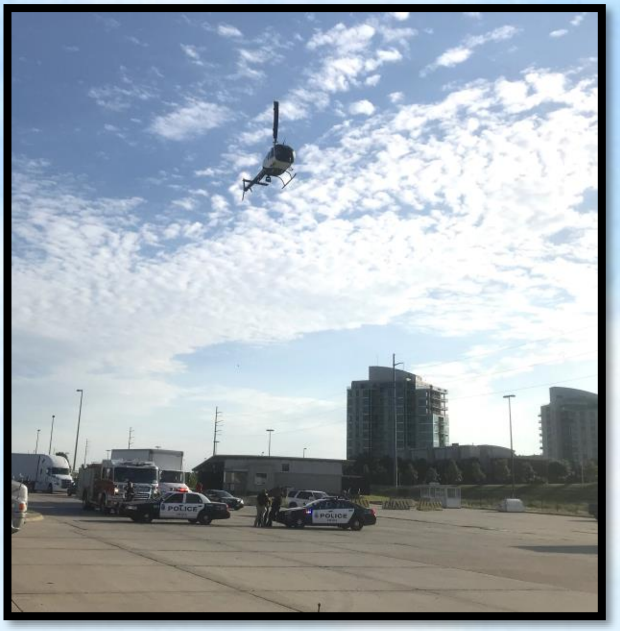
AIRBORNE PUBLIC SAFETY ASSOCIATION

The Safety Wire

July 2019

THOU SHALT NOT MAKE A MISTAKE summarizes the majority of policy manuals and regulations governing human behavior in the workplace. Public safety aviation is no exception, despite our efforts to grow beyond the archaic belief that the threat of punishment can somehow reduce human error to zero. Most of us understand that human error can never be completely removed from any activity we are involved in. We accept that even the most professional of us can be subject to mistakes from time to time. Yet, we still put a disproportionate amount of emphasis on the threat of discipline to control human error.



To get a clear picture of the probability of error, I thought it would be helpful to look at how many decisions the average person makes per day. Obviously, it is an abstract idea because we have different environments that create dissimilar needs for decisions. What rates as a ‘decision’ in the research papers I read is a matter of debate as well. Based on those definitions, different sources place the number of decisions between several hundred a day to tens of thousands. Whatever the number, the potential for mistakes are numerous, and always present. One journal estimated that the average worker makes 118 mistakes a year. The most common mistakes were general lapses that resulted in forgetting to complete tasks, sending an email to the wrong person, losing items, etc. Surprisingly, they reported that 1 out of 5 workers has been formally disciplined for some form of negligence. Fortunately, most mistakes do not result in injury. According to OSHA, 2.8 out of 100 workers are injured on the job per year and 3.5 out of 100,000 are killed. It is safe to assume these are usually the result of some human error. Unfortunately, mistakes in our industry carry a higher level of risk than most jobs, because when we have a lapse in our decision making, people are more likely to get hurt.

Human errors are caused by a multitude of factors. It may be a misperception or illusion, degraded performance due to fatigue, stress, temperature, etc. We may have a gap in our training or limited experience. Then there are issues such as confirmation bias, anchoring, attribution errors and textbooks full of other psychological explanations. One theory explains that the process itself can cause 'decision making fatigue' which leads to errors in decisions made towards the end of the day or at the end of a series of choices.

What we can take from this is that human error is inevitable. While we must try to minimize it, we must also expect it, and plan for it. That is where safety management comes in. We put in physical safety covers where able or use checklists for that 1:1000 occurrence where we may forget. We utilize tool control even when we have the best maintenance technicians and crew resource management for even the most experienced aircrews. Understanding these limitations also reminds us to put in two risk controls instead of one, as most controls require people to carry them out.

Most importantly, we have to understand that when errors do happen, we have to look past that last link in the chain where someone had a momentary lapse in their decision making. We need to use a risk management process to understand the circumstances that allowed the error to occur and how they might be corrected. Rarely in our industry does someone make a mistake because they failed to appreciate the prohibition against errors was written in the almighty book of rules. If that is the case, well, then the appropriate response is relatively clear.

"In order to live free and happily, you must sacrifice boredom.
It is not always an easy sacrifice."

~Richard Bach
Aviation author

ONLINE MEETINGS

APSA conducts regularly scheduled online meetings for safety officers, maintenance technicians, SAR personnel, and UAS operators 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.

The schedule for upcoming APSA online meetings is as follows.
If you would like to join, send an email to: bsmith@publicsafetyaviation.org

UAS:
Wednesday, August 14, 2019
1:00 PM - 2:00 PM EDT (1700 UTC)

SAR:
Wednesday, August 21, 2019
1:00 PM – 2:00 PM EDT (1700 UTC)

Maintenance:
Thursday, August 22, 2019
1:00 PM - 2:00 PM EDT (1700 UTC)

Safety Officers:
Friday, September 20, 2019
1:00 PM - 2:00 PM EDT (1700 UTC)

"There is nothing noble in being superior to your fellow man.
True nobility is being superior to your former self."

~Ernest Hemingway

RESOURCES

NTSB Jet Fuel Contamination Safety Alert
https://www.ntsb.gov/safety/safety-alerts/Documents/SA_079.pdf

Human Factors newsletter:
https://www.decodinghumanfactors.com

NASA Safety Newsletter – Unstabilized Approaches
https://asrs.arc.nasa.gov/docs/cb/cb_474.pdf

Practical SMS

The article above mentioned the importance of going beyond the final link in the chain of events that leads to an incident. How do we do that? There are many complicated ways of analyzing an incident to find the contributing factors. I have previously discussed the value of a simple, yet effective, model and would like to revisit the method again. The 5-Why's model is as simple as it sounds. We look at what happened and as, "Why did that happen?" or maybe, "Why did he/she do that?" etc. After answering, "Because this happened" etc., we again ask, "Why did that happen?" The number five is a general rule of thumb. We may need to ask seven or eight 'whys', or we may get stuck at three.

If we need to analyze a hazard that has not yet lead to an incident, we can switch to '5-Hows'. Similar to the method above, we can start the process by asking, "How could this lead to an incident?" The goal in both methods is to uncover the contributing factors that we can use to develop meaningful risk controls. Usually, the only option to controlling the final link in the chain is the old, "Thou shalt not make a mistake" ultimatum that is historically ineffective. The answer to 'why #4' or 'how #3' may offer a more system based fix that can protect everybody.

If you have a particularly complex incident or hazard, you can incorporate the PAVE model. An example is shown below.

1. Why			
2. Why			
People	**Aircraft**	**enVironment**	**External**
3. Why	3. Why	3. Why	3. Why
4. Why	4. Why	4. Why	4. Why
5. Why	5. Why	5. Why	5. Why

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.

Odor of electrical fire in the cockpit – with and without smoke

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 BK117
Injuries: 3 Minor
NTSB#: ATL04LA055

https://www.ntsb.gov/_layouts/ntsb.aviation/brief2.aspx?ev_id=20031219X02060&ntsbno=ATL04LA055&akey=1

The pilot stated he departed the hospital, climbed to 1,000 feet, and was in visual flight conditions on a heading of 120-degrees magnetic with a ceiling of 1,500 feet and 8 to 10 miles visibility. He passed Okeechobee to the northeast and encountered instrument meteorological conditions (IMC). He observed some highway lights to the east and started a left turn to get a reference on the lights and "lost total visibility due to heavy rain". He slowed the helicopter down and lost sight of the lights. He made a right turn to the south and "encountered vertigo." He immediately looked down at his flight instruments and observed the artificial horizon was above the horizon, and the airspeed was decreasing. He lowered the nose of the helicopter to regain airspeed and the helicopter began to settle. The nose of the helicopter went to the right and down. He looked back at his flight instruments, the attitude indicator showed the helicopter was inverted, and the vertical speed indicator indicated a 1,000-foot a minute descent. He immediately applied cyclic pitch and rolled the helicopter to the upright position and pulled collective pitch to increase power. The front seat paramedic made a mayday call on the radio. The helicopter collided with the trees in an upright position and fell to the ground. The pilot stated there were no mechanical deficiencies with the helicopter.

A paramedic located in the left front seat of the helicopter stated they had just cleared a rain shower when the pilot stated he wanted to follow State Road 70 due to the headlights of the cars. It was dark except for the lights of a few distant houses and the lights of the cars. The pilot started a turn. "During this bank our descent became increased and sharp." He reached over and grabbed the pilot's leg and said his name three times with no response. "We then came to a level attitude and began to fish back and forth from nose to tail and back. This increased in intensity until we entered a right hand downward spiral and impacted the ground."

Aircraft: Cirrus SR20
Injuries: 2 Fatal
NTSB#: WPR11FA354

https://www.ntsb.gov/_layouts/ntsb.aviation/brief2.aspx?ev_id=20110730X73924&ntsbno=WPR11FA354&akey=1

The airplane collided with terrain while maneuvering in dark night visual meteorological conditions while on the third leg of a 1,665 nautical mile (nm) cross-country flight. The airplane, with the pilot/owner and a pilot-rated passenger aboard, had departed the east coast in the morning and had been en route for about 16 hours. It could not be determined which of the two pilots was manipulating the flight controls at the time of the accident. The planned length of the last leg of the flight was 660 nm, which was about equal to the airplane's calculated maximum range for a no wind condition with a 45 minute reserve. Radar data revealed that during the last few minutes of the flight, the airplane changed course several times toward different nearby airports. The last radar return was about 0.1 nm south of the accident site, which was located in a remote, sparsely populated area. Examination of the accident site revealed signatures, including tree strikes and wreckage distribution, consistent with controlled flight into terrain. Postaccident examination of the engine and airframe revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. It is likely that the pilots lost situational awareness and failed to maintain terrain clearance. Conditions conducive to controlled flight into terrain included fatigue due to the pilots' long duty day, the dark night light condition, the lack of ground lighting in the region, and the fact that neither pilot was instrument rated.

Aircraft: **Bell 412SP**
Injuries: **3 Fatal**
NTSB#: **LAX07FA056**

The emergency medical services (EMS) helicopter was performing a cross-country repositioning flight from a hospital back to its base during dark night conditions back over a routing that the pilot had flown 5 times that day and also earlier in the evening when they had transported a patient to the hospital. Visual meteorological conditions predominantly prevailed along the route of flight; however, analysis of the weather reports disclosed conditions consistent with broken to overcast clouds having bases at 4,000 feet mean sea level (msl) in the vicinity of the accident site. An AIRMET had been issued for the area for IFR conditions, with mountain obscuration, precipitation, mist, and fog. The route of flight proceeded toward the apex of a mountain pass, which is the main transition route from one side of a mountain range to the other, where the helicopter's base is located. The tracking data indicated that the helicopter appeared to follow a major highway in the lower portion of the pass. The highway makes a large "S" shaped path as it gains in elevation toward the top of the pass, which is about 4,200 (msl). Near the upper end of the pass, the helicopter's satellite derived flight track showed that it inexplicably diverged toward the east, away from the highway, instead of continuing to follow the highway into the upper desert valley. The helicopter collided with terrain about 0.7 nautical miles east of the highway at 4,026 feet msl. While the operator was in the process of equipping its helicopter fleet with night vision goggles, the accident helicopter had not as yet been equipped with any enhanced night vision devices. The helicopter was equipped for instrument flight, including a 3-axis autopilot. The first fire department responders to the accident site reported that the area was covered by what they described as "intermittent waves" of fog that would suddenly form and then dissipate, which made it difficult to locate the wreckage.

There are no new ways to crash an aircraft…

…but there are new ways to keep them from crashing.

Safe hunting,

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