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SAFETYWIRE

Proficiency: Helicopters and Ice avoidance, detection and survival

(Source: Markus Lavenson, Sunday, 1 January 2019, AOPA Pilot)

Icing has crippled aircraft from large jets to small general aviation aircraft, and has caused thousands of accidents. In the United States there were 583 airframe-icing accidents with more than 800 fatalities for a 19-year period.

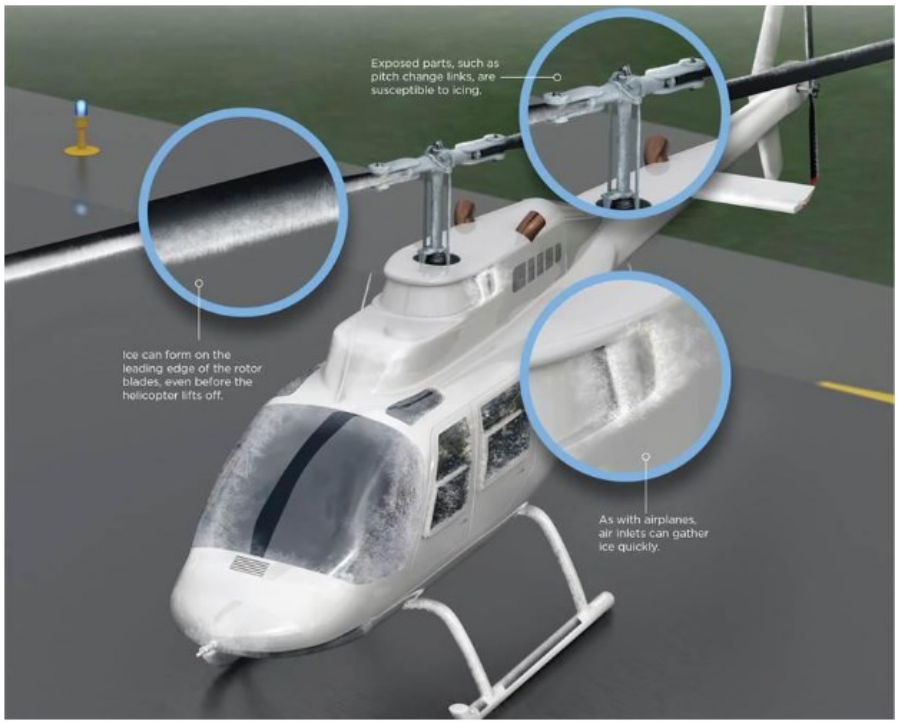

Illustration by Charles Floyd

Helicopters are more susceptible to the danger of icing conditions than most other types of aircraft. They are particularly vulnerable because, in addition to rotors with associated exposed flight-control linkage, helicopters generally have more equipment exposed in the airstream. And when an aircraft isn't built for high speed, it is less likely to have flush rivets, fairings, and smooth door hinges—so more places can give a foothold for ice to start accumulating. Helicopters also lack the climb performance and higher service ceiling of a jet or high-performance airplane, and they are not as capable of climbing out of a bad condition.

As a student pilot, I learned a valuable lesson one wintry day. The fog had dissipated enough to allow a flight lesson, at a little more than one mile of visibility. My instructor decided we could safely do some hover work at the airport, no higher than 10 feet.

As I rolled up the Bell 47's throttle, it hit the stop and would go no farther. The manifold pressure indicated full power, but the rotor was far below full rpm. The magnetos checked out and carburetor heat didn't help, so we shut down.

The entire leading edge of each rotor blade had about an inch of ice, making them so aerodynamically inefficient that full rpm at flat pitch wasn't possible. There had been enough moisture in the air at freezing temperature for ice to accumulate on the rotors, which are essentially wings moving through the air.

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Later in my career I learned just pulling an aircraft out of a warm hangar to a freezing ramp could cause problems. A warm aircraft being towed through a snowy ramp area will collect snow over the wheels and skids, which melts on the still-warm aircraft only to freeze on the ramp. This can lock wheel brakes and even freeze a wheel or skid to the ground, presenting a dynamic rollover hazard upon liftoff. When taxiing a wheeled helicopter or airplane, I always avoid puddles of water if taking off into freezing temperatures.

Avoidance

A helicopter is highly unlikely to be certified for flight into icing conditions, even though it may be certified for instrument flight rules. In accordance with FAR 91.527, a non-icing-certified aircraft is prohibited from VFR and IFR flight into known icing conditions, and from IFR flight into forecast icing conditions.

The Aeronautical Information Manual defines a known icing condition as “atmospheric conditions in which the formation of ice is observed or detected in flight. Note: Because of the variability in space and time of atmospheric conditions, the existence of a report of observed icing does not assume the presence or intensity of icing conditions at a later time, nor can a report of no icing assure the absence of icing conditions at a later time.” We are essentially prohibited from flying in a condition that can only be determined to be that condition by going out and flying in that condition. So while a non-icing-certified helicopter is prohibited from flying into known icing conditions, the only way an icing condition becomes a known icing condition is to actually go fly in it.

The AIM adds more pragmatic guidance: “A pilot can expect icing when flying in visible precipitation, such as rain or cloud droplets, and the temperature is between plus 2 and minus 10 degrees Celsius.” It has been my experience that an aircraft can accumulate ice down to minus 20 degrees C, so I recommend taking a more conservative route than the AIM, and consider any visible moisture between plus 2 and minus 20 degrees C to be a known and forecast icing condition.

The AIM defines a forecast icing condition as “Environmental conditions expected by a [National Weather Service] or an FAA-approved weather provider to be conducive to the formation of in-flight icing on aircraft.” Several resources can help a pilot to determine if there is a forecast icing condition: icing airmets/sigmets, current and forecast icing products (CIP and FIP), pilot reports, and all other standard weather briefing charts and products. A pirep should only be used as confirmation that a positive icing condition exists; if a pirep reports negative ice, that doesn’t mean another aircraft won’t encounter it. Different aircraft can react differently to ice accumulation in the same conditions. If unsure and all the charts seem overwhelming, sometimes it’s good to talk to a flight service briefer.

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Detection

Airframe ice accumulation causes many problems. It adds weight to the aircraft, degrading performance and possibly changing the center of gravity, and creates aerodynamic inefficiencies when adhering to surfaces such as horizontal and vertical stabilizers, and rotor blades.

Accumulating ice also can create flight control issues by adhering to exposed pitch change links and other flight control components, such as the swash plate. It can adhere to engine inlet areas, obstructing necessary airflow and even be ingested by the engine. It can accumulate unevenly on the main and tail rotor blades, creating an unbalanced condition.

Ice can shed unevenly, causing pronounced vibrations; ice slinging off the main rotor can damage the tail rotor and create a hazard on the ground.

Ice on the windscreen can interfere with pilot visibility as well as pitot static instruments. The altimeter, vertical speed, and airspeed indicators may show anomalies, indicating icing in the pitot static systems.

The lower corner of the front windshield, windshield wiper, or outside door hinge are good places to watch for accumulation. During cruise flight, a slow rise in required engine power might mean ice is accumulating on the airframe, increasing the weight of the aircraft, and/or on the rotor blades and creating aerodynamic inefficiency. A rise in engine turbine temperature may indicate ice interfering with the inlet. Low-frequency vibrations in the airframe or cyclic and collective can indicate ice accumulating on the main rotor, creating an unbalanced rotor. A higher-frequency vibration in the pedals can indicate ice accumulating on the tail rotor. Those flying aircraft with track and balance monitoring equipment will be better able to track this.

The thicker the cloud from top to bottom, the more vertical development there will be within that cloud, and the larger the moisture droplet size will be. Larger droplets are a greater hazard in forming ice that will adhere to an aircraft. Clouds with vertical development that are at freezing or just below freezing will have large liquid water content, which can rapidly accumulate on aircraft surfaces, so pilots should be extra vigilant between temperatures of plus 2 and minus 10 degrees C. These clouds will have larger droplet sizes than a thin stratus cloud, with droplets of greater inertia that are more likely to adhere to an aircraft.

Freezing rain droplets are a million times larger than a cloud droplet, and so have a much more serious potential for icing on the aircraft. Freezing rain is where an upper level unstable air mass has generated very large droplet sizes that eventually become so large and heavy they fall through a below-freezing air mass. Supercooled large droplets (SLDs) will then freeze on contact with any unlucky aircraft.

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Survive

When looking at icing potential charts, forecasts, winds aloft, surface analysis, and prognostic charts, one should have a good idea of cloud bases and tops, as well as temperatures and frontal activity. The pilot should monitor outside air temperature at all times, and note cloud bases and tops during climbs and descents. Before you launch, have several plans to modify course and altitude in the event icing is encountered. Monitoring temperatures at different altitudes throughout the flight, as well as cloud bases and tops, provides a pilot with situational awareness should icing be encountered and means of escape becomes necessary.

If icing is encountered just after takeoff, a course of action may be as simple as returning to land at the departure point. In IFR cruise flight, a change of altitude to warmer-than-freezing, or less than minus 20 degrees C, temperatures may be prudent, or a change of altitude to avoid clouds.

Situational awareness and knowing the big picture are important on any flight, but they are even more critical in potential icing conditions, especially when flying IFR. During VFR flight a helicopter usually has the option of landing more expeditiously, without having to take the time to fly instrument procedures, even landing off-airport if necessary. There are many times during IFR flight, especially when offshore or over a mountainous environment, where one is committed to a course of action and doesn't have the advantage of being able to land quickly. Sometimes a longer route, offering better conditions or more options, is better than a shorter flight with greater exposure.

Where icing conditions are concerned, it's critical to have multiple courses of action available. Don't worry if plan A doesn't work; there are plenty more letters in the alphabet.

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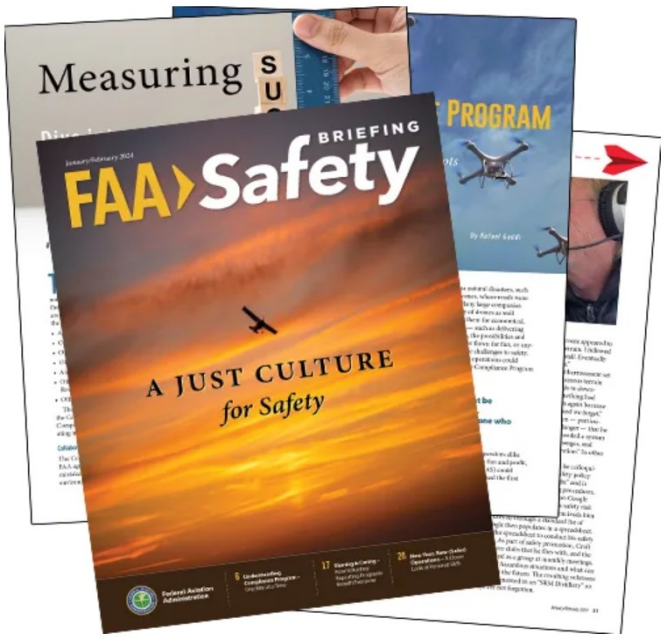
A Just Culture for Safety

(Source: Larry Fields, FAA Flight Standards Service Executive Director December 29, 2023 , FAA Safety Briefing)



Back in 2015, the FAA launched a unique program that would represent a major cultural change in how the agency goes about ensuring regulatory compliance. Dubbed the Compliance Philosophy (and later renamed Compliance Program), it helped the FAA achieve effective, quick, and efficient corrections to aviation safety issues resulting from deviations from standards. Nine years later, the program has been a great success, helping to build a just culture within the aviation community and enabling airmen to take an active role in addressing safety concerns. Yet, many airmen are still unfamiliar with the Compliance Program and the many benefits it brings to all National Airspace System (NAS) users.

This issue of *FAA Safety Briefing* acquaints you with this program, reinforces its importance, and demonstrates its effectiveness in the industry. For example, what might have once required the use of an enforcement action for a pilot deviation may now involve training, education, or counseling — a compliance action — to resolve. The FAA recognizes that some deviations are caused by a simple mistake or could stem from a lack of training, a lack of knowledge, diminished skills, or procedures that are not working as they should. A compliance action is a more effective way of correcting the issue and preventing reoccurrence. In fact, since October 2015, the agency has taken more than 44,000 compliance actions to identify the root cause of a safety issue and correct it at the most effective and efficient level.

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That doesn't mean the FAA still doesn't rely on enforcement actions (like certificate action) when warranted. However, it does show a trend toward a solution that relies more on cooperation and collaboration than punitive measures.

Another key benefit has been the uptick in activity with voluntary reporting programs that are available. These include the Aviation Safety Action Program and the Aviation Safety Reporting System or "NASA report," among others. In the past, airmen may not have always been as forthcoming with critical safety information, so this represents a huge step towards getting the big picture with aviation safety. We'll cover more about these critical programs in this issue and the mutual benefits they provide to both the regulators and the regulated.

And since they share the same airspace with traditional aviators, the Compliance Program also applies to our ever-expanding cadre of recreational and part 107 drone flyers. We cover some of the nuances of drone flying in this issue and the impact the Compliance Program is having on that industry.

It's worth noting that while the Compliance Program has its origins in the Flight Standards Service, the program's strategic safety oversight approach has been adopted by several other FAA services and offices, including the Aircraft Certification Service, the Office of Aerospace Medicine, the Air Traffic Safety Oversight Service, the Office of Airports, the Office of Commercial Space Transportation, the Office of Hazardous Materials Safety, and the Office of National Security Programs and Incident Response. These services and offices have continued to work together, in conjunction with the Office of the Chief Counsel, to meet the challenges of today's constantly evolving NAS, as evidenced by the most recent update to FAA Order 8000.373C.

Finally, I'd like to thank the FAA's Safety and Compliance team who contributed greatly to this issue and whose steadfast commitment and support of the Compliance Program has helped it become a game-changer toward advancing NAS safety and being a global leader for excellence.

While the Compliance Program has required a new mindset for the FAA and the aviation community, its principles remain focused on the idea that compliance is the foremost factor in safety. With this program, the FAA can be more adept at achieving a rapid return to compliance, mitigating risk, and ensuring positive and permanent changes that benefit the entire aviation industry.

Safe flying!

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What GA Pilots Need to Know about Super Bowl LVIII

(Source: Press Office January 22, 2024, Federal Aviation Administration)

General aviation pilots flying near Las Vegas from Feb. 7-12, 2024, must be aware of temporary flight restrictions, follow special air traffic procedures and comply with additional operational requirements that will be in effect for Super Bowl LVIII.

The FAA will issue a Notice to Air Missions (NOTAM) later in January about the procedures for the game and specific arrival and departure route requirements.

Information about Las Vegas-area airports and airspace is available on the FAA's Super Bowl webpage, which will be regularly updated as additional information becomes available.

Special air traffic procedures to minimize delays and ensure safety will be in effect for the following airports:

- Las Vegas Harry Reid International Airport (LAS)
- North Las Vegas Airport (VGT)
- Henderson Executive Airport (HND)
- Boulder City Airport (BVU)

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A reservation program to facilitate aircraft parking at the following Las Vegas-area airports will be in effect from Feb. 7 through Feb. 13. Pilots should contact the Fixed Base Operator (FBO) at their airport to obtain reservations and additional information.

- Las Vegas Harry Reid International Airport (LAS)
- North Las Vegas Airport (VGT)
- Henderson Executive Airport (HND)
- Boulder City Airport (BVU)

Pilots can familiarize themselves with a number of Las Vegas-area airports through the FAA's From the Flight Deck video series. These videos show actual runway approach and airport taxiway footage, combined with diagrams and visual graphics to identify hot spots and other safety-sensitive items.

Special Event TFR for Super Bowl Sunday – February 11, 2024

The FAA will publish a Temporary Flight Restriction (TFR) for Super Bowl LVIII centered on Allegiant Stadium. The FAA expects the TFR will be active from 2:30 – 8:30 p.m. local time on Sunday, Feb. 11. The TFR will have a 10-nautical-mile inner core and a 30-nautical-mile outer ring.

The game will begin at approximately 3:30 p.m. local time.

The TFR will not affect regularly scheduled commercial flights in and out of Las Vegas Harry Reid International Airport (LAS). Emergency medical, public safety and military aircraft may enter the TFR in coordination with air traffic control.

Super Bowl LVIII also is a No Drone Zone. As a designated National Security Special Event, additional unmanned aircraft restrictions will be in place before, during and after the game.

The FAA will post the full text and graphic depiction of the Super Bowl LVIII TFR here in February.

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SAFETY MANAGER'S CORNER

Safety and Culture Survey

When discussing safety management systems it's pretty common to hear how important the right culture is to the effective implementation and success of the system. From many perspectives, culture is actually the most important component, and without a positive one an organization can have all the tools, toys, bells and whistles and miss the mark. If it's so important, so critical, then it should be measured for assessment. How is this best accomplished?

Capturing employees' thoughts, perceptions and attitudes is certainly no easy task and can also prove to be somewhat of a moving target. Nonetheless, they remain some of the best true measures of safety management success and should not go ignored. A survey is one of the proven methods used to measure individual personal perceptions and awareness and can yield meaningful and measurable results if performed correctly. It's not easy for a safety manager to determine exactly how well safety management is progressing from the employees' perspective. Sometimes you need help seeing the forest through the trees and that's where a safety and culture survey can fill in the blanks. By asking the hard questions, a survey can determine if the employees believe safety management is working and if it's not, what do they see as the missing pieces. As a safety manger you may think certain processes are working just fine but a survey may reveal otherwise. Specific process steps may be unwieldy or simply impossible in an operational setting, even though they sounded just fine when designed and placed into the SMS manual.

A survey comprised of about twenty focused questions takes less than 15 minutes to complete and when conducted anonymously will uncover the hidden safety truths in your flight operation. The responses to questions like: "Is safety a high priority for this flight operation?" and "Are you comfortable discussing safety matters?" provide valuable individual indications and measureable response trends. Even in small business aviation flight operations anonymity can be preserved so every employee can have a sense of comfort knowing their individual responses are protected from even subtle retribution. Compiling the survey response results creates a contour map of the operation's strengths and weaknesses from the perspective of the employee population and that is without doubt highly valuable information.

There's yet another reason you should perform a survey- PRISM will do it for you. If you are a Pro level subscriber, one survey per year is available at no cost and if you are an Essential level subscriber the cost is modest. To date, PRISM has performed over 40 surveys of business aviation operations and each survey has provided significant insight and feedback for safety managers. If your operation hasn't participated in one it's something that should be seriously considered.

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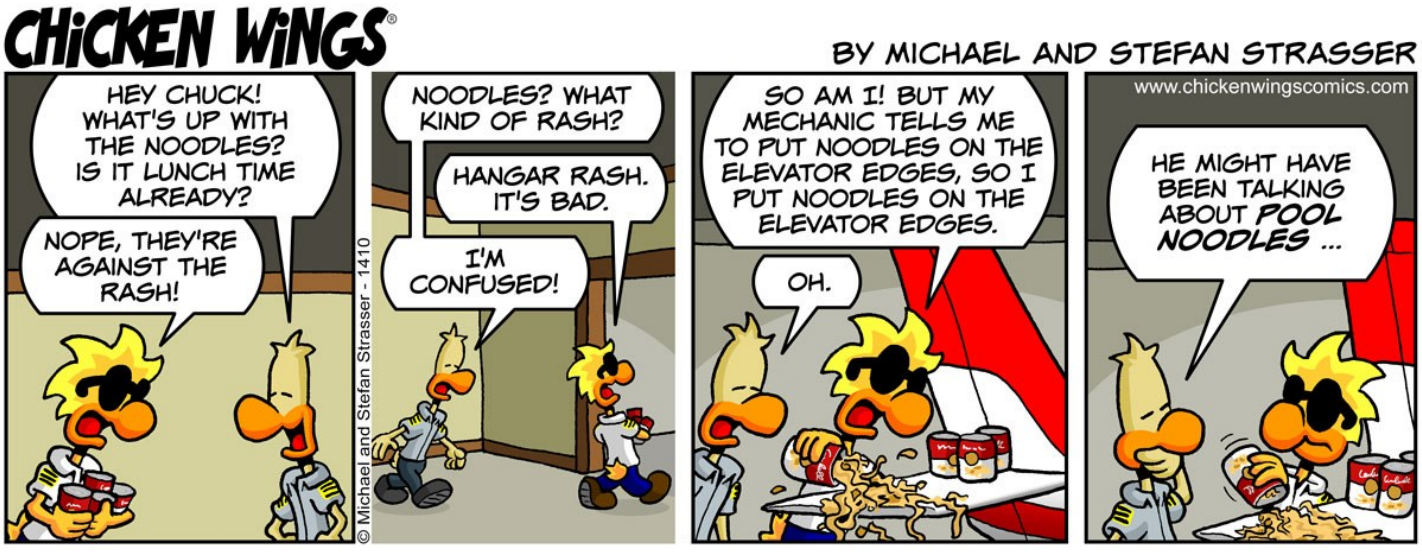
Quote of the Month

“Success is not final, failure is not fatal: it is the courage to continue that counts.”

— Winston Churchill

Sir Winston successfully stoked the courage of the Allies during WWII, most importantly during the lowest of times when all seemed lost. Although by no means is a business aviation flight operation confronted with trials and tribulations like the Blitz of 1940, nonetheless it is easy to both rest on the laurels of success or throw in the towel when failure appears unavoidable. Either situation is a mis-take. Yes of course, success breeds success but only when understood it must be continually strived for like a never ending journey. Failure only breeds failure when reality is ignored and facts misunderstood. There is no magic potion, no secret sauce; just the courage to discover and see things as they really are. Only then can you and your flight operation tackle the issues that should not be ignored and take the small steps that lead to the path of success.



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Feb 20 to Feb 24, 2024—PROS Course
ALAT Training
Denver, CO

Apr 2 to Apr 4, 2024—PRISM Course
Safety Management System (SMS)
Denver, CO

May 15 to May 19, 2024—PROS Course
ALAT Training
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Go to Upcoming Training Classes to register.