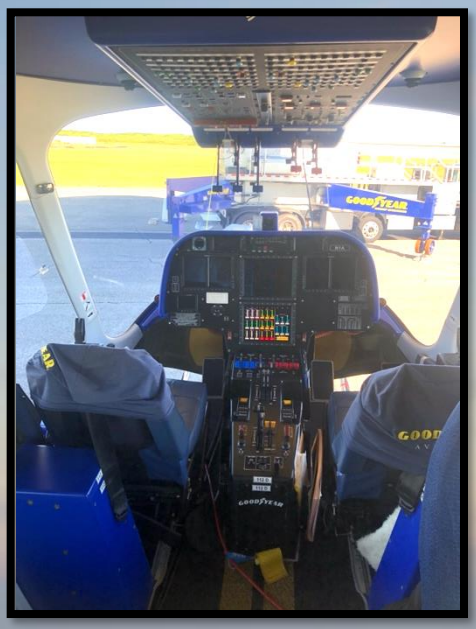
The Safety Wire

June 2022

Go around. I've noticed several conversations and articles lately in our industry about safety while conducting training maneuvers. From 2014-2021, there were 16 accidents, and four fatalities, during training in public safety aircraft that we know of. This does not include those incidents that occurred with public safety pilots in aircraft owned and operated by third-party training providers. A few years ago, a group of APSA members spent a considerable amount of time looking at training-related accidents in our community. The group came up with some ideas that I feel are worth repeating. Here are three of the suggestions:

1. Set initiation and abort criteria for each maneuver.
2. Use training flights to reinforce the standards for any maneuver.
3. Separate training and evaluation flights.



Read any training accident report and eventually the blame will make its way to the failure of the instructor to stop the sequence of events before it turned into an unrecoverable incident. As a new CFI, we are usually told to simply be on guard every second of the flight for students who are always on the verge of doing something wrong. It is unrealistic advice for a real problem. The issue we identified was that there usually is no clearly defined red line on a maneuver that tells the CFI the student is doing it so poorly that

we need to intervene. We usually wait until the situation gets uncomfortable and intervene then, which is often too late.

For some maneuvers, usually simulated engine failures, we set initiation and abort criteria. To start, we confirm a certain airspeed, altitude, attitude, position over the ground and/or aircraft operational parameters (engine instruments, rotor RPM, etc.) are met. This is an important step because a maneuver that starts poorly, ends poorly. Then to complete the maneuver, there is a certain ‘gate’ that requires similar parameters be met or the CFI must call for a go-around while there is still time to do it safely. Why do we fail to do this for all of the training maneuvers? We need to if we want to know when to stop a maneuver before disaster starts sinking its teeth into us.

The first step in the process of setting reasonable initiation and abort points is to know what our evaluation criteria are for each maneuver. Most maneuvers have private and commercial pilot level standards with an allowable variation (+/- 5 knots, 100 feet, etc.). This is a reasonable place to start. If there are not criteria set, you need to establish them. This can even be applied to operational maneuvers such as police orbits or vehicle pursuits.

If we have the standards set, design your training flights to meet those standards. This means aiming for the mark and, at minimum, staying within the allowable variance you have established. If the student exceeds the standard you’ve established, it is time to stop and start over. We should not be teaching students to do a terrible maneuver and then find a way to pull it back from near disaster to meet the goal at the end. Learning should be more than a series of near-death experiences. When they are no longer doing it right, stop and start again instead of waiting until it is so bad nobody can stop the train-wreck.

This brings us to the last point, training vs. evaluation. Last week, I read an introduction from a pilot giving a webinar that said he had been learning to fly for more than 30 years. The pilot was a 10,000-hour CFII, ATP, yet he felt it important to say he was still learning. It is important for all of us to be in a never-ending state of training as it takes a little more than a lifetime to learn everything there is to know about our jobs. We need an atmosphere that embraces that and allows us to get better. The evaluation element of a flight will always diminish the learning atmosphere. If we want pilots to feel comfortable

asking questions, admitting they need more work on something, or wanting to repeat a maneuver until they are comfortable with it, we need to have dedicated training flights where learning is the goal. Remember, when it comes to our skills, we are either getting better or getting worse, nothing is static. Training is how we get better.

The final question for instructors is, now that you know when to stop a training maneuver…how do you safely stop it and go-around for another try? That is a big conversation for another day.

"What is chiefly needed is skill rather than machinery."

~ Wilbur Wright

RESOURCES

AAIB Annual Safety Review (United Kingdom):
https://dft-newsroom.prgloo.com/news/aaib-publishes-annual-safety-review

Aviation Maintenance Human Factors Training:

- FAA:https://www.faa.gov/sites/faa.gov/files/about/initiatives/maintenance_hf/library/hf_ops_manual_2014.pdf
- ATSB:https://www.faasafety.gov/files/gslac/library/documents/2019/Feb/187964/AR%202008-55%20Human%20Factors%20Alan%20Hobbs.pdf

NASA Callback – Maintenance tooling:
https://asrs.arc.nasa.gov/publications/callback/cb_508.html

ONLINE MEETINGS

APSA conducts regularly scheduled online meetings for safety officers, maintenance technicians, SAR personnel, UAS operators and natural resources personnel via a conference call you can join using your computer, mobile device or phone. Online meetings are open to any APSA member. Contract maintenance providers to APSA members are welcome to participate in the maintenance meeting as well. If you would like to join, send an email to: safety@publicsafetyaviation.org

The schedule for upcoming APSA online meetings is as follows.

UAS:
Wednesday, July 6, 2022
1:00 PM - 2:00 PM EDT (1700 UTC)

Safety Officers:
Friday, July 15, 2022
1:00 PM - 2:00 PM EDT (1700 UTC)

SAR:
Wednesday, August 10, 2022
1:00 PM - 2:00 PM EDT (1700 UTC)

Maintenance:
Wednesday, August 24, 2022
1:00 PM - 2:00 PM EDT (1700 UTC)

Natural Resources:
Wednesday, October 5, 2022
1:00 PM - 2:00 PM EDT (1700 UTC)

"Argue for your limitations and you get to keep them."

~ Richard Bach
Illusions

EMERGENCY PROCEDURE OF THE MONTH

In each monthly emergency situation, discuss what you would do, as a crew, to respond to the following emergency. If the EP does not apply to your specific aircraft, think of something similar.

Loud bird strike at night - Unknown damage

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 UH-1H**
Injuries:	**1 Fatal**
NTSB#:	**WPR20LA280**

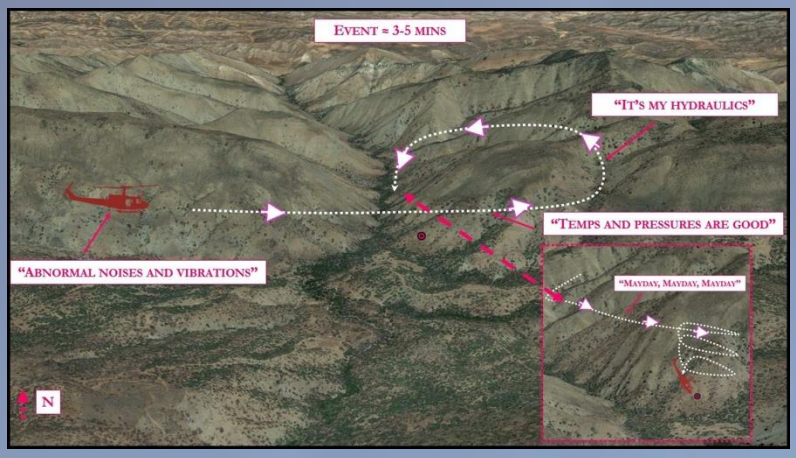
https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/101831/pdf

On August 19, 2020 about 0945 Pacific daylight time, an Arrow-Falcon Exporters, Inc. UH-1H, N711GH, was destroyed when it was involved in an accident near Coalinga, California. The pilot, the sole occupant was fatally injured. The helicopter was operated as a public use firefighting flight. The pilot departed at 0846 followed by another pilot that was flying a Bell 212 helicopter for another operator.

After departure, both helicopters flew south until reaching a small lake/reservoir (the dip site) to fill up the external load buckets attached to their respective helicopters (Bambi buckets). Thereafter, they flew to a predetermined areas and began to unload their water on the fire.

The Bell 212 pilot recalled that after he departed the dip site with a bucket of water, he heard the accident pilot communicate over the air-to-air radio that he felt "abnormal noises and vibrations" and that he was going to make a precautionary landing. The Bell 212 pilot dumped his water and then caught up to the accident helicopter with the intention of assisting the pilot find a good area to land; he remained a few hundred feet behind and above the accident helicopter. The accident helicopter was about a 1,000 ft above ground level (agl) and maneuvering at an airspeed between 60 to 70 kts. The accident pilot then stated that the helicopter's "temps and pressures are good." A few seconds later the accident pilot stated "it's my hydraulics." (See Picture 1 below). The Bell 212 pilot relayed

that that he should make a right turn and fly down the ravine to less mountainous terrain (the flats).



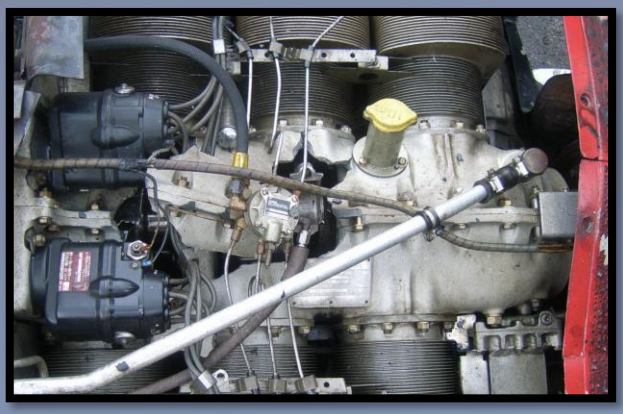
The helicopter started to make a right turn and then banked back to the left while losing airspeed. The Bell 212 pilot noticed the helicopter still had its 100 ft longline and Bambi bucket attached and told the accident pilot to "release your long line and get forward airspeed," The accident pilot then stated "Mayday, Mayday, Mayday." The left turn steepened remaining in a level pitch attitude, and the helicopter began to make three or four 360° rotations (rapidly swapping the front and back), while drifting north-east. The helicopter then pitched in a nose-low, near vertical attitude and collided into terrain. A fire immediately erupted and the Bell 212 pilot made multiple trips to the dip site to fill his bucket and drop water on the accident site.

Aircraft:	**Cessna T210L**
Injuries:	**3 Fatal**
ATSB#:	**ERA10GA320**

https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/76392/pdf

The aerial observation flight was conducted under contract to the U.S. Forest Service. As the flight neared its destination airport, the pilot reported via the airport's common traffic advisory frequency his intent to land. Witnesses reported that, as the airplane overflew them on approach to the airport, it appeared to be in distress, trailing black smoke with the engine "sputtering." The airplane subsequently impacted a light stanchion about 1,300 feet short of the intended landing runway. Before coming to rest, the airplane struck a house and several parked cars, and it was nearly consumed during a post- impact fire.

Postaccident examination revealed a catastrophic failure of the airplane's engine, which originated with a fatigue failure of the number 2 cylinder exhaust valve. The fatigue failure



was likely due to abnormal loading associated with excessive valve-to-valve guide clearance resulting from valve guide wear. Significant exhaust valve guide wear was observed on all cylinders, with the valve guides of the generally cooler cylinders near the front of the engine showing less wear than those of the generally hotter cylinders near the rear of the engine. This overall pattern suggested a persistent elevated temperature problem, which could have resulted from either improper engine operation or an undiagnosed maintenance issue.

The investigation revealed that, when performing engine cylinder differential pressure tests during required routine inspections of the airplane’s engine, the contract operator utilized gauges that had not been calibrated since their purchase and did not perform the tests in accordance with the engine manufacturer's recommendations. Also, the engine manufacturer recommended that cylinder borescope inspections be accomplished in conjunction with the differential pressure tests, and there were no notations in the engine maintenance records of any visual borescope inspections of the interior of the cylinders.

If properly performed, differential pressure tests and borescope inspections may have detected valve guide wear and prevented the exhaust valve failure, and fuel injection system inspections may have detected and corrected incorrect adjustment of the engine fuel system, which can result in elevated engine cylinder temperatures and lead to valve guide wear.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The total loss of engine power resulting from the fatigue failure of the engine's number 2 cylinder exhaust valve. The fatigue failure was due to valve guide wear that led to excessive clearance between the valve and valve guide. Contributing to the accident was the contract operator’s lack of compliance with its own maintenance procedures, which, if followed, would have prevented the accident.

Aircraft: Airbus AS350 B3
Injuries: 1 Fatal, 2 Serious
NTSB#: CEN19FA109

https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/99185/pdf

While conducting controlled fire operations, the helicopter was maneuvering over trees, when the engine lost power. The pilot performed an autorotation and the helicopter impacted trees and then terrain, and came to rest on its side. The fuselage and empennage sustained substantial damage. One crewmember was fatally injured.

Examination revealed that a fuel line between the engine firewall and hydro-mechanical unit (HMU) was loose and not secured with safety wire as required. About 25 flight hours before the accident, that fuel line was disconnected to defuel of the helicopter in order to perform a weight and balance check. No other maintenance was performed in that area. The mechanic who returned the helicopter to service stated that he was confident that he torqued and secured the line. No other anomalies were detected with the helicopter which would have precluded normal flight. The circumstances of the accident are consistent with a loss of engine power due to the loose fuel line.

Probable Cause and Findings
The National Transportation Safety Board determines the probable cause(s) of this accident to be: Maintenance personnel's failure to properly re-install and secure a fuel line, which resulted in a total loss of engine power.

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