AIRBORNE PUBLIC SAFETY ASSOCIATION
TO SERVE, SAVE AND PROTECT FROM THE AIR

The Safety Wire

April 2021

Not quite bad enough...

I recently read an article about the tragic deaths of nine US Marines during a training exercise involving an amphibious vehicle. What struck me about the incident was the number of contributing factors that set the stage for the accident. There was not a safety boat in the water that day, many of the troops had not yet received water egress training, several minor safety protocols were ignored, a headlight had been installed incorrectly which allowed it to take on water, emergency lighting was disabled, the schedule for the exercise had been changed due to technical issues on the beach, etc., etc.

What struck me about the story was that all of these items were probably seen at the time to be 'small' issues. Most of us expect that we will have to make 'no-go' decisions from time to time. We tend to set the threshold for those decisions high enough so we can explain later why we didn't fly or complete a maintenance task. The contributing factors that lead to accidents, however, may never reach that high threshold. Sometimes it doesn't take a huge, glaring factor to bend metal and hurt people. A pile of smaller, seemingly insignificant problems often pull aircraft out of the sky in a violent manner.

Still, we can't shut down ops every time we see a small issue during our day. Our schedules are generally written in pencil, lightly, so we can erase them and update as random tasking comes in from the field. Most of our industry is literally responding to situations that didn't go as planned! What is a professional to do?

We have two opportunities to identify the bucket of 'small' factors and control them before they control us. First, before we start the operation, we need to take the time to actively seek out, identify and respond to all of the small issues impacting the upcoming activity. The minor, sometimes 'silly' concerns we discuss in briefings, such as those involving Flight Risk Assessment Tools (FRATs), are unbelievably powerful in preventing accidents such as the one mentioned above. They allow us to see the total weight of the little things that we view as inconsequential when considered individually.

Not all problems present themselves before the activity starts. During an operation, the little things can pull us into disaster at a slow rate that is undetectable until it is too late. Define the operational profile as much as possible. Aircrew qualifications, maintenance standards, tactics, and techniques, etc. Of course, we cannot define every detail of our operation. However, if we know what the operation is supposed to look like, we know when things are not going right, even if it is 'little' stuff.

So how many small issues should we tolerate? Unfortunately, there is not a clear answer. I have always maintained a rule that someone passed on and has served me well. No more than three. Sometimes, one or two issues warrant an immediate response. If you reach three issues, even little ones, it is time to at least pause and reevaluate. You may find a way to continue the operation, but you and your team need to step back for a second to take a look at what is happening and determine how to bring the activity back under control. It may require a full stop in the action and reset, or it may be a pause and a discussion. You may realize that things need to stop entirely.

In the end, it is rarely one thing that turns a normal activity into disaster. Often it is one 'big' thing, preceded by a number of smaller factors. We spend our lives training to look for and respond to those big things. However, sometimes it is just, 'death by a thousand cuts', small cuts that we write off as having no major significance until it is too late.

"The machine does not isolate man from the great problems of nature, but plunges him more deeply into them."

~ Antoine de Saint-Exupery
Wind, Sand and Stars

Annual Safety Survey Info

May 24th is Aviation Maintenance Day. Don't forget to thank the hard-working people who make it possible for aircrews to do their work and come home safely every day. Whether in-house or contract, maintenance plays a major role in the effectiveness of safety management efforts at your organization. Ensure you are including them in your SMS. The numbers below are alarmingly low.

- In-house refresher training provided for maintenance staff — 49%
- Factory refresher training provided for maintenance staff — 42%
- Tool control system utilized — 47% (29% not sure)
- Maintenance involved in SMS — 46% (17% not sure)
- Maintenance staff covered by fatigue policy — 28%

ONLINE MEETINGS

APSA conducts regularly scheduled online meetings for safety officers, maintenance technicians, SAR personnel, UAS operators and natural resource 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, May 12, 2021
1:00 PM - 2:00 PM EDT (1700 UTC)

Safety Officers:
Friday, May 28, 2021
1:00 PM – 2:00 PM EDT (1700 UTC)

Maintenance:
Wednesday, June 9, 2021
1:00 PM - 2:00 PM EDT (1700 UTC)

Natural Resources:
Wednesday, June 23, 2021
1:00 PM – 2:00 PM EDT (1700 UTC)

SAR:
Wednesday, August 11, 2021
1:00 PM – 2:00 PM EDT (1700 UTC)

"Any damned fool can criticize,
it takes a genius to design in the first place."

~ Edgar Schmued
Chief Designer – North American Aviation

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.

Laser strike. Pilot has eye pain.

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:	**MBB BK 117**
Injuries:	**4 Fatal**
NTSB#:	**ERA17MA316**

https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/95967/pdf

The pilot was conducting an air ambulance flight to transport a patient to another hospital located about 130 nautical miles away. About 8 minutes after takeoff, at a GPS altitude of about 2,500 ft mean sea level (msl) and a groundspeed of about 120 knots, the helicopter began a left turn toward the south. Although the precise timing and order of events could not be determined, the No. 2 engine experienced a bearing seizure; the engine continued to run. It is likely that the pilot then errantly shutdown the No. 1 engine and continued to fly for a brief period utilizing the No. 2 engine. About 1 minute after the left turn began, the last data point was recorded, which indicated that the helicopter was at a GPS altitude of about 1,200 ft msl and a groundspeed of 75 knots. It is likely that the No. 2 engine subsequently lost all power. The helicopter then impacted a shallow turf drainage pathway between fields of tall grass on a farm, and a postcrash fire ensued, which consumed most of the helicopter structure. The lack of any ground scars leading toward or away from the main wreckage indicated that the helicopter was in a near-vertical descent before impacting the ground. One rotor blade was found intact resting in undisturbed 8-ft-tall grass, consistent with little or no rotation of the main rotor system. Neither engine exhibited damage consistent with rotation at the time of impact.

Detailed examination of the No. 2 engine revealed that its gas generator shaft rear bearing was seized and damaged. Specifically, all the roller elements were flattened and none of the roller elements would rotate. Several bearing components showed damage consistent with friction between the seized rollers and the inner race and ensuing overheating. These signatures were not observed in the No. 1 engine gas generator shaft rear bearing. The lack of rotation of the roller pins and the damage to the gas generator spool indicated that the No. 2 engine's rear bearing had failed during the accident flight.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A failure of the rear bearing in the No. 2 engine, which (1) created multiple and likely unexpected and confusing cockpit indications, resulting in the pilot's improper diagnosis and subsequent erroneous shutdown of the No. 1 engine, and (2) the resulting degraded the performance of the No. 2 engine, until it ultimately lost power. The complete loss of engine power likely occurred at an altitude and/or airspeed that was too low for the pilot to execute a successful emergency autorotative landing.

Aircraft: **Aeryon SkyRanger R60**
Injuries: **None**
AAIB#: **26747**

https://assets.publishing.service.gov.uk/media/5fd8ce1dd3bf7f40d2f0a645/Aeryon_SkyRanger_R60_registration_na_01-21.pdf

The UAS was being used to search for a missing person in the area of a large pond surrounded by trees. The search was being conducted at night and was using a thermal camera to search areas hard to access by foot. The weather at the time was good with only a light breeze.

The UAS pilot reported that during the flight he became aware of a message on the screen of the flight controller which he did not recognize. He did not realize the message was a warning and attempted to clear it but in doing so the aircraft motors cut out, causing the UA to fall from a height of about 70 ft into the pond below.

Data from the UAS was sent to the manufacturer for analysis. This confirmed that the cut-out screen icon had been activated three times within three seconds, causing all four electric motors on the UA to stop. At the time of the accident he had accumulated a total of 6 hours 15 minutes flying time, of which 4 hours 15 minutes were on the SkyRanger.

Aircraft: **Cessna 206**
Injuries: **1 Minor, 2 None**
NTSB#: **CEN18LA382**

https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/98324/pdf

The airline transport pilot and the flight instructor were conducting an instructional flight in a public aircraft with an observer on board and proceeded to an airport to conduct instrument approaches. After crossing the final approach fix and before arriving at the missed approach point, the engine lost power. The instructor took control and maneuvered the airplane over a set of power lines. He attempted to maneuver under a second set of power lines when the right wing struck one of the lines. The airplane touched down on a roadway, and its left wing struck a passing vehicle. The landing gear struck the concrete median, yawing the airplane clockwise, and the airplane's tail struck a second vehicle.

Photo 8 – Damage to pistons 2 and 3. Note embedded valve fragments.

Postaccident engine examination revealed the No. 1 cylinder intake valve had failed. Fractured pieces of the intake valve had been drawn into the intake plenum. The No. 1 cylinder was extensively damaged, and all of the piston heads had impact marks or pieces of valve embedded in the heads. The No. 1 cylinder, No. 1 piston, its intake and exhaust valve train components (springs, pushrods, and rocker arms), and 12 hydraulic lifters were sent to the engine manufacturer for metallurgical examination, which revealed that the No. 1 cylinder intake valve had failed in fatigue; however, the root cause of the failure could not be determined due to the extensive damage after the valve failure. Both the intake and exhaust rocker arms had nonconforming shoe heights. In addition, nine of the hydraulic lifters failed the leak-down test, including the No. 1 intake. Maintenance information revealed the engine had been overhauled 4 years earlier, during which all 12 hydraulic lifters were replaced. The intake and exhaust rocker arms had been reworked and reused, and about 0.01 inch of material had been removed from the shoe pads during the overhaul. While the nonconforming rocker arm shoe height and lifter may have contributed to a malfunction of the valve, the investigation could not determine with certainty the reason for the fatigue failure. The fatigue failure of the No. 1 cylinder intake valve resulted in the loss of engine power.