AIRBORNE LAW ENFORCEMENT ASSOCIATION

# The Safety Wire

February 2017

**My phone is on fire!** These are five words I do not want to hear when I am flying. To be honest, I never really gave it too much thought. Even when the FAA banned certain Samsung phones from commercial flights because of fire incidents, I assumed that the industry was making a knee jerk reaction to an isolated incident. It couldn't be that bad, could it? Recently, while at an ALEA Safety Seminar, I listened to an agency describe the bags they carried in their aircraft specifically to deal with in-flight phone or tablet battery fires. I realized that I should probably look into this more.

What is the risk? It depends on both the severity and probability of an event. Since 2002, there have been more than 40 manufacturers' recalls due to fire or explosion issues in lithium ion batteries for personal devices. The trigger for a recall can be as high as 1:200,000 battery failures, so the fires are not exactly rampant. However, some of the factors that increase the likelihood of thermal runaway in the battery, which leads to fires, are very common in public safety aviation. First, extreme heat (such as prolonged exposure to direct sunlight) not only increases thermal energy in the battery, possibly beyond containment capabilities, but also can weaken the internal components. Weakened internal components can result in electrical shorts within the battery, which triggers thermal runaway.  These same components are adversely affected by vibration, compounding any damage caused by heat. Manufacturers also warn against using your device while it is charging because charging produces extra heat. Many of us have tablets mounted on the glare shield, in direct sunlight, constantly connected to chargers hard-wired into the aircraft, in hot, poorly ventilated cabins of aircraft that produce constant vibration. I would say there is at least a moderate level of probability in this risk calculation.

Severity of a lithium ion battery fire in the cockpit is different depending on your ability to ventilate the aircraft, i.e. a pressurized cabin vs. flying without doors. If you are unable to ventilate easily, you will be stuck with not only the smoke and fire, but toxic fumes. During thermal runaway, temperatures can reach up to 500 degrees Celsius (932F) within the cell. While the obvious option of tossing it out of a door or vent may seem simple, grabbing the burning device may not be so easy, especially if you do not wear fire resistant gloves. I would suggest that the severity side of the risk assessment would be moderate to severe for most of us.

So what to do? First, do not leave the device plugged in all the time, especially while you are using it. A typical tablet or phone battery should last longer than the length of most of our flights. If it does not, it is probably time to get a new battery installed.  Try moving the device out of direct sunlight. Finally, avoid after-market chargers and cords.

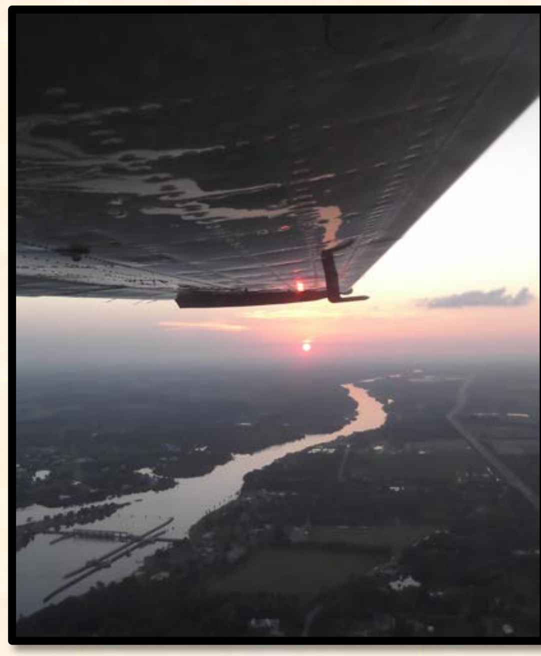
If the device does catch fire, a standard fire extinguisher will work on small lithium ion batteries. Water will also work. However, due to the extreme heat, the fire may need to burn itself out. Other than ejecting the device out of the window, another option is to have a fire containment bag. The Ontario Ministry of Natural Resources showed me an example of one they put in their aircraft from a company called Brimstone Fire Protection. Considering the aircraft types they fly, it was obviously a good decision for them. The bag comes with gloves that can be used to grab a burning device, place it in the bag and seal it. The sealed bag protects against both the heat from the fire and the fumes. I found similar options from Baker Aviation, Hot Stop, and Fire Containment Concepts. It may seem like overkill to have such a bag in a small, single-engine aircraft. But when someone yells, “my phone is on fire!” during a flight, I can’t imagine not wishing I had one nearby.

"For some years, I have been afflicted with the belief that flight is possible to man. My disease has increased in severity and I feel that it will soon cost me an increased amount of money if not my life."

*~ Wilbur Wright*
*May, 1900*
*Letter to Chanute*

# *ALEA Annual Safety Survey*

ALEA is conducting an annual safety survey during the month of February 2017.



Your input will help the Association understand your safety needs. We will use this information to direct our safety program in 2017 and beyond in order to best serve the needs of ALEA members.

All responses are **completely anonymous** and will be retained only by ALEA. If you have any questions, please contact Bryan Smith (safety@alea.org).

Again, thank you for your time.
Please click here to begin the survey (you must sign in on the website).

# *Practical SMS*

In the newsletter last month, I suggested trying something different in 2017. This applies to our safety programs as well. It is vital that we change up the material and safety output on a regular basis. The world around us is ever changing, our safety program needs to reflect that.

Of the four pillars of SMS, Safety Assurance is usually the one that is not implemented very well. This final step in the process can help us keep our safety program fresh and relevant. By looking at what safety controls are working, and which are not, we can make changes to the program. For example, if your FRAT looks the same every day…you are missing something. Items that never change may need to be addressed a different way, or even removed. What are the items that should be in the FRAT? Ask the crews what they talk about at the beginning of the shift. Look at the hazard information that has been collected in your SMS to see what should be focused on. Attack the items that are actually impacting the crew.

Goals and objectives should change at least once a year. Revisiting them mid-year is not a bad idea, either. If your program has successfully implemented an effective risk control, continue to monitor it but replace that item on the goals and objectives with something new that your data indicates still carries a high risk. If you are not progressing towards your goal, set different objectives to help your unit progress towards that goal instead of beating your head against the same wall, hoping it might break *this* year.

Through the utilization of Safety Assurance, or program performance information, you can make changes to your program that will not only maintain an effective connection with daily operations, but will help to sustain the attention of your unit members as well.

## Resources

Police Aviation News
http://www.policeaviationnews.com/Acrobat/250PANewsFebruary2017.pdf

Human Factors Website and Newsletter:
http://www.decodinghumanfactors.com/home.html

NASA Aviation Safety Newsletter:
https://asrs.arc.nasa.gov/publications/callback/cb_445.html

Transport Canada Aviation Safety Newsletter:
http://www.tc.gc.ca/eng/civilaviation/publications/tp185-menu-5395.htm

# ALEA Online Meetings

The schedule for upcoming ALEA online meetings is below. Meetings are conducted though an online conference call you can join using your computer or phone. They are open to any ALEA member. Contract maintenance providers to ALEA members are welcome on the maintenance meeting.

***Safety Officers:***
Tuesday, March 14, 2017
1:00 PM - 2:00 PM EST (1800 UTC)

***Maintenance:***
Tuesday, March 28, 2017
1:00 PM - 2:00 PM EST (1800 UTC)

***UAS:***
Wednesday, March 29, 2017 1:00 PM - 2:00 PM EST (1800 UTC)

**"Nothing endures but change."**

*~ Heraclitus*

# Reality Check...

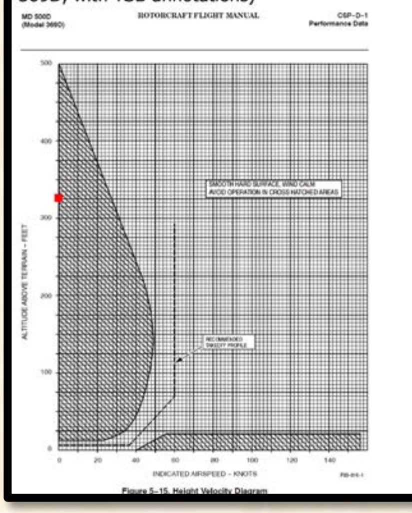
*Note: The following reports are taken directly from the reporting source and edited for length. The grammatical format and writing style of the reporting source has been retained. My comments are added in red where appropriate. The goal of publishing these reports is to learn from these tragic events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

**Aircraft:** **MD 369D**
**Injuries:** **2 fatal**
**TSB Canada#:** **A15C0146**

http://www.tsb.gc.ca/eng/rapports-reports/aviation/2015/a15c0146/a15c0146.asp

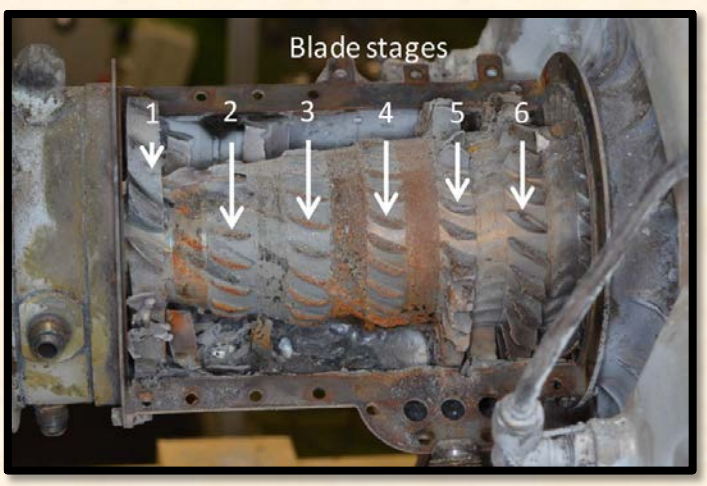
A Hughes 369D was conducting aerial work on power lines with the pilot and an external platform worker on board. While installing a marker ball in a hover at approximately 325 feet above ground level, the helicopter experienced an engine failure, descended suddenly, and collided with the terrain. The pilot and external platform worker were fatally injured. While the first marker ball was being installed after lunch, a ground crew member took a video of the installation. The video revealed that, while the helicopter was in a hover facing northeast, a yellow flame came from the engine exhaust, followed by a puff of black smoke. The helicopter was seen backing away from the power line and descending in a left-hand rotation. The pilot had 21,992 total flying hours and 7,621 hours in type.

**Figure 1.** Height velocity diagram, showing altitude and airspeed at the time of the engine failure (red square) (Source: Rotorcraft flight manual for the Hughes 369D, with TSB annotations)




At the time of the engine failure, the helicopter was in a hover at an altitude from which a successful autorotation landing was unlikely. Although the autorotative force required for a successful autorotation landing was not generated, the helicopter had attained a significant vertical rate of descent just before impact; the investigation determined that it was approximately 2600 feet per minute. Under normal conditions, an object is at a 1 g force state. When the weight of that object is doubled or tripled as a result of a sudden change in state or momentum, the object will have a g force of 2 or 3, respectively. Studies conducted by the United States Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA) have concluded that a g force beyond 27 results in serious injury and could be fatal. The rate of descent, calculated by analysis of the video, would have resulted in a g force of 139 to 208 on impact.

Disassembly of the compressor assembly revealed complete failure of stages 2, 3, and 4 of the axial compressor blades. The compressor front support struts did not exhibit any pre-impact anomalies. The stage 1 compressor blades were fully intact. Examination of the compressor front support struts and stage 1 compressor blades did not show any signs of pre-existing erosion/corrosion. Lack of damage



to the front support struts or to the stage 1 compressor blades suggests that the engine did not ingest any foreign objects.

**Findings as to causes and contributing factors:**
1. It is likely that a stage 2 compressor blade was subject to fatigue and eventual overload failure, resulting in a loss of engine power.
2. The engine failure occurred while the helicopter was in a hover. There was insufficient altitude to conduct a successful autorotation, and the helicopter collided with the terrain.

**Aircraft:** **Cessna 172N**
**Injuries:** **1 fatal**
**NTSB#:** **CEN16FA073**


The noninstrument-rated pilot planned to conduct a cross-country flight. Before departure on the second leg of the flight, the pilot obtained a weather briefing, which noted areas of instrument flight rules (IFR) conditions along his route of flight, including his destination airport. During the briefing, the pilot indicated that his vehicle and work was at his destination. The briefer and pilot discussed flying visual flight rules (VFR) over the cloud layer and possible alternate destination airports. The briefer suggested maintaining VFR flight and making an intermediary stop to again check the weather. The pilot elected to fly direct to his destination. During the flight, the pilot flew above the cloud layer and received VFR flight-following from ATC. The controller advised him that his preferred destination airport was currently under IFR conditions, but another airport was reporting VFR. The pilot elected to continue to the alternate destination airport. The pilot notified the controller he did not have visual contact with the ground and continued his descent. Shortly thereafter, the controller lost radar and radio communication with the pilot. About the time of the accident, a person in the area reported the weather conditions as, "clouds on the ground," with low ceilings, and freezing fog and added that the visibility had changed from about 6 miles to less than 1⁄4 mile in seconds. The airplane wreckage was located about 8 miles from the airport. Examination of the wreckage did not reveal any anomalies that would have precluded normal operations. A review of the pilot's logbook revealed he had a total of about 111 flight hours. The accident is consistent with controlled flight into terrain in instrument meteorological conditions as the pilot continued the descent without the ground in sight.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The noninstrument-rated pilot's improper decision to continue visual flight into instrument meteorological conditions, which resulted in a collision with terrain.