# Winter's Still With Us

By Capt. Bill de Groh (American Eagle), Chairman, ALPA Aircraft Design and Operations Group


## The coldest months confront flight crews with special challenges.

F/O CHRIS NEVINS (DELTA)

**A Delta B-757 gets deiced on the ramp at Salt Lake City International Airport.**

The year 2012 was one of the safest in airline history. The flying public takes comfort in this stellar safety record and will continue to expect as much or better. As we look back with pride on our contribution to this safety record, we know we must not become complacent. And though 2012 claimed another distinction as one of the warmest weather periods recorded in North America, as the familiar disclaimer goes, past results are no guarantee of future returns. Now is a good time to review, prepare, and be vigilant about the effects of cold weather. While the subject matter may seem redundant and even routine for some, remember that through such preparation we have achieved the current level of safety.

For the winter of 2013, we need to consider:

### Runway excursions

"Airport surface operations" is on the NTSB's "Top Ten Most Wanted List" of needed safety improvements. Included in this broader subject is the narrower issue of runway excursions—especially those associated with slippery/contaminated runway operations.

For the landing phase of flight you might consider the following items unless your aircraft operator's manual (AOM) contains guidance in these areas, in which case your AOM procedures, of course, take precedence:

❄ Avoid basing a decision about the suitability of a landing runway on runway friction surveys alone. Use all the information available—ATC, ATIS, NOTAMs, SNOTAMs, AMSCR, and company field condition reports—to form a picture of expected runway conditions.

❄ Be conservative in assessing runway condition. For example, if you hear a mixed braking action report, such as "medium to poor," consider using the more restrictive term "poor." Similarly, if the runway report says the runway is covered with packed snow and slush, consider using the more restrictive condition. The capability to reliably measure runway friction, or Mu, has been questioned in recent years, especially when liquid water is present on the runway surface. So with multiple sources of runway information, conflicts are not only possible but likely. Compare sources to assess their validity.

❄ Determine the suitability of the runway for landing by checking that the contaminant depth doesn't exceed any depth limits contained in your AOM. Consider both landing and takeoff limitations, in case takeoff is scheduled before the weather improves. Finally, check that the crosswind component doesn't exceed the limits or recommendations in your AOM.

❄ Although current U.S. regulations don't require operators to use the manufacturer's advisory data for takeoffs and

F/O RYAN MITCHELL (CALM AIR)

**Ground crew work with a Calm Air ATR 42 on the ramp at Churchill Airport in Manitoba, Canada.**

landings on slippery or contaminated runways, some operators provide the data to their flight crews. FAA Safety Alert for Operators (SAFO) 06012 recommends that operators develop procedures for flight crews to use to assess landing distance at time of arrival. The SAFO provides guidance to operators to develop landing distance information if manufacturer advisory data are not available. If you don't have information to make a landing distance assessment at time of arrival, work with your Flight Ops department and regulating authority to develop the information from the guidance material available.

❄ If your airline has procedures for determining the required landing runway length based upon the actual runway conditions existing at your ETA, use that information to assess the suitability of the landing runway. Bear in mind that this information might *not* include any extra runway length as a safety margin. Find out if this is the case; if so, consider adding a safety margin to account for inaccurate runway condition reports, inaccurate braking action advisories, or other factors that could diminish braking performance. Consider adding 15 percent of the unfactored landing distance as a minimum margin for normal operations.

❄ Avoid carrying excess speed over the threshold. If additional braking force is not available (i.e., a constant deceleration rate), a 10 percent increase in touchdown speed increases stopping distance by about 21 percent. For example, if an airplane with an unfactored stopping distance of 2,830 feet at a touchdown speed of 129 knots touches down at 142 knots (a 10 percent increase), the estimated stopping distance, if no additional braking force is available, becomes 3,424 feet. That's an increase of 594 feet. This illustrates the importance of avoiding excess threshold crossing speed and a prolonged flare.

❄ Avoid crossing the threshold higher than the recommended threshold crossing height. A 3-degree descent path crossing the threshold at a 50-foot height intersects the runway 954 feet from the runway threshold. The landing flare will carry the airplane's touchdown point further, depending on ground speed and flare time. For every 10 feet above the nominal threshold crossing height, the touchdown point moves an additional 200 feet past the runway threshold. Some operations, such as autoland or head-up guidance system (HGS) approaches, will involve touchdown points farther down the runway, but this is accounted for in the performance information for these operations.

❄ Consider using 1,000 feet beyond the threshold as a target touchdown point, if a recommended distance to touchdown is not provided. Be on centerline with little or no drift.

❄ Make a firm and positive touchdown to assist wheel spin-up for antiskid system operation. Avoid extended flares in an effort to achieve a soft touchdown; better to be on target and not give away runway length. If touchdown is delayed while trying to decelerate during an extended flare, AC 91-79 suggests that landing distance could increase 230 feet for each second beyond the normal flare time. Fly the nosewheel onto the runway without delay.

❄ Confirm spoiler deployment, whether using automatic or manual spoilers. Failure to deploy spoilers will decrease stopping force by 20 – 30 percent. Spoilers have a pronounced effect on wing lift. Reducing wing lift after landing increases the load on the main landing gear, which has a significant effect on braking force.

❄ If the airplane has autobrakes, use the recommended setting and confirm normal operation. If the airplane is not equipped with autobrakes, immediately but smoothly apply pedal braking. In both cases, be prepared to use maximum manual pedal braking if necessary.

❄ Once the nosewheel is on the ground, gradually increase forward control column pressure to increase the load on the nosewheel to improve its traction.

❄ Begin to deploy the thrust reversers upon touchdown, increasing to maximum reverse thrust after nosewheel contact. Pay particular attention to directional control. If there is a loss of directional control, it may be necessary to come out of reverse to regain the runway centerline; obviously, this will increase the landing distance.

❄ If necessary, maintain this stopping configuration until slowed well below the turn-off speed to improve cornering traction. Don't get talked into an early turnoff at higher speed.

❄ As the airplane slows and rudder effectiveness diminishes, gently begin using nosewheel steering. Both directional control and braking require tire-to-ground friction, and they share the maximum friction force the tires can provide. Demanding more cornering friction will leave less friction available for braking.

❄ When faced with the prospect of landing on a slippery or contaminated runway, information, planning, and proper technique will be the best defense against a runway excursion. This is not an exact science, and may never be, so be conservative.

## Aircraft ground deicing

Significant progress has been made to improve the effectiveness of ground deicing fluids. Because anti-icing fluids continue to improve, we should constantly review and be aware of the information and limitations in holdover time (HOT) tables.

The *Official FAA Holdover Time Tables, Winter 2012 – 2013,* provides new

HOT information, a list of approved deicing/anti-icing fluids, and recommendations about other ground deicing/anti-icing issues. The Type I HOT tables are unchanged from last year but still incorporate separate values for aircraft whose critical surfaces are constructed primarily of composite materials. For your information, this document can be found at: http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/deicing/, but remember that your airline's procedures are FAA-approved and are controlling.

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

### Inflight icing

Any amount of ice on an aircraft will begin to degrade its performance and controllability; once airborne, pilots must use whatever means are available to recognize and respond to inflight icing. Current operational rules allow flight, with limited exceptions, into known icing conditions, provided the aircraft is designed and properly equipped with working deicing/anti-icing systems.

Known icing conditions are defined as atmospheric conditions in which ice formation has been observed or detected in flight. However, allowable flight into known icing conditions does not include any quantifiable limits on the accumulation rate or type of icing the aircraft will encounter. Thus each icing encounter is unique, and pilots should have an exit strategy before encountering known icing conditions.

Continuously monitor for ice accretion throughout the flight and be aware of its adverse effects on your aircraft's performance. With increased accretion of ice on the wing leading edges, the stall angle of attack will be reduced; i.e., stall may occur at a higher speed. Pilots should know—and follow—their airline's operating procedures, especially regarding using the autopilot in known icing conditions. Even though your airplane is approved for flight in known icing conditions, consider the ice protection system to be a means to buy time to exit the icing; it's not intended to allow prolonged, continuous operations in known icing conditions. Current ice protection certification requirements do not account for operations in supercooled large droplet (SLD) conditions. So know how to determine if SLD conditions are present, and don't delay to implement your exit plan.

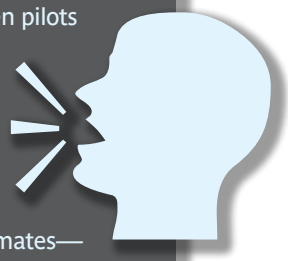
As with ground deicing, operational procedures and technology to deal with inflight icing are continuing to advance. The FAA recently issued a new rule, 14 CFR 121.321, which requires that by Oct. 21, 2013, airplanes with a MTOW less than 60,000 pounds satisfy one of three requirements when operating in conditions conducive to airframe icing to encourage timely activation of the airplane's airframe ice protection system.

Flight operations in winter conditions can be, and often are, very challenging. Closely following approved procedures, seeking out all the available information, and applying sound decision-making will make this winter season a safe one.

## Speak Up for Safety

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

A key to smooth winter operations is good communication between pilots and air traffic controllers. Winter weather increases workload on both sides of the mike. To keep the flow moving smoothly, keep controllers in your CRM decision-making loop.



### Don't keep secrets

Winter weather challenges can increase the workload of aviating and navigating, but don't neglect communicating with your teammates—controllers and other pilots. Let the controller know what problems you are facing and your plan for dealing with them as soon as possible. Make clear how urgent your situation is so the controller can prioritize it. Be specific; include critical information such as how many minutes or miles ahead you'll need to turn to avoid weather.

The precipitation that controllers see on their displays can be as much as six minutes old, but thunderstorms can grow as fast as 6,000 feet per minute, and liquid precip can become freezing precip in less than six minutes. Don't expect the controller to "see" weather at the same update rate you see on your cockpit weather radar.

Not all aircraft are created equal; controllers are not acutely aware of your aircraft's capabilities for dealing with winter weather. Make deviation requests early to give controllers time to adjust the flow.

### PIREPS: Share the wealth

If possible, issue a departure or arrival PIREP when you experience anything worth reporting. Use standard phraseology for precipitation: "light," "moderate," "heavy," "extreme," and "intensity unknown." Make runway braking action and condition reports after landing to help those behind you.

### Remember who's in charge

Controllers issue clearances to ensure proper separation and sequencing. Regarding weather, however, the controller may tell you what's in your path, but not necessarily what to do. If the safety of your flight is at risk, use your pilot-in-command authority and make a decision—then notify ATC. Controllers are not mind readers. If you need to deviate immediately and can't wait for an ATC clearance, tell the controller exactly what you are doing so that ATC can adjust your fellow pilots' flight paths.

To beat the challenges of winter operations, keep your pilot and controller teammates in the loop!