PRISM

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SAFETYWIRE

Operations: Improving Your Emergency Response Plan

Source: Business Aviation Insider May/June

An emergency response plan (ERP) can be a critical resource for handling difficult situations before they escalate into a crisis for your flight operation or company.

“An emergency is something abnormal that poses a threat to life, limb, property or their good name as a business,” said Stephen Burgess, emergency operations center manager for Fireside Partners. “Developing and following an ERP can help mitigate the impacts of that emergency.”

An effective ERP may include input and participation from personnel in several departments across the company. The definition of what constitutes an emergency, and what resources will be needed in response, can also vary greatly between companies.

“The best ERPs start off with a risk assessment to determine the necessary individuals or resources to interface between stakeholders,” said Amanda Ferraro, CAM, CEO of Aviation Safety Solutions. “Do you need public relations involved? HR? Legal?

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>
> **AMANDA FERRARO** , *CAM, CEO of Aviation Safety Solutions*

"The event may not even seem like a serious ordeal, but maybe it's brought publicity to your organization, especially as social media has become so prevalent," she continued. "An ERP will be helpful in organizing those resources and getting the right individuals involved in handling the situation."

Keep in mind "an ERP doesn't have to be hundreds of pages," Ferraro said. "I've seen ERPs developed around commercially-available checklist apps that work really well for some organizations."

Basic templates are also available from the FAA and NBAA, she added, to assist smaller flight operations in developing their ERP. Examination of past emergency situations can also help inform an effective plan to handle similar events in the future.

Regardless of your flight operation's size, one often overlooked – but critical – part of an ERP is employee and family support. Having such guidance at hand can be invaluable in the aftermath of more serious, or even fatal, situations.

"Smaller operators must wear more hats in terms of response duties," Burgess said. "Somebody might be not only running the response at large but also taking point on any communication and media concerns. And they may even be the main person coordinating family support.

"The challenges to handling an emergency are definitely magnified for smaller flight operations," he continued. "Those operators must identify what resources they have available and ask themselves, 'what can we handle? Where is the threshold where we'd need to rely on outside support?'"

Also, for an ERP to be truly effective, it must be a living document, not something forgotten in a dust-covered binder on the shelf.

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“You should continually and frequently review your plan and adjust it accordingly,” Burgess said. “Take five minutes to ask, ‘how can we make this better? Are these steps clear enough? Is this overly complex, or is it too simple?’”

“The first thing you start with is never the last thing you’ll use,” said Ferraro. “Anything and everything in your ERP can be adapted as needed.

“Our industry is well-prepared to respond to canned training scenarios,” she concluded. “When faced with something new or unusual, however, I’ve seen flight departments forget entirely there was an ERP available.”

Further guidance to help inform your operation’s ERP is available in NBAA’s Guidance on Company Response to an Aviation Accident.

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Time To Refocus And Get Back To Basics

(Source: Aviation Week Network; By: Robert Sumwalt—June 02, 2023)

An airplane holding short of the runway
Credit: Robert Sumwalt

Recently, I co-moderated the plenary session of the FAA's Safety Summit with FAA Acting Administrator, Billy Nolen. In case you've been living on Mars for the past few months, there have been several recent, highly publicized safety-related events affecting the U.S. commercial aviation system. The FAA issued a Safety Alert for Operators on March 22, stating that "the potential severity of these events is concerning."

In December, a United Airlines Boeing 777 flight plunged to within 800 ft. of the Pacific Ocean after departing Maui. The aircraft climbed to 2,200 ft. after takeoff and then began descending toward the water at more than 8,000 fpm. That same day, 36 people were injured in turbulence on a Hawaiian Airlines flight from Phoenix to Honolulu. Eleven of those injuries were serious. Later that month, a ramp agent died when she was ingested into an engine of an Embraer 170 at Montgomery, Alabama.

In early March, a Bombardier Challenger 300 was involved in an inflight upset. A 55-year-old old passenger died following a series of extreme pitch oscillations and severe G-forces. The Part 91 flight departed Keene, New Hampshire, and was en route to Leesburg, Virginia, when the upset occurred. Details have yet to emerge on the cause of the upset, but what is troubling is what happened before the aircraft even left the ground. The first departure attempt ended in a rejected takeoff (RTO), when one of the pilots noticed a disagreement between the captain's and first officer's airspeed indicators. This wasn't a disagreement of just a few knots: According to NTSB's preliminary report, at the time of the RTO, the captain's primary flight display (PFD) indicated 104 kt., while the FO's PFD displayed only 2 kt. A question yet to be answered is why this disagreement was not called out and the RTO initiated before reaching 104 kt.

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The airplane was taxied clear of the runway and onto a taxiway. The left engine was shut down, and air stairs were lowered. The second-in-command deplaned, walked to the front of the airplane and discovered that the right pitot probe cover was still in place. He removed the cover, noticed no damage, and returned to the cockpit. The left engine was restarted and off they went for another takeoff. On takeoff roll, the second-in-command realized there were no V-speeds displayed on the PFD. He called out V1 and rotate at 116 kt., based on his memory of previous takeoffs. To be clear, these events may have had nothing to do with the cause of the upset, but it does call into question the crew's attention to detail before things really turned sour.

What has received the most attention over the past few months is the slew of highly publicized runway incursions, including two in which pilots took off without ATC clearance. During the first two-and-a-half months of this year, there have been at least six of the most severe categories of runway incursions, compared to a 20-year average of around two-and-a-half per year.

An easy explanation—one that I've heard several times over the past few weeks—is that the aviation industry is coming out of the pandemic and the workforce is a bit rusty. I don't buy it. The pilot workforce has been in a massive hiring mode for over a year now. Which pilot needs a year to wipe the rust off? Besides, what data do we have that shows that these events are related to "rusty" pilots and controllers?

A common thread woven throughout several of these events appears to be a lack of attention to detail. As in taking off without clearance. Crossing runways without clearance. Failing to remove a pitot cover. It's time to get refocused and get back to basics—basics like avoiding distractions during critical phases of taxi and flight. Basics such as the crew carefully monitoring and cross-checking each other while taxiing. Basics like ensuring that everyone on the flight deck understands and agrees on taxi instructions and ATC clearances, and basics like ensuring those instructions are followed. The FAA's Safety Alert for Operators indicated that these recent events "demonstrate the need for continued vigilance and attention to mitigation of safety events." Within the past few days, the Air Line Pilots Association International issued a safety alert to "maintain and increase vigilance, actively prevent complacency, and continually report hazards."

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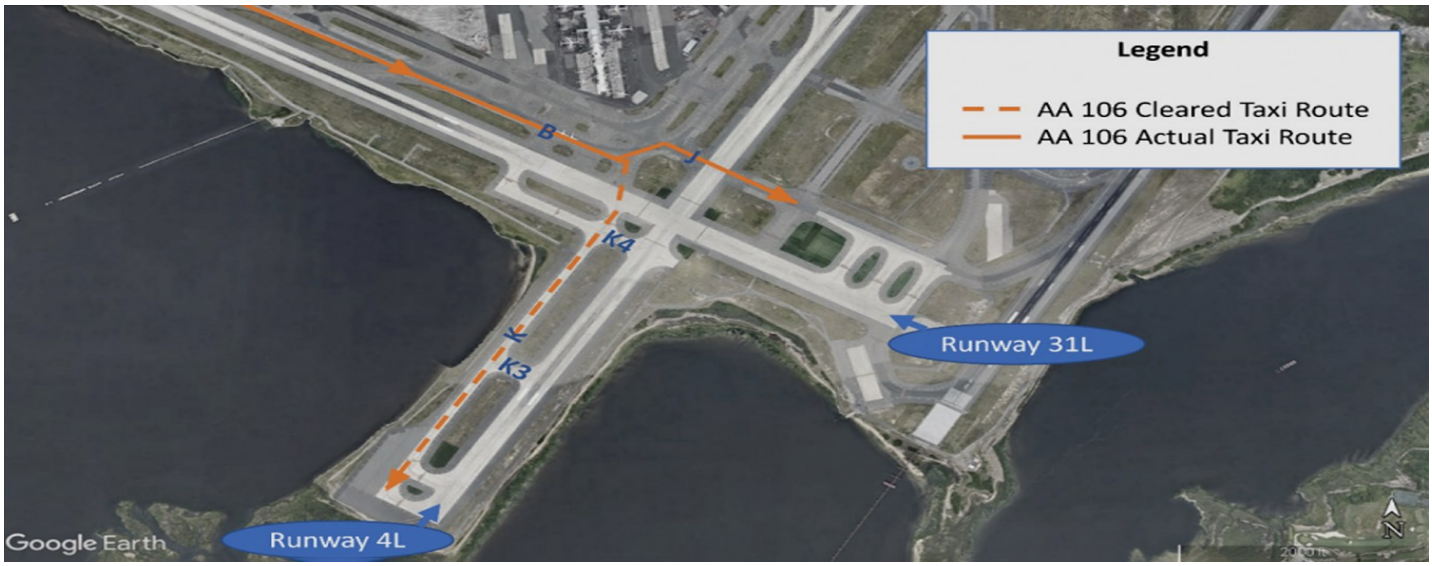
Of the six or so runway incursions since January, only two of them—those at Austin, Texas and Sarasota, Florida—involved air traffic controllers trying to “push tin” too closely. In each instance, an air traffic controller issued takeoff clearance while another aircraft was on a close final to the runway. The five remaining runway incursions were pilot-related.

There are two pilots on the flight deck for a reason. Having two sets of eyes and ears is one of the most effective safety measures in the cockpit. When I first arrived at a business aviation flight department years ago, it wasn’t unusual to have one pilot starting the engines and calling ATC for taxi instructions while the other pilot was still in the back briefing passengers. Similarly, during my airline career, there were times when I was talking to the ground crew on the interphone while the first officer was calling for taxi. Doing these things may save scant seconds of time, but they also circumvent the critically important redundancy of having two pilots listening to, understanding, and agreeing on the taxi instructions.



Depiction of American Airlines Boeing 777 cleared route versus the actual taxi route. Source :NTSB

In mid-January, an American Airlines Boeing 777 bound for London Heathrow Airport entered Runway 4L at John F. Kennedy International Airport and proceeded across the runway on Taxiway Juliet without ATC authorization. As the 777 entered the runway, a Delta Air Lines Boeing 737, having received ATC clearance for takeoff, was accelerating through 80 kt. on Runway 4L. The two aircraft were approximately 2,700 ft. apart at this point. The Delta crew initiated a rejected takeoff at around 100 kt. and stopped the aircraft approximately 500 ft. from where the triple-seven had crossed on Juliet. Because the 777 had continued across while Delta was decelerating, the closest the two aircraft came to each other was about 1,400 ft., according to NTSB.

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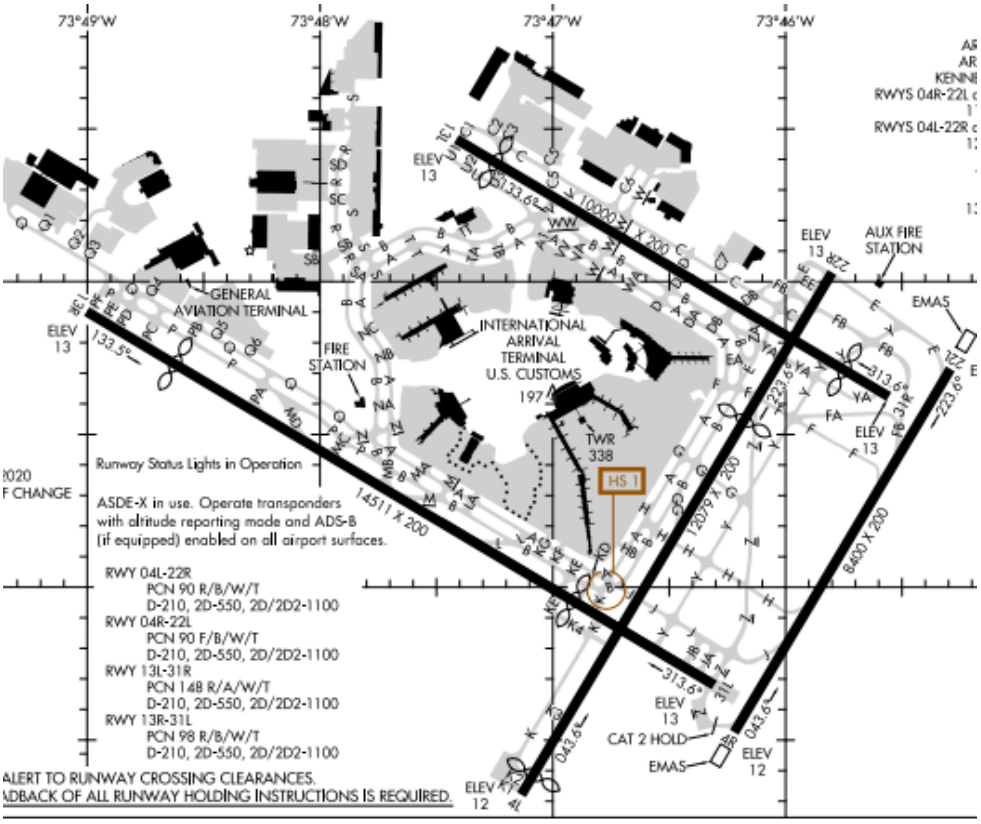
Some runway incursions are the result of an aircraft failing to stop and blundering onto a runway without clearance. This wasn't one of them. American was instructed to taxi to Runway 4L via taxiway Bravo. At some point during taxi, the crew was cleared to cross runway 31L at Taxiway Kilo. However, upon reaching the Taxiway Bravo/Taxiway Kilo intersection, the aircraft made a left turn, followed by a quick 90-deg. right turn onto Taxiway Juliet and continued across Runway 4L without ATC clearance.



One factor in runway incursions is pilots not having a clear understanding of taxi instructions or having an erroneous pre-conceived mindset of what the plan will be. In the JFK case, the most typical departure runway for heavy jets is Runway 31L. It's plausible that with that mindset, the captain erroneously proceeded as if 31L was the designated departure runway.

It's understandable that the erroneous mindset of one person could lead to this error, but there were two other pilots on the flight deck that evening—the first officer and an international relief officer. Where was the redundancy and crosscheck from those pilots?

There are also procedures designed to enhance crew vigilance during taxi. American Airlines' procedure specifies that the crew should review the planned departure runway, as well as the planned taxi route, including hot spots and runway crossings. Several years ago, I was part of a group that revised the FAA's advisory circular on flight crew procedures during taxi operations. Although the version that we created has since been updated by FAA Advisory Circular AC 120-74B, both versions specify an important best practice: "Brief the expected taxi route to include any hold-short lines and runways to cross, hot spots, and any other potential conflicts. Once taxi instructions are received, the pre-taxi route should be reviewed and monitored. It is essential that any changes to the taxi route be understood by all crewmembers."

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The first accident I investigated with the NTSB was the wrong-runway departure of Comair Flight 5191. As readers may recall, the crew taxied to and attempted to take off on a runway that was too short. The airplane overran the runway, crashed into trees, and burst into flames. Forty-nine lives were lost in the pre-dawn hours that August day. NTSB noted that the crew failed to conduct a thorough taxi briefing, as required by Comair standard operating procedures. We determined that had a complete taxi briefing been done, the crew would have had greater awareness that a shorter runway—the one that they unsuccessfully attempted to depart on —intersected their intended taxi route to the correct runway.

Although a pre-taxi briefing can help prevent runway incursions, there is also a potential down-side—such a briefing could set an expectation bias for the anticipated taxi route. AC (advisory circular) 120-74B lays out this potential problem: “Caution: A potential pitfall of pre-taxi and pre-landing planning is setting expectations and then receiving different instructions from ATC. Flight crews need to follow the clearance or instructions that are actually received, and not the ones they expected to receive.”

Critical flight deck redundancy can be lost when pilots attempt to do the right things at wrong time. There are activities that need to be done before takeoff, such as loading the flight management computer and going through a checklist. Likewise, after landing, one pilot often is off the ATC frequency and calling the FBO or operations. Although these things may be necessary, a sharp pilot will choose when and where to do them, considering the importance of doing them during the lowest-risk periods.

Review of incidents and accidents reveal that we are more vulnerable to missing things when one pilot is heads-down, off ATC frequency, or otherwise out of the loop. In 2013, the Flight Safety Foundation published A Practical Guide for Improving Flight Path Monitoring. The document defined Areas of Vulnerability (AOV) as those areas of operation where there is an “increased likelihood of a flight path [or taxi] deviation or the increased severity of potential consequences if such a deviation occurs.” Because approaching an active runway is considered a high AOV, a good prioritization of tasks may be for both pilots to suspend doing everything other than making sure the aircraft stops short of the runway, or, if it is about to cross, both pilots agree and confirm clearance to cross.

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Another vulnerability occurs when pilots do the wrong things at the wrong time. Avoiding distractions by complying with the sterile cockpit rule is strong defense against runway incursions and other safety problems. As NTSB noted in the Comair wrong runway departure crash, there was constant non-pertinent chatter during taxi, which “likely contributed to their loss of positional awareness.”

We all make mistakes–I’ve certainly made more than a few myself. However, a combination of flight crew vigilance, attention to detail, and SOP compliance can help minimize errors, or when one is made, neutralize the error before it leads to something serious. Add to that list the need to refocus and get back to basics.

Robert Sumwalt

Robert Sumwalt, who writes BCA's Impact column, was a member of the NTSB from 2006-21, including being chairman from, 2017-21. Before that he managed...

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Helicopter Wake Deserves A Wide Berth

(Source: Aviation Week Network; By Patrick Veillette, Ph.D, June 06, 2023)

When rotor downwash hits the ground surface, the vortex circulation is outward, upward, around and away from the main rotors in all directions.

Credit: U.S. Army

Helicopter wake turbulence is more complex than wake turbulence caused by a comparably sized airplane due to its different wake structure, duration and decay. These characteristics create a potent threat, especially around airports where helicopters are engaged in low speed flight while nearby fixed-wing aircraft are landing or departing.

An airplane in the takeoff or landing phase is at a slow airspeed which lessens the power of the flight controls to counter an abrupt motion, and the airplane has essentially no altitude margin for recovery from an upset caused by a wake encounter.

These were the conditions that existed at Cable Airport (CCB) in Upland, California, on Jan. 3, 2022. The pilot of a Cessna 120 was on approach to land while a UH-1 “Huey” helicopter was conducting a slow hover taxi adjacent to the runway. The Cessna 120 pilot decided to land long to maintain separation, but when the helicopter appeared to cross the runway, he decided to go-around.

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About one-third down the runway, the Cessna 120 encountered the helicopter's downwash and entered an uncommanded steep right bank. The pilot attempted to counter this roll with opposite aileron, but it was insufficient to countermand the induced roll. A video of the actual sequence of events can be found on the Flight Safety Foundation's Aviation Safety Network website.

The Cessna 120 impacted right of the runway and sustained substantial damage. The pilot fortunately sustained only minor injuries. The NTSB determined the pilot's loss of control during the go-around was due to a wake turbulence encounter from a slow hover taxiing helicopter.

Airplane Rolls Close To Ground

A similar event occurred on Dec. 5, 2014, at Northern Colorado Regional Airport (FNL), outside Fort Collins, Colorado, for a solo student pilot of a Cirrus SR20. The student pilot entered the traffic pattern for a full-stop landing on Runway 33. He observed a Sikorsky UH-60 Black Hawk on downwind and delayed his turn to base leg until the helicopter was on final, abeam his position. The student pilot adjusted his aim point to land long due to his concern about wake turbulence. His goal was to land beyond the helicopter's touchdown point.

During the initiation of the landing flare, the SR20 suddenly rolled into a steep left bank. The student reacted by attempting to go around but the nearly instantaneous roll close to the ground resulted in an impact with the terrain. The airbag seatbelt assemblies mounted in the two front crew seats did not deploy as the airplane cartwheeled. The student pilot was seriously injured and the aircraft was substantially damaged.

A YouTube video captured this segment of both the departure of the Black Hawk and the abrupt roll of the Cirrus. It is readily apparent that the roll of the Cirrus happened so fast and so close to the ground that there wasn't time now altitude for a recovery.

The NTSB investigation of the accident determined that the helicopter transitioned into a departure about 30 sec. ahead of the Cirrus, leaving behind an invisible wake of powerful vortices. The winds were relatively light at the time, recorded as 3 kts from 110 deg. In other words, this was a quartering tailwind.

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The safety board's report found that the student pilot likely did not comprehend the significance of wake turbulence created by a helicopter during the departure, which resulted in the loss of control during landing. The NTSB's causal finding also determined the pilot guidance in the Aeronautical Information Manual and an advisory circular on aircraft wake turbulence published at the time did not recommend separation criteria for a small airplane following a helicopter.

After similar accidents the NTSB has noted that accident pilots likely did not comprehend the significance of wake turbulence created by a helicopter.

A Helicopters Wake Is Different

A twin-engine Leonardo Helicopters AW169. Credit: Halo Aviation

There are some similarities in wake vortices formed by fixed-wing and rotary-wing aircraft. Just like fixed wing aircraft, helicopter vortices are dependent on a helicopter's weight, size and speed. Vortices formed at low airspeeds are initially stronger than those formed at higher airspeeds. A heavier helicopter produces stronger wake vortices than a lighter helicopter. The strength of a vortex is also dependent on its age.

Since each rotor blade is generating its own vortex continuously throughout a rotation, a helicopter's wake is composed of a series of vortices that not only contain their own mini-tornado rotation but also the overall downward motion from the downwash. When rotor downwash from a helicopter in hover or slow flight close to the ground hits the surface, this turbulent airmass circulates outward, upward, around and away from the main rotors in all directions. A slow-moving helicopter's wake is the equivalent of a small microburst, and must be given a wide berth.

The area contaminated by the wake turbulence of a helicopter is larger than that of an airplane of comparable size and weight, especially at speeds below 70-80 kts. A distance of approximately three times the diameter of the rotor contains substantial disruption from the downwash. The FAA's Advisory Circular 90-23G "Aircraft Wake Turbulence," advises pilots to avoid operations within distances of 3 times the diameter of a helicopter in a slow hover taxi or stationary hover.

The blade number appears to also effect vortex size, as an increased number of rotor blades appears to increase the vortex size. For example, the Bell UH-1H, with two rotor blades and essentially the same weight as the Sikorsky S-76A with four rotor blades produces a smaller vortex than the S-76A.

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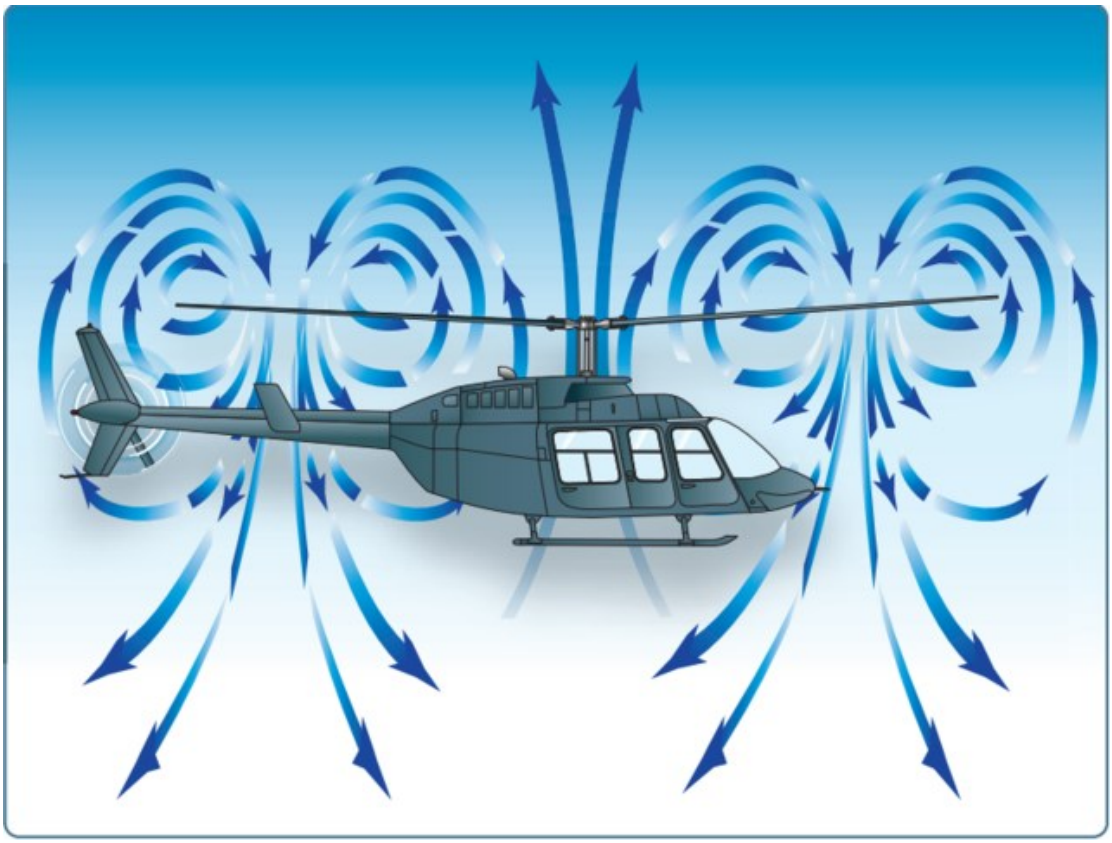
A helicopter's wake in forward flight is more complex than the wake created by an airplane because each blade's vortices will differ as its angle of attack varies throughout a single rotation depending on whether the blade is advancing or retreating in comparison to the approaching airflow. The retreating blade operates at a higher angle of attack in order to produce as much lift as the advancing blade. The vortex behind the retreating blade is characterized by a greater cross sectional area. The vortex behind the advancing rotor blade is consistently smaller, tighter and more coherent, especially as the helicopter's forward speed increases above 80 kts.

Flight testing has discovered that helicopter wakes react differently depending on whether the helicopter is climbing or descending. The vortex cores were observed moving further apart during descents, while the cores would move closer together during climbing flight. A possible explanation includes the amount of engine power required to generate lift, and therefore the hot exhaust is entrained in the wake, therefore contributing to the buoyancy of the wake.



PRISM will feature Part 2 of this article next month that describes FAA flight testing to better understand the risk to a fixed-wing aircraft that inadvertently flies into a helicopter's wake.

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SAFETY MANAGER'S CORNER

With wildfire season in full swing, we felt it was pertinent to remind everyone about the hazards and effects on your staff.

How will I know if smoke will be in my area?

- **Check the Air Quality Index (AQI) for current air quality in your area.**
  - **The AQI is used to report information about the most common air pollutants, including particulate matter (PM2.5 or PM10) and ozone. For more information, visit www.airnow.gov**
- **You can also see the location of fires, the path of smoke plumes, and air quality information on the AirNow website, under "Current Fire Conditions" at: : https:// www.airnow.gov/index.cfm? action=topics.smoke_wildfires**

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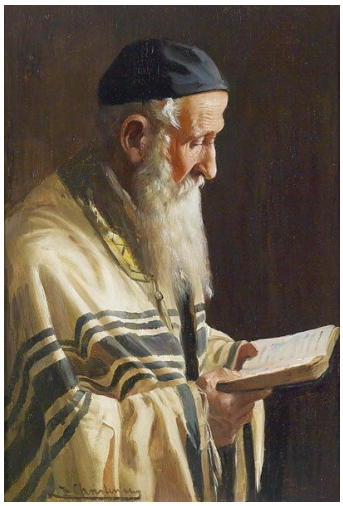
Quote of the Month



> **If not you, then who? If not now, then when?**
>
> — Rabi Hillel the Elder.

The quote is most often attributed to Rabi Hillel the Elder. I doubt we'll ever know who actually said it first. The sentiment however, is fantastic. When we apply it to safety management it embodies the attitude that we should all take. An effective Safety Management System (SMS) requires the involvement of all employees, from top management to front-line workers. By creating a strong safety culture, organizations can create an environment where employees feel empowered to raise safety concerns, participate in safety programs, and report accidents and incidents. If you see something, say something.

On Short Final...

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Aug 21 to Aug 25, 2023—PROS Course
Aviation Lead Auditor Training (ALAT)
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Sept 26 to Sept 28, 2023—PRISM Course
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Oct 30 to Nov 3, 2023—PROS Course
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