

Finnish-style **SnowHow**



Fighting extreme winter weather to keep aircraft flying is critical when an airport is less than 450 miles south of the Arctic Circle.

Tony Mallett talks snow business with the dedicated team managing Finavia's world-leading runway clearance programme.

▼Finavia operates a large fleet of snow-clearing machines, many made by Vammas. (Photos author except where stated)

The expert team at Helsinki Airport (HEL) take a great deal of pride in the efficiency of their snow clearance operation. Heavy falls are expected as early as November and can continue well into April. As much as 6-7ft (2m) might accumulate and at times the temperature can drop to -25C (-13F), but even in such conditions the runways must remain open and the flights kept moving.

The airport's snow clearing team has developed procedures to keep the airfield clear and open to air traffic, supported by state-of-the-art equipment including snow blowers, sweepers, ploughs and friction testers. Seasonal staff are drafted in to supplement regular employees, almost doubling the number of personnel dedicated to the programme, and they strive to keep flights moving 24 hours a day, seven days a week.

Ready for the bad weather

Airports of the World is introduced to Heini Noronen-Juhola, Finavia Vice President at HEL, outside Terminal 2. It is immediately evident that ensuring customers are not too badly affected by inclement weather is a high priority - all pathways and road surfaces are clear, and treated with large amounts of salt and grit. A noticeable thrum emanates from the tyres of passing cars and Heini said that all Finavia's vehicles - as well as many used by private motorists and taxis - are winter-proofed with tyre treads embedded with metal studs to aid traction in snow and ice.

As the visit started, en route to the nerve-centre of Helsinki's SnowHow operations, Heini filled in some details about her background. She obtained a master's degree from Helsinki University of Technology and came to the airport in 2008 after working in the high-tech and venture capital industries. Alongside coordinating a team that keeps the airport running smoothly during the depths of winter, Heini also sings in the airport's rock and pop group - Band from HEL.

Jani Elasmaa, Finavia's Head of Airfield Maintenance, joined the group as we progressed into the airside area, and outlined how the SnowHow team works via daily consultations, unofficial collaborations and structured weekly meetings with a general agenda. "I have 63 permanent staff members, and 68 seasonal workers. If we count also our contractors, our headcount is well beyond 200. I'm head of unit, so basically any operation related to airfield maintenance or equipment is in my alley. As well as dealing with the winter weather, I've been heavily involved on our new apron buses project - we will soon receive ten new state-of-the-art apron vehicles to ramp up the passenger experience."

Once airside, we pull up at a giant hangar which houses around 250 snow-clearing vehicles and associated support equipment. The size and scale of the facility is impressive. Numerous 24ft-(7.3m) wide snow ploughs are scattered around the outside walls of the depot, ready to be coupled to the front of the vehicles that





Vehicles are equipped with studded tyres to cope with winter conditions.



Winter vehicles are protected from inclement weather in a large well-appointed depot when not in use.



Vice President Heini Noronen-Juhola and Head of Airfield Maintenance Jani Elasmaa.

▼ Snow is not the only problem during the winter – mist and fog also make aircraft handling more challenging.



Other vehicles also have snow ploughs installed in front of the driver's cab.

will propel them across the airfield. Inside the building there are several numbered floodlit bays, each accommodating specialised trucks lined up with almost military precision, standing prepared and ready for any immediate call to action.

Jani explained how his team maintain such a huge fleet of specialised vehicles: "Depending on the machine, they always have daily and weekly checks, but major services are always done outside of the winter season. By the time the season starts, every machine has gone through a series of rigorous checks and a service. During the winter, maintenance is more reactive instead of preventative.

"A vehicle's lifespan depends heavily on its intended use. The backbone of the operation, our Vammas PSB 5500 heavy snow clearing units, have been calculated to exceed 20 years in service. Half-way through its lifespan a heavy check is performed. During that check, the machine will be stripped down—these operations are equivalent to the D-checks

done on aircraft."

Those bright yellow vehicles, developed by the Finnish firm Vammas in consultation with Helsinki Airport, are worth a closer look. The PSB 5500s weigh 31 tons, and are 82ft (25m) long and 12ft (3.7m) tall. A large snowplough can be attached to the front, below the driver's cabin, while in a central position underneath the lanky body there is a rotating sweeper brush and towards the rear a large blower capable of expelling air at up to 250mph (400km/h). The plough has independent spring-loaded cutting segments along its lower edge for maximum contact with the runway surface, even where it is a little uneven.

The twin-engined vehicles (one to provide motion, the other to power the brush and blower) can reach speeds of 40mph (64km/h), and have both wheel steering and articulation to manoeuvre it into tight spaces with the plough, sweeper and blower covering the same track across the surface. The heated driver's cabin is quiet and spacious with room to seat three, and



Driver Lauri Lähteenmäki inspects a snow plough prior to starting a snow-clearing duty.




Ploughs are fitted with independent spring-loaded cutting segments to clear uneven surfaces



The driver's cab is dual-glazed and has an extremely effective heater. Visibility is excellent.

the panels feature one-touch and joy-stick controls. Excellent all-round visibility is provided through dual-layers of thermally heated glass, enabling staff to monitor progress and gauge the effectiveness of the snow removal. Each plough can clear a 24ft (7.3m) swathe of runway, almost 10,000ft (3,000m) long, in just 11 minutes. A PSB 5500 costs around €1m.

Work begins on the apron, behind a Finnair Airbus A320 parked at a gate. The plough at the front pushes most of the accumulation off to one side, the sweeper underneath cleans further snow from the surface, and the blower at the rear removes any last remnants from the surface. Jani chipped in to explain how the surfaces are treated: "We plough, brush and sweep snow. During icing conditions we apply potassium formate, either in liquid or solid form, to prevent icing. We also spread fine sand, which is carefully specified to ensure it does not damage jet engines."

Lauri demonstrated the excellent manoeuvrability of the vehicle and his dexterity at the controls by clearing around the blast deflectors protecting the buildings from the effects of aircraft exhaust. Around the edges of the aprons and runways there are lights standing proud of the surface to ensure they can be seen when there is a covering of snow, but Jani added: "We use plastic blades on our snow ploughs that do not damage the lights." 

Ploughing

While we are inspecting the equipment, driver Lauri Lähteenmäki prepares vehicle 70 for service by hitching it to one of the ploughs in the compound. Along with Lauri, we climb aboard for a tour of the airfield, which starts with the plough being raised during the transfer from the depot to the runway. The sweeper unit is slewed lengthwise along the length of the vehicle, reducing the overall width to 8ft (2.4m) to drive along normal roads - the brushes are rotated through 90°, parallel to the plough and perpendicular to the direction of travel, when snow is being cleared.

Each Vammass PSB 5500 has a plough, brush and snow blower. (Finavia)



▼ Vehicles are operated in a staggered convoy and can clear a runway in around ten minutes. (Finavia)





Jani carefully monitors progress outside as things start to get busier, with a number of long-haul aircraft arriving from Asia. The efficient operation of the hub, which handles a significant amount of passengers reliant on timely transfers between Europe and the Far East even in winter, is vital to preserving throughput at the airport.

Preparedness

Finavia aims to be one step ahead when bad weather looms. Staff use a plethora of information sources to monitor temperatures and precisely predict the movement of precipitation, up to eight hours before it arrives. Jani elaborated: "We have constant monitoring, and alert systems for different kinds of weather events. We work closely with FMI [Finnish Meteorological Institute] and also utilise commercial weather service providers. Our airport has nine sensors around the runways, and one of our service providers uses this data to correlate their forecast. Last November we got almost 2.5 inches (6cm) of snow in one hour. It was the first

▲▲A convoy in action. (Finavia)

▶▶Smaller ploughs are used to clear more confined areas. (Finavia)

▶Cleared snow is moved to remote areas of the airport for storage, or taken offsite. (Finavia)

▼Tractor units with ploughs clear runway and taxiway edges where lights stand proud of the surface. (Finavia)



of the season and we got a good start - everything went fine."

A team working at a dedicated Snow Desk monitors the weather, organises staff numbers, and assigns vehicles. It also keeps in contact with the airlines, ground-handling teams and air traffic control. Removing snow from just one runway can be a major challenge at many airports, but at Helsinki there are three with a combined

length of 31,040ft (9,461m). Clearing three strips takes place by rotation - the tightly choreographed operation involving a convoy of vehicles clearing one runway, while the remaining two remain available to air traffic. Ten of the combined plough/sweeper/blower units traverse the full length of a runway side-by-side, clearing the 197ft (60m) width in around ten or 11 minutes. Much of the snow is pushed off





the shoulders onto the grass, so to ensure aircraft wings do not come into contact with any accumulations, and the side of the airstrips are subsequently cleared by additional blowers. Large piles of snow are moved and stored in remote areas around the airfield, or moved off site when the airport's facilities are full.

As the weather and light deteriorated, Jani pointed out the row of lights piercing the low-lying mist: "It's here that you can see the significance of the green taxiway centreline lights. We have to keep them visible and clear of snow so aircraft can be manoeuvred safely."

Dusk finally gives way to night, and floodlights illuminate a line of long-haul aircraft parked at Terminal 2, being loaded for the next wave of departures. It isn't snowing, so Heini and her team take an opportunity to carry out one final apron check in the service vehicle before returning to base. For now there is a moment of respite, but its Finland and its winter, so it is almost guaranteed things will not stay like this for long.

There's No Business Like Snow Business

Jani is very proud of what he and the team do: "I enjoy the ever-changing environment at the airport. In my role, every day is a different one. Of course, dealing with people and unique equipment is what I enjoy a lot."

It's also obvious the team at HEL are extremely adept at keeping the airport clear of snow and ice. The last time winter weather impacted operations at Helsinki was in 2003 with a 30-minute interruption to aircraft movements. In fact, Finavia is often asked

to show off its winter weather operations to visitors from other airports, and in 2015 hosted the WOASE (Winter Operations and Airside Safety Europe) conference, which was attended by more than 140 delegates from across the globe. The event ran over two days with 21 different presentations from world speakers, and concluded with a demonstration of equipment by the SnowHow team.

▲The team keeps the airport open despite the weather. (Finavia)

▼The equipment is ready for the next shift to start work.

So when passing through Helsinki or another northern hub, spare a thought for the large team working round-the-clock behind the scenes to ensure the flights can land and take-off. It's a far more complex process than clearing snow from a driveway at home and a lot of equipment and experience has gone into keeping the airport open whatever the winter throws at it. ☑

