AIRPORT SNOW AND ICE CONTROL
Session Highlights

In September and October of 2003, AirTAP once again sponsored working sessions—one in Rochester and another in Park Rapids—on airport snow and ice control. Jim Moriarty of Peer Associations (formerly fleet manager for the MSP Metropolitan Airports Commission) served as the technical expert for the session. Moriarty drew on his extensive experience, having been responsible for all of the equipment used to maintain the airfields at MSP International Airport, and shared his thoughts on the responsibility of the airport operator regarding snow and ice control.

AirTAP program consultant Ann Johnson of Professional Engineering Services facilitated the sharing of ideas and best practices among session participants and provided the summary information for this "highlights" document.

AirTAP is a statewide assistance program for aviation personnel that offers practical instruction by knowledgeable and experienced trainers, as well as a range of information resources. AirTAP's efforts include providing training programs, technical assistance, access to experts, and printed materials.

AirTAP was developed through the joint efforts of the Minnesota Department of Transportation (Mn/DOT), the Minnesota Council of Airports (MCOA), and the Center for Transportation Studies (CTS).

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Why is snow and ice control important?
Jim Moriarty, former fleet manager for the Minneapolis/St. Paul Metropolitan Airports Commission (MAC), explained how winter weather can have a serious impact on safe airport operations, often resulting in conditions that may lead to incidents, accidents, or delays. For that reason, snow and ice control at an airport is extremely important, regardless of the size of the airport or the aircraft using it. Landing or taking off on a slippery surface is much more dangerous for a plane than driving on a slippery surface is for a car, as planes are not able to brake in the same way. Snow and ice control on the last third of the runway is especially critical, as this area must offer a clear pavement if a pilot decides to abort a takeoff.

Snow plans
Snow and ice should be removed as soon as possible during or after a weather event. To facilitate this, every airport should have a current "**snow plan**" that describes in detail snow and ice control and removal operations. A snow plan should be concise, accurate, practical, and specific to the Federal Aviation Administration (FAA)/Federal Aviation Regulation (FAR) circular under which an airport operates. A snow plan is required for all FAR 139 certificated airports, and it must be submitted to the FAA for approval. The airport owner's legal staff should review a snow plan before it is sent to the FAA regional office.

FAA Advisory Circular 150/5200 provides a guide for creating a snow plan and suggests a list of items to include.

Moriarty said that the snow removal plan at Minneapolis-St. Paul International Airport (MSP) requires runways to be cleared within 30 minutes of closing. After each storm, airport users and MAC personnel hold a snow removal critique meeting, at which the snow event and removal are discussed, along with ideas for aiding the next snow event.

At all three AirTAP sessions, participants viewed a video showcasing MSP's snow removal operations during a 20-inch snow event. The efficiency and skill of the operators were highlighted, along with MAC's philosophy and procedures for addressing a snow event.

NOTAMS & Airfield Condition Reports
A **Notice to Airmen (NOTAM)** must be issued to alert pilots to plowing operations, closed pavement surfaces, and the conditions of lighting, airfield signage, and navigational aids (NAVAIDs). The AirTAP sessions provided several examples, and participants were able to offer their own examples as well. NOTAMS should also warn pilots of any hazards. For example, obstructions such as snow piles must be listed on a NOTAM. Pin or pillow drifts are considered obstructions as well, as they can ruin an aircraft's landing gear. Pavement inspections must be repeated periodically in order to generate continuous updates on the airfield condition and to determine when and if re-plowing is needed.

At MSP, a NOTAM is issued any time a runway is closed regardless of the duration. And yellow lighted Xs are placed on runway ends to further alert pilots. MAC maintenance staff tries to give pilots at least a one-hour notice of pavement closings, but may only provide 30 minutes if warranted by conditions.

Airfield Condition Reports, issued by airports to give pilots information on pavement conditions, must be specific, accurate, timely, and use approved FAA phraseology. Workshop participants were provided with examples from MSP that specified the deicer used, locations of ice patches, friction numbers for each third of the runway, and specific information about drifting snow height and location.

Lighting, markings, signage, and NAVAIDS

Keeping signs, markings, and lighting clear is critical for safe operations at an airport. FAA regulations state that all lights must be clear of snow. Lights should be kept free of ice as well or they may freeze solid.

NAVAIDs and light couplings must be checked after plowing to ensure that they were not damaged and are operating correctly.

The windsock is another important tool for pilots. Its condition should therefore be checked frequently by airport owners or maintenance staff; alternatively, local police could be charged with checking that the windsock is lighted during periodic airport inspections. The airport owner must take overall responsibility for the windsock condition and ensure that it is always lighted.

According to FAA Part 139, an airport with three burned-out runway or taxiway lights in a row must close. For unlighted pavements, three consecutive non-functioning pavement delineators also dictate that the airport close.

Snow clearing techniques

One technique that can be used to control drifting snow is a **Canadian snow fence**. This is created by using a snowblower to blow a trench parallel to the runway, taxiway, or road pavement once the ground is frozen. This trench creates an area of lower pressure, and blowing snow is attracted to the low spot, which prevents the snow from blowing onto the pavement. The width of the trench is usually determined by the width of the blower (10 feet is typical).

Workshop participants also shared snow-clearing techniques used at their airports. Moriarty said that MAC holds training for its maintenance staff every year, and in order for employees to continue serving on the maintenance staff, they must pass the test with a perfect score.

Chemical and sand usage

The application of chemicals and sand is often needed to improve the surface friction on airport pavements. FAA approved chemicals are **sodium formate** (NAC) and **potassium acetate**. NAC can be purchased in bulk, but since it cakes with humidity, storage is sometimes a problem. Upon application, operators must wear a breathing apparatus to protect themselves from the cloud of airborne dust that is released from the material. NAC works at low temperatures (below 15^{o} F), but it doesn't penetrate snow or ice as well as urea and is slow to work.

Potassium acetate should not be applied before the start of a freezing rain event, since it is greasy when applied to a dry surface and will necessitate sanding if no rain occurs. Potassium acetate is also a good conductor of electricity, making old wiring and poor electrical connections vulnerable in areas where it is used. For that reason, seals on surface lights should be checked before application.

Sand should always be used sparingly and with a chemical to decrease slipperiness. The type of sand used must be approved by the FAA, which certifies that the additives in it do not

cause corrosion to airplane parts. After a significant snow event, pavement should be swept to prevent excess sand from causing prop blasting. Sand must be loose when applied to surfaces in order to eliminate any chunks that have formed that could cause a foreign object damage (F.O.D.) problem. Storing sand in a heated facility will reduce chunking of the sand when it is applied.

Two Minnesota airports use **urea** to control ice. Moriarty said that due to its ease of use and low cost, it can be a good tool, but its use has been banned at MSP for environmental reasons. Airports using urea should confirm that the product is acceptable according to FAA standards. Airports should also keep records of the products used, noting FAA approvals.

Friction measurement devices and tools

A **decelerometer** is an instrument that measures the friction between a test vehicle's tire and the pavement. A decelerometer is recommended for all 139 certificated airports. Although one is not required for friction testing, it offers more credibility than do subjective pavement condition reports such as poor, fair, and good. A decelerometer costs about $1,300, with an additional $600 each year for calibration.

Moriarty reported that the MAC uses a Saab sedan to test friction, which provides an objective number indicating the friction conditions of the pavement.

If issuing braking reports based on using a wheeled vehicle only, follow the FAA advisory circular and disable the anti-lock brake system.

"From the Pilot's Seat"

As part of each Snow and Ice Control session, a pilot offered his perspective on the importance of the pavement to safe operations. All emphasized the need to keep the last third of the runway clear, since different aircraft experience different braking under the same pavement conditions.

Facility tour

Participants were given the opportunity to tour the local maintenance garage at each session and learn about the different blade products that are available and when each is used, as well as the types of trucks that should be used for each maintenance activity.