

# Proactive de-icing and snow clearing : a priority for temperate climes

Most of Western Europe is situated in a temperate climate zone where winters are usually mild, and snow and ice make only brief disruptive incursions into the year. In other regions, such as parts of continental North America and Asia, one knows the snow, almost to the week, when sub-zero temperatures are coming and how long they'll stay, writes *Ian McInnes*

De-icing and snow clearing operations at the airport in low temperate zones have usually swung into action on a reactive basis and often on very short notice. The theory adopted by airport operators and governments seemed to be that a little disruption on a random and limited basis is a more cost effective option than having a lot of equipment and facilities ready for a situation that is

a rarity. However, for whatever reason, the climate is changing and the winter of 2010-2011 was a costly, particularly for the UK, and embarrassing lesson to all involved in keeping a nation moving; and the prospect of fines imposed by the government on airports has been raised.

In the UK, transport secretary Philip Hammond said that his department would attempt to ensure that supplies

of runway de-icing fluid did not run out, a problem that became Europe-wide in the winter of 2010. "We recognise that the cost, both economic and social, of this level of disruption, can be very great. Winters such as this year's and last have been rare in modern Britain, but we need to consider whether we are now seeing a step change in our weather that might justify investment in equipment and technologies to reduce the impacts of severe



The HT-Series snow tractor can perform a number of functions, including: ploughing, sweeping, scraping and/or forced air blowing



Volvo A25D clearing snow at Arlanda Airport

temperature and heavy snowfall," said Hammond in the House of Commons.

"I will be assessing advice on this subject from the Government's Chief Scientific Advisor, Professor Sir John Beddington, and will work with transport operators to examine the business case in each sector for increased investment in winter resilience where that makes sense – recognising always that spending more on winter preparedness inevitably means there will be less to spend on other priorities." Beddington has said that climate change in the longer term should mean milder winters but cannot rule out fluctuations leading to possible repeats of a £280 million per day cost to the economy. It is doubtful that anyone on the planet can, with absolute certainty, predict the severity or mildness.

According to European Union (EU) Transport Commissioner, Siim Kallas, the EU's transport policy chief, around 35,000 flights were cancelled in the EU due to bad weather conditions in 2010. "Thousands of passengers were stranded at hubs all over Europe, but also in other parts of the world. This caused major luggage handling problems. Concerns about de-icing product shortage also affected the operations at certain airports," said Kallas.

The EU Commissioner highlighted that:

airports operating at close to capacity were vulnerable to disruption; snow removal was too slow in some instances; Heathrow closed for several days causing a knock-on effect to other hubs; and a threat of a lack of de-icing products disrupted and scaled down de-icing operations. Kallas has asked European airports to report back to him with contingency plans and reports for the winter of 2011-2012 as soon as possible and said he would be looking to introduce measures during the Summer of 2011, including: contingency planning for snow at airports; improved co-operation between airports; better functioning and networking of airline hubs; improving passenger information, especially about delays and re-routing; and minimum service quality requirements for passengers. Change is coming.

Knowing what is on the way is a key part of the battle in an uncertain climate zone. The Met Office operates an aircraft de-icing service that was established initially for BMI (British Midland Airways) but increasingly for other airlines, said Jason Kelly, Met Office Aviation Forecaster.

"These forecasts take the form of temperature graphs, and also statements telling airfield operations crews to either anti-ice or de-ice aircraft, with the relevant forecast period being 0600-0900 local,"

said Kelly. "The idea behind the forecasts is that the notice to de-ice aircraft can be issued sufficiently early to prevent any delays during the morning rush from each of the airports. Naturally, this is particularly important at Heathrow, where missing the designated departure slot, due to the need to de-ice, can lead to significant delays," said Kelly.

The nature of the UK's weather is a major factor; however: "Naturally, the nature of snow events, especially the marginal situations that occur in the UK, make for the most challenging aspect of these forecasts," said Kelly. "An increase in surface wind, a slight increase or drop in temperature and precipitation intensity all have impacts on whether what actually falls from the sky is rain, sleet or snow. In more clear-cut snow events, the aircraft may well be de-iced; however, as was seen at some airports in December 2010, the amount of snow that falls may actually close the airport, preventing aircraft operations."

The decision to issue an anti-ice or de-ice instruction is made by: "The duty forecasters at the Met Office headquarters in Exeter; or for the Scottish airfields, at Aberdeen (in consultation with the Airfields team leader in Exeter)," said Kelly. "The main factors that would dictate the issuing of an anti-ice instruction would

***“ I am pleased to have secured agreement from the Chief Executives of British Airways, Virgin Atlantic, BMI, NATS and the CAA to establish a Heathrow partnership for passengers which meets regularly to publicly reinforce Heathrow’s collective commitment to make every passenger’s journey better than the last one..” (Matthews at BAA)***

be a forecast of accumulating snowfall or freezing precipitation. When these events are forecast, in consultation with airline operations staff, Met Office forecasters will assess the risk of ice. Warnings are issued and the airfields teams take the necessary action to prevent the build-up of snow or ice.”

Kelly said that de-ice instructions are issued around 0400 local, for the period 0600-0900 local time and are triggered by air temperatures less than +3C. There are other factors to consider too, said Kelly. “These are dew point (the temperature air must cool to before it condenses into water), cloud cover, wind speed

and the likelihood of precipitation. Out of these factors, dew point is the most important,” said Kelly. “If, for instance, the dew point is sub-zero, then it is possible for the aircraft skin to cool to this point, allowing ice to form, regardless of the air temperature. Cloud cover will, in general, prevent the formation of ice on aircraft, whilst strong winds will stir the air sufficiently to prevent it from cooling to the point where ice will form.”

According to the Met Office, December 2010 was the coldest winter for 100 years accompanied by widespread heavy snowfalls and was the third severe winter in a row. Airport operator BAA report-

ed that 10% fewer passengers used its airports in December 2010 and that the disruption caused by the snow and ice cost the company £24 million. The UK Government published that the overall cost to the nation’s economy alone could be around £1 billion and possibly more. These are serious and politically damaging numbers, especially when the post-recession economy is so fragile.

Heathrow and Gatwick operator BAA has already publicly responded by announcing in January 2011 a review panel of international aviation experts led by Professor David Begg to seek the views of passengers affected by disruption at Heathrow in December 2010 and also the wider public. During the last week of March 2011, BAA said that it was adopting all of the recommendations of the Begg Winter Resilience Report which includes: revised snow plans and new equipment; increased staff and training; the implementation of crisis management processes; the establishment of command, control and communication processes between the airport (including the airlines) and passengers; and additional passenger care and support in ad-

### **JBT AeroTech celebrating 50 years of de-icers**



2011 marks the fiftieth year anniversary for JBT AeroTech de-icers. It all began in the winter of 1961 at Chicago O’Hare, when a converted FMC John Bean Division fruit-picking machine fitted with agriculture pumps and a steam cleaner demonstrated to several airlines that applying heated de-icing fluid with a purpose-built vehicle was faster and more efficient than using rented tree sprayers (which was the most common vehicle used for de-icing at the time). The innovative design of the John Bean de-icer was also very compact allowing it to easily and safely access tight operating areas around the aircraft

The prototype proved to be such a success that FMC launched the custom chassis Maintenance Master de-icer the following year. The unique design of the three-wheeled de-icer included a one-man basket, single-seat operator cab, 1,000 gallon fluid tank, 525,000 BTU heater, single engine and hydrostatic drive. Between 1962 and 1964 a total of 177 Maintenance Master de-icers were sold to 15 airlines throughout the world.

Today, 4,500 de-icers later, the JBT AeroTech Tempest de-icers carry on the tradition that began with the Maintenance Master 50 years ago. Both de-icers were designed with a purpose built chassis that included a single engine and hydrostatic drive system to safely and efficiently de-ice aircraft. The Tempest, like the Maintenance Master, has many innovative features including a swing-out power module, blendUP™ proportional mix system and AirFirst™ forced air which can reduce glycol use by up to 70%.

Looking to the future, JBT AeroTech continues to seek innovative solutions for making Tempest de-icers more efficient to operate along with environmentally friendly systems that provide greater savings in glycol usage.

dition to that already in place under EU legislation. BAA also said that was proposing developing a £50 million Heathrow resilience investment plan, which it said it will recommend to airlines and the Civil Aviation Authority (CAA).

"Following December's disruption, we invested in new equipment, people and training to enable us to respond better to snow in future. We are now putting together a comprehensive action plan to implement all 14 Begg recommendations," said BAA's Chief Executive Colin Matthews. "I am pleased to have secured agreement from the Chief Executives of British Airways, Virgin Atlantic, BMI, NATS and the CAA to establish a Heathrow partnership for passengers which meets regularly to publicly reinforce Heathrow's collective commitment to make every passenger's journey better than the last one."

BAA said that Heathrow now has 166 individual pieces of snow-clearing equipment, including sweepers, de-icers, blowers, gritters, under-wing tractors and snow removal lorries compared with 47 in December 2010 and has increased its airside operations team that are available and trained for snow-clearing to 269 personnel compared with 117 in December 2010.

Certainly there is plenty of equipment available to cope with snow clearing. One such example is the Volvo A25D articulated hauler, which the company says works to make sure that Arlanda Airport, just outside Stockholm, Sweden keeps operating. The airport has never closed since its opening in 1962. Volvo says that by driving nine A25Ds alongside each other, it is possible to clear a 3.3km long and 45m wide runway in less than 10 minutes.

"We have a total of 250,000m<sup>2</sup> to clear, but aircraft have to continue taking off and landing at the same time," said Stefan Sundkvist, Field Coordinator at Arlanda Airport. "There's absolutely no room for driving around haphazardly. All the traffic has to be controlled and planned down to the last detail."

Oshkosh too has a series of vehicles designed to keep runways clear, such as the HT-Series snow tractor, which the company says can perform a number of functions, including: ploughing, sweeping, scraping and/or forced air blowing. Oshkosh says that the multi-task equipment fitted with an ALL STEER electronic all-wheel steering system, can complete a runway U-turn in less than 75ft (22.9m), wall to wall, with a 24-foot (7.3m) plough and tow behind broom.

Control the snow and you have a chance of controlling the ice, which is imperative in a melt freeze cycle of a temperate climate. BAA announced an idea based on under-floor heating in April 2011 of using geothermal energy to de-ice the ground under aircraft. "It's not the snow that caused problems last year, it was the ice," said Steven Morgan, BAA's Capital Projects Director. "We are working on a concept to capture geothermal energy from the surface of the tarmac, so energy without using the grid, during the summer, to then provide a heating capability so the stands don't freeze in the winter. We would store the energy underground and use it to gently heat water that would then be run through pipes in freezing conditions to warm the stands, which are the slabs of concrete directly beneath the planes, to just above zero." The project is in the research stage with no cost tag as yet but may prove to have merit.

For now, as we approach the summer of 2011, the sun will shine and it is easy to forget the chaos of 2010. Will winter 2011 be as bad in Europe and if it is will the lessons learned have been implemented? The future careers of some politicians and airport operator executives may depend on it. ■

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