, it occurred to me that they were reacting to what I was doing… then it hit me that I was about to be severely tangled in a bird's nest of wires overhead. I slammed the collective down and somehow stopped at a high hover, no telling how many

*continued page 6*

inches from what would have certainly gone down as a mother of all spectacular wrecks.

Tunnel vision seized me…from the instant high blood pressure no doubt. I remember noticing that I was missing some peripheral vision. I descended a little while unconsciously holding my breath, nodded to all the freaked out linemen (like everything was cool…yeah…I meant to do that) and flew away.

After landing at the motel my knees got weak and my stomach knotted up. Later...in the pool while sucking down beers, all the crew couldn't stop shaking their heads and laughing at me. I tried to laugh too but it took a few days before I could muster any kind of smile.

Now it's just one of the dusty stories…seems like a long time ago, but I know that this definitely helped me become more aware and conservative… especially during the last 25% of a mission/hitch/day or whatever. Fatigue sneaks up, lurks over your shoulder, and just waits to get you when you make even a small mistake. It has been the common thread in several other "That time I almost killed myself" events of my past."

*If you have had experiences that you feel our reader's would benefit from, please submit them to:*

**Bell Helicopter Textron, Inc.**
**Jim Szymanski**
**HELIPROPS Manager**
**P.O. Box 482**
**Fort Worth, Texas 76101**

# Q& Your Answers…

**In the last issue we asked,**

## Q "Have you ever experienced Dynamic Rollover, or something close to it?"

***Human A.D.***

*Not many responses even though we suspect that most helicopter pilots have experienced at least one episode of the helicopter rolling uncomfortably far either on takeoff, while maneuvering laterally at a very low hover, or on landing on a slope. We feel that way because of the many reports in the NTSB reports of dynamic rollovers. In our next issue we will devote an article to this basic subject.*

A "At approximately 0945 local time on 28 April 2003 an Instructor Pilot and two student pilots launched from South Whiting Field in a TH-57C Bell JetRanger for Florala Municipal Airport, Alabama on a pair of radio instrument syllabus events. The aircrew landed at Florala at 1200 after an uneventful Instrument flight. The aircrew had lunch at 1200-1300 and then preflighted the helicopter for the return trip to Whiting Field. During the preflight the aircrew did not notice that the right skid was in a shallow rut. There are numerous skid ruts in the cold parking area at Florala Municipal caused by helicopter skids sinking into the asphalt during hot days. The aircrew attempted two unsuccessful engine starts between 1315 and 1345. Both attempts were aborted due to excessive rise in TOT on engine lightoff. The aircrew then contacted the HT-8 Flight Duty Officer and relayed their problem of a weak battery. The HT-8 Duty Officer contacted the contractor and Raytheon dispatched a troubleshooter to Florala Municipal arriving at 1800 and quickly replaced the battery. At 1820 the aircrew successfully started the aircraft. The flight instructor decided that the aircrew would cancel the second event due to crewday issues and return to base via a VFR flight plan. The student pilot (sitting in the right seat) was directed to perform the vertical takeoff. The student pilot applied UP collective and right pedal as his initial input for the lift into a hover. As he did this the left skid came of the ground and the right skid remained on the deck. The student pilot then applied additional UP collective and more right pedal in an attempt to break the right skid free of the ground. At this point the helicopter began to accelerate about the right skid (pivot point). Simultaneously, the instructor pushed the collective full DOWN and applied a left cyclic input. Initially, the helicopter continued to rise and then it froze momentarily on the right skid (The instructor pilot noted that the main rotor blades were approximately two feet from impacting the ground on the right side). At this point the other student pilot who was sitting in

the right rear passenger seat (observer) dove to the left rear passenger seat. The helicopter then fell back on its left skid. When the helicopter had settled to the deck the aircrew noted that the student pilot at the controls had applied nearly full right pedal. The instructor pilot then departed the aircraft and conducted a full inspection of the helicopter and the tarmac around the right skid. He noted that the skid was in a shallow rut and that there was no visible damage to the helicopter.

**Analysis:** The proper flight control input for lifting the TH-57C into a hover is to add UP collective with coordinated left pedal input. The left pedal is necessary because this model helicopter will naturally yaw right whenever UP collective (Increased Power) is applied. In this event three distinct factors provided the framework for a near Dynamic Rollover event:

**(1)** One skid was in a shallow rut. This rut was in asphalt, so the skid had a hard surface on either side of it that could provide a locking point with any degree of surface yaw.

**(2)** The student pilot at the controls applied initial right pedal, which combined with the natural right yaw tendency of the helicopter with power application. The student then applied further, nearly full right pedal, which likely exacerbated the locking effect on the right skid in the rut.

**(3)** When the student pilot at the controls increased his UP collective input in an attempt to break free of the deck, the increased lift caused an increase in the rate of rotation about the pivot Point (right skid). The instructor pilot stated that the main rotor blades were within two feet of impacting the tarmac on the right side of the helicopter when the helicopter momentarily froze at the apex of its rotation about the pivot point. The proximity of the rotor blades to the ground and the momentary hangup at the apex of rotation would indicate that the instructor pilot likely applied the proper dynamic rollover recovery procedure at or close to the critical dynamic rollover angle of the TH-57. The student pilot in the passenger cabin who dove to the left side of the passenger cabin at the point when the aircraft froze about its pivot likely provided the necessary counterweight to start the helicopter to fall back to the left (and to safety).

Dynamic Rollover, once the combination of ingredients that lead to its onset are missed, happens quickly, and calls or swift action on the flight controls. This instructor pilot and the student pilot in the passenger cabin together averted a near mishap in a relatively benign environment during a seemingly straightforward maneuver."

# What is your Answer?

**"Have you had a Wire Strike or something close to it? How did you maneuver to avoid it." Tell us about it."**

***Email your answer to:***

jszymanski@bellhelicopter.textron.com

***You can also fax your answer to 817-278-2428***

***or Mail them to:***

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The primary objective of the **HELIPROPS** program and the **HUMAN A.D.** is to help reduce human error related accidents. This newsletter stresses professionalism, safety and good aeronautical decision-making.

Letters with constructive comments and suggestions are invited. Correspondents should provide name, address and telephone number to:

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