Season of Ice

By Capt. Charles Hogeman (United), ALPA Aviation Safety Chairman

Sometimes slowly, sometimes abruptly, winter comes to much of North America, and most ALPA members will have to deal with it.

The season of ice—which consists of snowflakes, freezing rain and drizzle, ice fog, or compressed snow—forces us to be prepared for challenging operating environments.

Winter brings increased potential for inflight icing and for ground icing when snow, slush, or ice adheres to aircraft and airport pavements. Falling or blowing snow and ice fog reduce visibility, and runway contamination can extend both takeoff and landing required runway distances.

As winter is already under way in many places where ALPA members fly, let's take a look at winter ops—what's new and what's worth our review.

Winter ground ops

Deteriorating conditions may cause a wet runway to ice up; rising temperatures may cause frozen contaminants to melt and overcome ground operations.

Airport operators derive their guidance on winter ops from FAA Advisory Circular (AC) 150/5200-30C, "Airport Winter Safety and Operations." The AC provides guidance on developing the airport's snow and ice control plan (SICP), conducting and reporting runway friction surveys, and establishing snow removal and control procedures. The SICP contains the safety requirements, snow clearing criteria, and other operational information intended to ensure safe aircraft movement on the airport.

While airport personnel should properly clear aircraft movement areas of snow, we must be mindful of our airplane's wheel footprint, engine nacelle heights, and wingspan to avoid hitting snow banks.

Aircraft ground deicing

Deicing fluids continue to improve, requiring constant review, evaluation, and testing of holdover time (HOT) tables (see "Notes from a Winter Ops Conference," page 24).

On Aug. 29, 2011, the FAA published "FAA-Approved Deicing Program Updates, Winter 2011 – 2012," which provides new HOT information, a list of approved deicing/anti-icing fluids, and recommendations about other ground deicing/anti-icing issues. The updated HOT tables incorporate new information, including the finding that Type I fluid performance on aircraft constructed primarily of composite materials is not as good as on aluminum surfaces.

Review your airline's current ground deicing program, holdover times, and taxiing techniques on a regular basis.

Inflight icing

As air temperatures drop, the freezing level will continue to fall until reaching the surface, significantly increasing the potential for encountering inflight icing. Pilots should remain vigilant and heed a few simple rules concerning inflight icing conditions:

- Understand that "known icing" does not presuppose an accumulation rate, and each icing encounter is unique.
- Any accumulation on aircraft surfaces begins to degrade aircraft performance, handling, and controllability.
- Have an exit strategy before encountering conditions with the potential to exceed aircraft limits.
- Know what your aircraft operator's

F/O JOSEF R. KUNZEL (UNITED)

WHAT CONTROLLERS WISH ALL PILOTS KNEW—AND DID

By Steve Serur, ALPA Staff Engineer
(and former air traffic controller)

In general, air traffic controllers have a global, or macro, view; you and your fellow flightcrew members have the tactical view.

ATC's first duty priority is to keep aircraft separated and issue safety alerts. Controllers will provide additional services to the extent possible, contingent only upon higher priority duties and other factors that include the limitations of radar and the controllers' workload associated with the volume of traffic and frequency congestion.

Not all radars are the same

Regarding weather radar, don't expect controllers to see what you see from the cockpit with as much detail as you do. While controllers' weather picture has improved substantially with the advent of Doppler weather radar networks plus color scopes and displays in ATC facilities, it's usually not as good as the high-update-rate weather radar pointed out of the nose cone of your airplane.

Also, the precip that the controller sees on his or her display can be as much as six minutes old, which doesn't help with transient weather phenomena. Thunderstorms can develop at rates as fast as 6,000 feet per minute—much faster than ATC updates.

Key the mike!

When you need to make a tactical maneuver around weather—whether for icing, turbulence, or thunderstorms—let ATC know as soon as possible. If you need to turn in three minutes, don't keep it a secret. Say something like, "We show extreme weather ahead and will need a turn within three minutes [or 25 miles]." Let the controller know how big a problem it is for you and how long you have to resolve the problem. Controllers use that kind of information to prioritize what they're working on. If you don't tell them, you'll get whatever sense of urgency they feel is appropriate vis-à-vis whatever else is going on.

Some pilots have state-of-the-art weather detection equipment in their aircraft; others don't. Controllers don't know which you have. If you need more weather "service," ask for it.

The controller will tell you what's in your path, but won't necessarily tell you what to do. That's what pilot-in-command authority is all about: don't wait for ATC, make a decision—then talk to the controller.

Controllers are not mind readers. If you need to deviate immediately and can't wait for a clearance, tell the controller exactly what you plan to do, so ATC can plan around you. Don't just say, "Turning left." Also, if you're deviating for weather and change controllers, let the new controller know how you plan to get back on course.

PIREPS: Share the wealth

Try to issue a departure or arrival PIREP when you experience something worth reporting (for example, icing, turbulence, or hail). Use the standard terms for precipitation: "light," "moderate," "heavy," "extreme," and "intensity unknown."

If you have state-of-the-art equipment in your airplane, share the wealth. Don't be reluctant to report ice buildup, even though your anti-icing/deicing system is staying well ahead of the accumulation rate. Someone behind you may not have the same capability.

For example, if you're in a holding stack, be proactive in reporting ice accumulation so that others entering the stack with varying degrees of anti-icing/deicing equipage can predict potential problems and how much time they will have to deal with them. For controllers, extricating an airplane from a holding stack and moving it up or down is not simple. Help out the controllers and your fellow pilots!

When the going gets tough, the tough have less time to help you. Just like on the highway, when the weather gets bad, separation and sequencing become more difficult, leaving less time, not more, for controllers to issue weather information. So when the weather is bad, and the controllers are busy, you're least likely to be offered that helpful vector. Keep your eyes open and ask—and you shall receive.

manual (AOM) says about airspeed guidance and using the autopilot when in icing conditions.

- Make use of all available training resources when preparing for winter.

Before flight, and especially during winter operations, pilots should ensure that they are fully aware of the weather conditions and forecasts for their entire route, including possible diversion to an alternate, note all weather updates, and act in accordance with their flight operations manual (FOM).

For aircraft not having an ice-detection system, pilots should, when flying in known icing conditions, be aware of the physical cues for recognizing the first signs of ice on specified surfaces. Any buildup of ice, especially on wing leading edges, propeller spinners, and cockpit side windows, should be sufficient indication to activate the aircraft anti-icing systems, in accordance with flight manual guidance.

Continuously monitor the ice accretion throughout the flight and its possible adverse effects on the aircraft's performance. With increased accretion of ice on the horizontal stabilizer and vertical fin leading edges, the stall angle of attack will be reduced. The autopilot will compensate for this change until reaching a point at which the autopilot will automatically disengage. Pilots should note their airline operating procedures—especially regarding using the autopilot during icing conditions.

Ice accretion will add weight to the airplane, thus increasing stall speed, and drag, which will eventually lead to a dangerous aircraft configuration. Pilots must take the appropriate action, consistent with their airplane flight manual (AFM), in a timely manner to ensure that the anti-icing systems are activated.

Pilots of airplanes having a maximum takeoff weight (MTOW) of 60,000 pounds or less should understand that these airplanes are more susceptible to undetected ice buildup than larger airplanes. Exit icing conditions as soon as reasonably possible, and always operate the airplane in accordance with the AFM procedures for flight in icing conditions.

The FAA recently issued a final rule (see "ALPA Supports Tougher Ice Cert Standards," page 24) to change certain regulations pertaining to flight in inflight icing. The new rule mandates that aircraft having an MTOW of less than 60,000 pounds and equipped with an ice detection system must alert the flight crew when activating the ice protection system is necessary. The system must be capable of being activated manually or automatically.

ALPA SUPPORTS TOUGHER ICING CERT STANDARDS

The FAA's August 2011 update on approved aircraft deicing fluids and holdover times resulted from the agency's 2010 notice of proposed rulemaking (NPRM) aimed at strengthening federal aviation regulations (FARs) regarding icing certification of airliners. ALPA endorsed the FAA proposal but warned that even more regulatory action is needed.

The NPRM proposed amending airworthiness standards to improve the safety of flight of transport-Category airplanes certified for flight in icing conditions. The proposed regulations would

- expand the certification icing environment to include freezing rain and freezing drizzle,
- expand the engine and engine installation certification requirements, and some airplane component certification regulations, to include freezing rain, freezing drizzle, ice crystals, and mixed phase icing conditions, and
- require airplanes with a maximum takeoff weight of less than 60,000 pounds or with reversible flight controls (i.e., those that can be back-driven by air loads on the flight control surfaces) to meet new safety standards to address supercooled large droplet (SLD) icing conditions.

The proposed regulations were the result of an extensive review of icing accidents and incidents, and recommendations from the FAA Aviation Rulemaking Advisory Committee (ARAC) on which ALPA participated.

Commenting on the NPRM, ALPA said the Association endorses the NPRM proposals and "views them as an important evolutionary step toward improving safety of flight…." However, ALPA warned, more regulations need to be promulgated, "along with the supporting research to address all the remaining concerns for flight in SLD icing conditions.

"In particular," the Association continued, "ALPA would like to see more research conducted to enable regulations that would address the potential SLD effects on all transport-category aircraft, to include those with a takeoff weight of 60,000 pounds or more…. [I]t cannot be assumed that an absence of accident/incident data for the larger aircraft means an absence of risk. Further research is needed to better understand the science of SLD and to analyze its effects and potential safety risk to all aircraft types regardless of their size and/or control design."

ALPA also supports recommendations made by the Ice Protection Harmonization Working Group (IPHWG). These recommendations concern the timing of icing protection systems activation and would require some airplanes to exit all icing conditions after encountering large-droplet icing conditions conducive to creating ice accretions aft of the airframe's protected area. ALPA has long emphasized the need for airliners to be equipped with the means to automatically inform the flight crew when hazardous icing is adversely affecting the airplane.

ALPA recommends continuous funding for flight icing research. A focus of that research should be providing flight crews with better methods to identify the type of icing environment in which they are operating and, in particular, to be alerted to any effects that icing is having on the flight characteristics of the airplane. ALPA encourages development of technical systems that would automatically detect the presence of hazardous ice, measure the rate of accumulation, and alert the flight crew.

CAPT JEFFREY L. BROWN (CONTINENTAL AIR MICRONESIA)

NOTES FROM A WINTER OPS CONFERENCE

By F/O Steve Jangelis (Delta), ALPA Airport Ground Environment Group Chairman

On October 5–6, I attended the Air Canada Pilots Association (ACPA) Winter Operations Conference in Montreal, Quebec. Here are some highlights:

Transport Canada mandates that flight attendants receive training about icing. The training advises the flight attendants that they are the flight crew's "eyes" and stresses the "clean aircraft" concept—i.e., what that means and looks like. Flight attendants are encouraged to contact the pilots if they feel the conditions do not look safe. This is an excellent idea that we should import into the United States.

A Society of Automotive Engineers (SAE) committee developing best practices for aircraft anti-icing/deicing has named several "most wanted" safety enhancements: deicing pad communications, vehicle safe zones, positive aircraft hold procedures (to prevent pulling an airplane out of the deicing bay without communications), and yearly fluid testing.

Deicing fluids have improved a great deal since 1990, and the frequent changes to holdover tables are a result of the fluids being tweaked and new types being introduced monthly. On the other hand, fluid corrosion (e.g., cadmium and catalytic) has become a large concern for both manufacturers and regulators, and fluid vendors must provide corrosion testing reports.

A new airport-based system to determine holdover time is being tested in Canada. The system takes the current precipitation level (measured via a catch device) and provides rapid, automated updates on holdover times based on fluids available. These updates could be relayed electronically, like ATIS, via ACARS. The system has been tested for six years and should be approved soon; Transport Canada and the FAA are jointly working on regulations for installing this equipment.

The big news: Ducted air (steam) deice technology is expected to go on the market next year after this winter's final tests of the system, which uses ducted air to melt ice on aircraft. The boom truck blows air into a soft air bladder, similar to a Zodiac boat, which then spreads the air over a large area of the airplane. The system can deice an entire airliner in one-third the time required for conventional deicing, and with no environmental impact. The technology appears very promising and may spell the end of fluid deicing as we know it.