AIRBORNE LAW ENFORCEMENT ASSOCIATION

The Safety Wire

September 2017

Desperate times call for desperate measures. There are times when we use maxims such as this to justify accepting risk levels that are far higher than we would normally allow. Recently, two major hurricanes in the United States highlighted the difficulty in balancing the need for our services and the need to do our job safely. "Desperate times" may require temporary acceptance of a higher risk level, however, that risk should not be blindly accepted in a moment of Hollywood style bravado. "Desperate times" are when we need professional risk management the most, not the least.

The steps we should strive for in managing safety are:

1. **Identify the threats**. There will always be unknown hazards that pop up in our line of work. Make as many hazards 'known' as possible. A target must be identified before we can fire at it.
2. **Understand the threats.** Most hazards have a number of contributing factors that determine how much of a risk they are to our operation. We must understand them as best we can, then find weaknesses to attack with well-designed tools such as procedures, policies, training, etc.

3 **Train.** Understand the plan and how to deploy it. Burn that into your head with realistic, scenario based training so it becomes as instinctual as possible.

4 **Execute the attack.** Identify the need to employ a risk control and pull the trigger at the right time as accurately as possible.

Few experienced police officers would argue that we should abandon training and established tactics in a gunfight. After all, “Train how you fight” is the unofficial slogan for law enforcement training in general. Unfortunately, when it comes to combating the risks that can kill us in critical incidents, we often start fighting differently than how we’ve trained. Fatigue management is ignored, FRATs are forgotten, performance charts are snubbed, maximum wind limits are brushed aside…at a time we need all of these things the most. These situations often involve the most extreme weather conditions we might consider flying in, under the heavy influence of life and death requests for our service. Increased attention from the media, agency leadership and our peers can have a major influence on our decision-making. Often added to these factors are time pressure and incomplete mission information. We are left with greatly reduced human performance in the most ‘desperate’ of conditions. Of the four items listed above, the only option left in this situation is, ‘execute the attack’. If the first three steps have not previously been completed, or are ignored, our actions are less likely to be effective, compromising both safety and mission effectiveness.

When the hurricane approaches, riots break loose, or officers scream over the radio they have been shot, the opportunity for analytical mission planning and risk management is gone. If your unit feels that certain events allow for increased assumption of risk, plan for it ahead of time. What is that increased level of risk? What is the limit? Why are you going to take it? How will you mitigate it? Can you compensate with increased safety margins elsewhere? If you do not think it is okay to increase risk assumption for a specific event…DON'T!

Fight smart. Train how you plan to fight. When times get desperate, make sure you fight how you trained.

"Anyone can hold the helm when the sea is calm."

~ Publilius Syrus

Practical Safety Management

This time of year tends to bring numerous changes to our operations. Some examples include: weather changes, budgets, hours of daylight, holidays, and even school schedules for those of us with children. In the past, we have also seen a spike in the public safety aviation accident rate in the September through November timeframe.

All of these changes make this a great time to schedule some safety related training. Your training could be a dedicated safety meeting for the unit, online training, etc. Whatever it is, you should link this training to the current list of hazards identified by your safety management system. That list should include items identified through safety (hazard) reports, incidents, audits, inspections and surveys. The coordination of training and safety creates a practical impact on operations that unit members will find more realistic and, hopefully, interesting.

If you are not sure where to find the resources you need, start with the ALEA website where members have access to a number of free online courses and presentations:

https://www.pathlms.com/alea/

Resources

HAI Rotor Safety Tips:
https://www.rotor.org/rotornews/Aug17/SafetyTipoftheWeek-HelmetVisors.jpg
https://www.rotor.org/rotornews/Sep17/SafetyTipoftheWeek-Nutrition.jpg

US Helicopter Safety Team – Safety Enhancements:
http://www.ushst.org/MobilApp.aspx

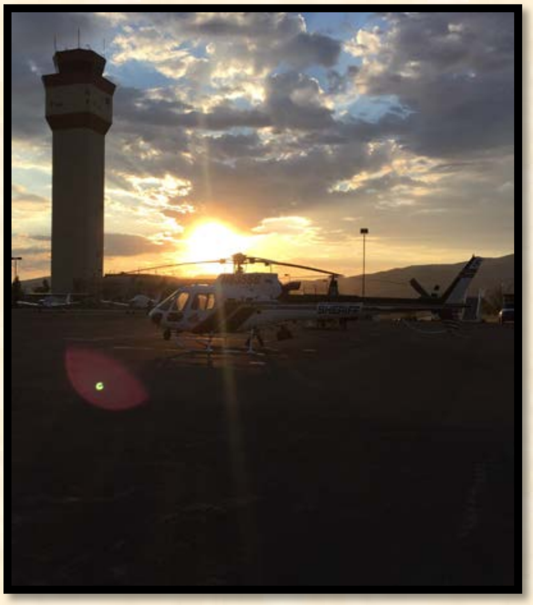
Police Aviation News:
http://www.policeaviationnews.com/Acrobat/257PANSeptember2017.pdf

NTSB Safety Alert – Maintenance Inspections:
https://ntsb.gov/safety/safety-alerts/Documents/SA_022.pdf

Aviation Human Factors Newsletter:
http://www.decodinghumanfactors.com

ALEA Online Meetings

The schedule for upcoming ALEA online meetings is as follows.
If you would like to join, send an email to: safety@alea.org



UAS:
Wednesday, October 11th, 2017
1:00 PM – 2:00 PM EDT (1700 UTC)

Safety Officers:
Monday, October 23rd, 2017
1:00 PM - 2:00 PM EDT (1700 UTC)

Maintenance:
Tuesday, October 24th, 2017
1:00 PM - 2:00 PM EDT (1700 UTC)

"Nobody who gets too relaxed builds up much flying time."

~ Ernest K. Gann

Reality Check...

Note: *The following reports are taken directly from the reporting source and edited for length. The grammatical format and writing style of the reporting source has been retained. My comments are added in red where appropriate. The goal of publishing these reports is to learn from these tragic events and not to pass judgment on the persons involved.*

Aircraft:	**Bell 407**
Injuries:	**2 Fatal**
NTSB#:	**ERA17FA274**

https://app.ntsb.gov/pdfgenerator/ReportGeneratorFile.ashx?EventID=20170813X82426&AKey=1&RType=Prelim&IType=FA

On August 12, 2017, a Bell 407, operated by the Virginia State Police (VSP), was destroyed after impacting trees and terrain in Charlottesville, Virginia. The airline transport rated pilot, and private pilot-rated observer, were fatally injured. According to the VSP, the mission of the helicopter flight crew was to provide continuous video downlink to the VSP command center of the public demonstrations that were occurring in Charlottesville, Virginia.

The helicopter arrived over the city of Charlottesville at 1604, and remained over the city until 1642 when they were re-tasked to provide over-watch for the Governor of Virginia's motorcade. At 1643, the helicopter crew advised the VSP command center that they were heading directly to the motorcade, and were about 30 seconds away. About 1649, another helicopter advised the VSP command center that the accident helicopter had crashed.

Preliminary radar data provided by the Federal Aviation Administration (FAA), indicated that just prior to the accident, at 1648, the helicopter was flying at an altitude of approximately 2,200 ft above mean sea level (msl) in the area of the motorcade. At that time, the helicopter was traveling north-northwestbound before it began to turn to the right and descend rapidly. At 1648:30, radar indicated that the helicopter was descending through 1,450 ft msl, at a calculated groundspeed of 30 knots. Moments later, the helicopter descended below the floor of radar coverage, and radar contact was lost.

Approximately 37 witnesses were interviewed, and their descriptions of the altitude, direction of flight, and velocity of the helicopter varied; however, the preponderance of witness statements reported that the helicopter initially was hovering, began a rolling oscillation, began to spin (rotate about the vertical axis), and then descended in a 45° nose down attitude, while continuing to spin until it was lost from sight below the tops of the surrounding trees. They then observed a plume of smoke rising from the area of the accident site. Preliminary review of security camera video provided by the University of Virginia corroborated statements from witnesses regarding the rotation (spinning) of the helicopter during the descent, and the nose down pitch attitude.

Examination of the accident site revealed, that the main wreckage had come to rest upright, on a magnetic heading of 333° in heavily wooded terrain, adjacent to a residence. The helicopter fuselage was highly fragmented from impact and postimpact fire damage, but most major components were present. A debris field, that was several hundred feet long was observed to the west of the main wreckage, with several pieces of debris coming to rest on the roof of the residence. The debris field was comprised primarily of sheet metal from the tailboom, aluminum honeycomb sandwich structure from the airframe, tail rotor drive system pieces, and tail rotor control tube pieces. The main wreckage was comprised of the cockpit and cabin, baggage area, and the forward tailboom attachment to the main fuselage.

Examination of the tailboom revealed that the mid-section, which included the horizontal stabilizer, had come to rest adjacent to the forward right side of the nose section. The left horizontal stabilizer exhibited an angled cut consistent with main rotor blade contact.

The tailboom aft section, which contained the tail rotor gearbox and tail rotor, was fractured about 48.5 inches from the tail rotor axis of rotation. The tailboom aft section came to rest in a tree about 40 ft above the ground and 100-150 ft south-southwest of the main wreckage. The left side of the tailboom aft section had an impact mark consistent with contact with a tail rotor blade. The impact mark was located about 27-31 inches from the tail rotor axis of rotation.

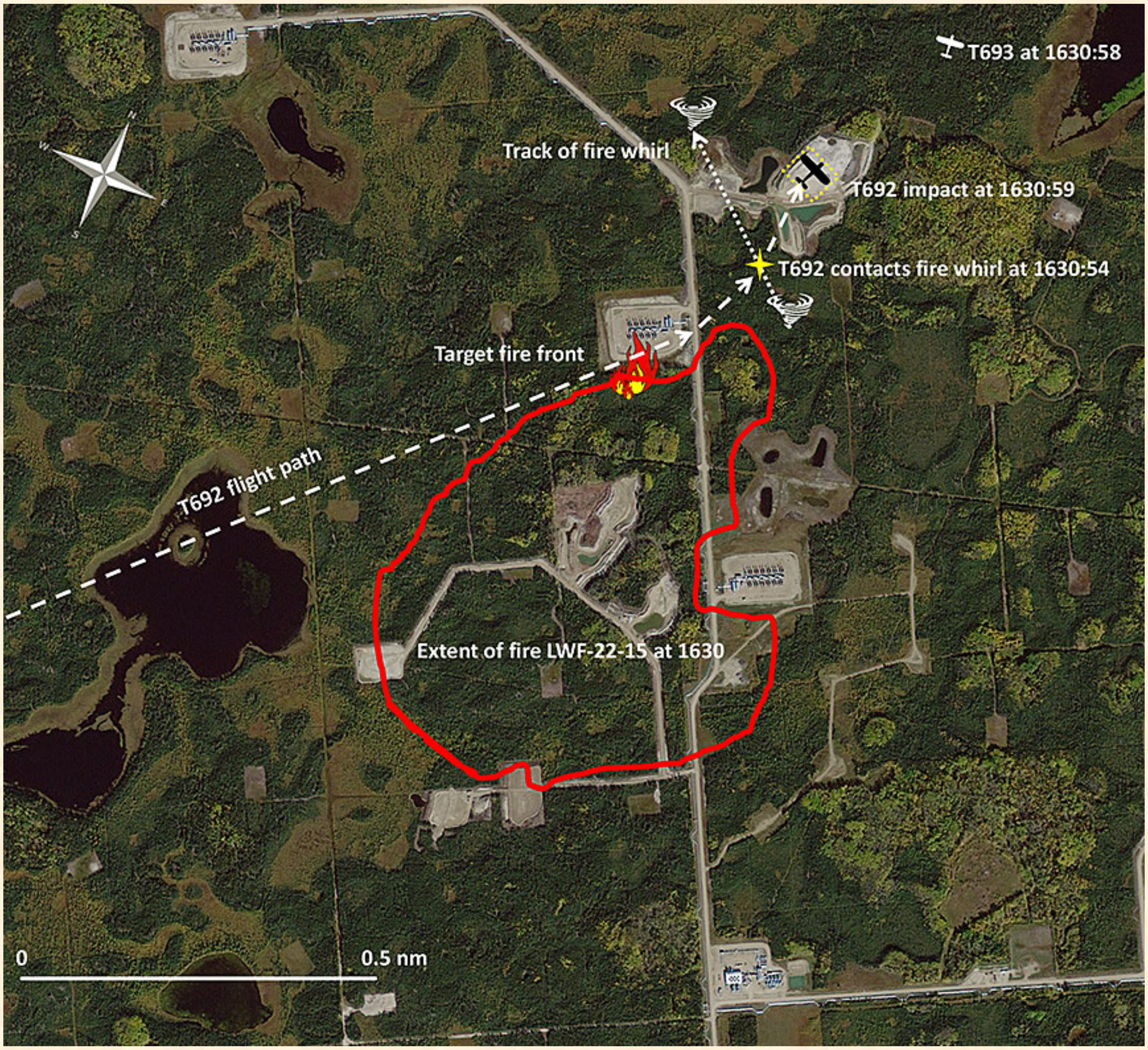
Examination of the tail rotor drive shafts (TRDS) revealed that, the oil cooler remained installed to the airframe. The forward and aft splines were thermally damaged but did not exhibit evidence of smeared or missing spline teeth. The tail rotor, which was still installed on the aft portion of the tail boom, came to rest in the top of a tree. Examination of the tail rotor revealed that, both blades (white and red) remained attached, and the tail rotor rotated freely with no evidence of binding. Examination of the engine revealed that hard body foreign object damage was present on the first stage compressor blades, consistent with the engine operating at the time of the accident. Control continuity was established between the cyclic pitch control to the mixing unit. The tail rotor fore-aft push-pull tube (routed under collective stick) was continuous back to the bellcrank (underneath the mixing unit).

Aircraft: **AT-802A**
Injuries: **1 Fatal**
TSB Canada #: **A15W0069**

http://www.tsb.gc.ca/eng/rapports-reports/aviation/2015/a15w0069/a15w0069.pdf

The Conair amphibious float-equipped Air Tractor AT-802A Fire Boss, was operating in support of wildfire management operations. Tanker 692 was the last in a formation of 4 AT-802A Fire Boss. Tanker 692 had completed 2 drops on the fire, from west to east, with a turnout to the north. When exiting its third drop, Tanker 692 encountered severe turbulence and then pitched to a nose-up attitude. The aircraft climbed to approximately 400–500 feet above ground level, where it rolled to the left and entered a nose-down attitude. It struck the ground right-wing low and close to nose-level at 1630 Mountain Daylight Time. The pilot was fatally injured as a result of non-survivable impact forces. There was no post-impact fire.

Immediately after the accident, a large fire whirl was seen moving from southeast to northwest across the borrow pit west of T692. The fire whirl was approximately 50–100 feet wide at the base and extended to an altitude of approximately 1500 feet agl. It had a very strong rotation and uptake of material. The fire whirl continued across the borrow pit and re-entered the treeline, where another fire was ignited by debris it was carrying. It then disappeared from view shortly after entering the trees.



Fire whirls are tornadic events generated by a fire. On a small scale, they are similar to dust devils; on a large scale, they are more like tornadoes generated by a thunderstorm. There are several documented examples of this phenomenon. In June 2002 near Durango, Colorado, the Mission Ridge fire generated a large rotating vertical plume with winds strong enough to overturn vehicles and damage structures. The Neola North fire near Neola, Utah, generated cyclonic winds that caused the death of 3 people on 29 June 2007. On 18 January 2003 in Canberra, Australia, a large bush fire spawned a fire whirl on the scale of a tornado. It created a damage path 25 km long and, in some areas, 500 m wide. Trees were uprooted, vehicles were overturned, and roofs were ripped from houses. The winds were estimated at 250 km per hour, which equates to a strong F2 on the Fujita scale.

Forthofer and Butler identify 4 common factors for the development of fire whirls:

1. A large heat source,
2. An unstable atmosphere,
3. Low-to-moderate ambient wind,
4. A strong source of vorticity/rotation.

Fire behaviour training:

There is a certain level of inherent risk when engaging in forest-fire suppression operations. The risks are mitigated by a number of factors, including personal protective equipment, standard operating procedures, and training. Most of the training for flight crew centres on the safe operation of the aircraft and the procedures to keep aircraft separated but still effective while fighting the fire. There is no regulatory requirement for training on environmental conditions specific to the forest fire environment, such as the development of fire whirls and their hazards. If fire behaviour training is not provided to personnel involved in fire-suppression activities, there is a risk of aircraft being flown into unsafe conditions.

Figure 6. The smoke column, showing evidence of plume shedding, with a funnel developing in the smoke, at 1629:53, approximately 1 minute before the accident (Source: Government of Alberta, with TSB annotations)

Flight crew restraint system:

When operating in conditions that can generate turbulence, such as updrafts, downdrafts, and wind shear, an aircraft has a greater likelihood of being involved in an upset event. The acceleration generated by such events can make control of the aircraft difficult to maintain. This difficulty is exacerbated by separation of the pilot from the seat. If the flight crew restraint system does not adequately protect the pilot from the effects of negative g forces, there is a risk that aircraft control and crew safety will be compromised.

Findings as to causes and contributing factors:

1. The aircraft encountered a fire whirl, causing it to enter an undesired nose-up attitude, resulting in a loss of control.
2. The aircraft's low operating altitude made recovery improbable, resulting in impact with terrain.