Airside Snow Plan 2024/2025
Stockholm Arlanda Airport

English version

Swedavia Airports

List of revisions

Vers	Date	Prepared by
03.00	2024-11-07	Torstein Grönmo



List of sources

EASA ADR.AMC1.OPS Operations in Winter Conditions

Utbildningshandboken PLOG-SOP-BLÅS metodik
('Training manual for PLOUGH-SWEEP-BLOW methods', in Swedish)

Applicable Airport Regulations (AR

A-04-2013 Security responsibilities of companies and employees
A-08-2013 Traffic regulations related to vehicles, equipment and working tools
A-12-2013 Aircraft movements and parking stands
G-06-2013 Incident reporting

Contact Airside

For internal questions concerning snow removal on Airside or if you need help with snow removal at the gate and stand contact the Snow Coordinator at 010-109 15 00.

Contact Landside

Snow removal Operation 010-109 17 35 or 073-385 28 91

Table of contents

1 Introduction

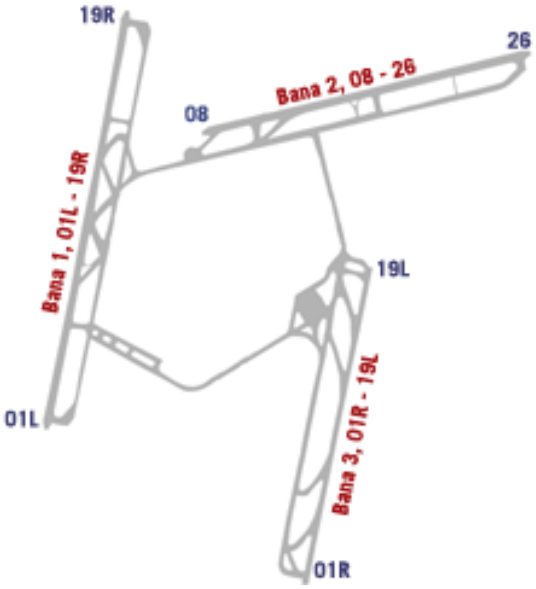
Adverse weather conditions, in the form of snow, ice, fog or frost etc., have an impact on airport operations during the winter months. The consequences could be disruptions to flight timetables, deteriorated conditions for ground transport services and a greater workload for all companies and organisations at the airport. There is an especially great need for coordination and collaboration under these conditions.

Snow clearance of the take-off and landing runways, taxiways, aprons (ramps) and aircraft parking stands is a very demanding task. Airlines want to operate their flights with as little delay as possible and avoid cancellations. Safe operation is only possible if runway conditions are within certain parameters. Our objective at Stockholm Arlanda is for snow removal and de-icing to have a minimal impact on operations.

This document contains a brief description of how we work and set priorities to minimise disruptions at Stockholm Arlanda Airport.

This version concerns the 2024/2025 season and always applies in full. If there is an update during the season under way, the entire document will be replaced. The aim is to disseminate information in a standardised way. Formal regulation of responsibilities and duties of outside companies and organisations working at the airport is done via Airport Regulations (AR) and licence agreements entered, not via this document.

The 2024/2025 season is specified as the period Monday, September 30, 2024, to Sunday, April 27, 2025.



2 General

Stockholm Arlanda is well prepared for snow. The airport has extensive experience with snow removal. Air traffic may be delayed by heavy snowfall, but Stockholm Arlanda's ambition is to never close because of snow – an ambition that we have managed to live up to so far.

Stockholm Arlanda's runway system consists of three runways and associated taxiways.

The runway system is linked to aprons (ramps), aircraft parking stands and transport routes for other vehicular traffic. To make use of the airport's capacity, all kinds of surfaces must be accessible and clear of snow in order to be operational.

3 Snow removal, airside

3.1 How snow removal works

Snow removal is carried out in teams, called snow removal teams. Special routes are planned for the snow removal teams, which clear each route at intervals of 25 to 60 minutes.

The snow removal team is led by a snow removal supervisor, who also has direct contact with the air traffic control tower (TWR). Each team consists of 8-10 PSB machines that move side by side. PSB stands for ploughing, sweeping and blowing. The PSB machines are followed by a snow thrower. As needed, a formiate truck spraying anti-skid agent on the runways comes last, or else a gritter is used.

It takes between 8 and 12 minutes to clear each runway.

3.2 Vehicles and equipment

To carry out quick, safe, effective and environmentally-friendly snow removal, machinery and equipment with the latest technology and performance standards are required. Our machinery is completely free from emissions of fossil carbon dioxide.

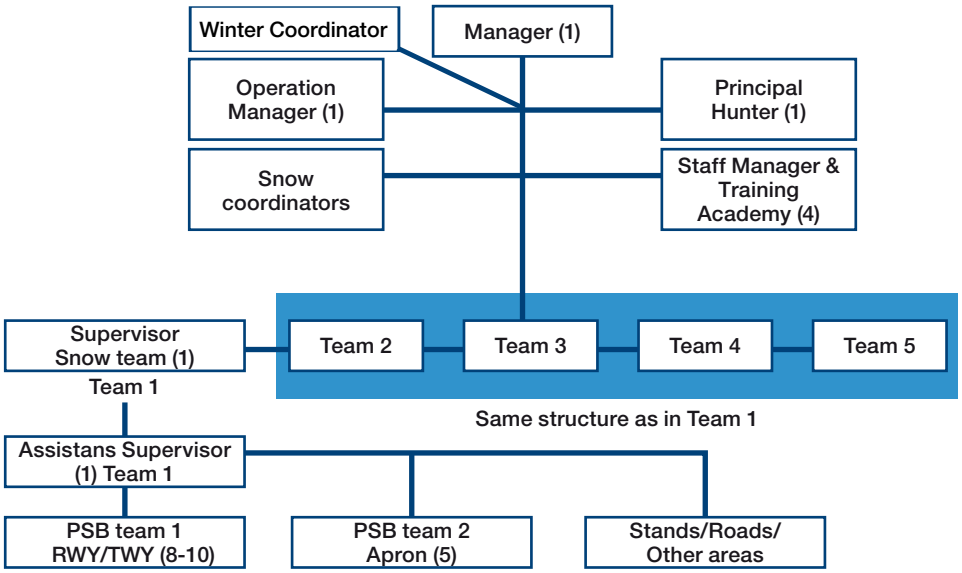
Below is a list of our most commonly used snow removal vehicles on airside and the quantity.

PSB	18	Snow groomer	1
Friction measurement vehicle	2	Truck with snow flatbed	3
Truck with formiate spreader	2	Tool transport vehicle	2
Truck with grit spreader 8–10 m^3	2	Loader L60/70	7
Snow loader	3	Loader L90	1
Large thrower for runway system 8,000 tonnes/hour	2	Loader L120	3
UTV	3	Loader L150	4
		Grader	1
		Truck	2

In addition to the vehicles above, we also have the possibility, via an external contractor, of ordering external transport capacity to remove snow from our aprons and aircraft parking stands within 90 minutes of contact.

3.3 Staff

Winter Organisation, Airfield Maintenance ~ 120 persons



Our winter organisation on airside consists of some 120 people divided into 5 shifts and teams. Each team consists of 24 people and is led by a snow removal supervisor and assisted by an assistant supervisor (1st man). These teams work 12-hour shifts around the clock throughout the winter season.

In heavy or prolonged snowfall, a snow coordinator is called in. The snow coordinator's role is to assist the snow removal supervisor in coordinating snow removal primarily from around the airport's aircraft parking stands and network of roads. The snow coordinator is also the person who takes calls concerning snow removal needs from other operations at the airport.

In adverse weather conditions, there is also the possibility of calling in an emergency team of an additional 7 people.
3 UTV for snow removal on occupied aircraft stands in order to make handling operations functional.
The UTV:s are parked in Swedavia's operating area and are used by appointed handling companies.
For use, please contact the snow coordinator on tel. 010-109 15 00

3.4 Classification of snow:

Class	Dry snow 12 hours	Dry snow 3 hours	Wet snow 3 hours	Freezing rain	Measure
Extreme	More than 15 cm	More than 8 cm	More than 4 cm	More than 5 mm	TTF
Heavy	From 10 to 15 cm	From 6 to 8 cm	From 3 to 4 cm	From 3 to 5 mm	TTF
Medium	From 6 to 10 cm	From 4 to 6 cm	From 2 to 4 cm	From 0 to 3 mm	Snow Council
Light	From 2 to 6 cm	From 2 to 4 cm	From 1 to 2 cm		Snow coordinator
Very light	Less than 2 cm	Less than 2 cm	Less than 1 cm		Snow

Very light snowfall

- Supervisor and coordinator check weather forecast, staffing situation and capacity
- Ordinary group complete the assignment
- Parallel runways used
- Checklists for staffing and ahead of coming snowfall to be checked

Light snowfall

- Supervisor and coordinator check weather forecast, staffing situation and capacity
- Snow coordinator and/or Winter coordinator called in by supervisor or APOC if necessary
- Regular team + emergency team (hourly wage workers on weekends) to handle the task
- Parallel runways used if possible
- Checklists for staffing and ahead of coming snowfall to be checked

Medium snowfall

- Snow coordinator and Winter coordinator called in
- Snow Council (formerly three-party conferral) consisting of supervisor/snow coordinator/ATOS/ TWR (meteorologist) consult ahead of approaching weather situation
- Snow Council meets via telephone once a day. Additional Snow Council meeting convened if necessary
- Snow Council agrees on what conditions, capacities, traffic pictures etc. could/will prevail
- Based on these decisions, production is planned
- Checklists for staffing and in preparation for coming snowfall to be checked

Heavy snowfall

- Snow coordinator and Winter coordinator called in
- TTF convenes before the weather situation arises – when there is a 40% risk of capacity disruption/extreme weather. TTF meeting is initiated in consultation with SNL/Snow coordinator/ATOS/TWR(meteorologist). ATOS convenes meeting.
- Snow Council meets via telephone once a day. Additional Snow Council meeting convened if necessary
- Snow Council agrees on what conditions, capacities, traffic pictures etc. could/will prevail
- Based on these decisions, production is planned
- Checklists for staffing and in preparation for coming snowfall to be checked

Extreme snowfall

- Snow coordinator and Winter coordinator called in
- TTF convenes before the weather situation arises – when there is a 40% risk of capacity disruption/ extreme weather. TTF meeting is initiated in consultation with SNL/Snow coordinator/APOC Supervisor/TWR (meteorologist).APOC Supervisor convenes meeting.
- Snow Council meets via telephone onece a day. Additional Snow Council meeting convened if necessary
- Snow Council agrees on what conditions, capacities, traffic pictures etc. could/will prevail
- Based on these decisions, production is planned (staffing, machinery, food, formiate, other materials)
- Checklists for staffing and ahead of coming snowfall to be checked

3.5 Priorities, airside:

In a heavy snowfall with strong winds, it is crucial that tasks are assigned priorities. Changes of this type are reported via NOTAM.

When snowfall changes from very light to light, RWY 01R-19L is closed. As soon as the snow stops falling, clearance begins, and the aim is to open RWY 01R-19L at the latest within 24 hours of the time the snow stops falling.

A continuous dialogue is maintained between the shift supervisor and air traffic management before, during snow removal and after this task is completed.

Priority 1

- Runway in operation
- Taxiways serving runway in operation
- Aprons and their parking stands based on current traffic picture
- Emergency routes from fire station to runway in operation

Priority 2

- Preparing additional runway for operation and taxiways for this
- Relevant access routes on airside
- Other emergency routes for fire and rescue vehicles

Priority 3

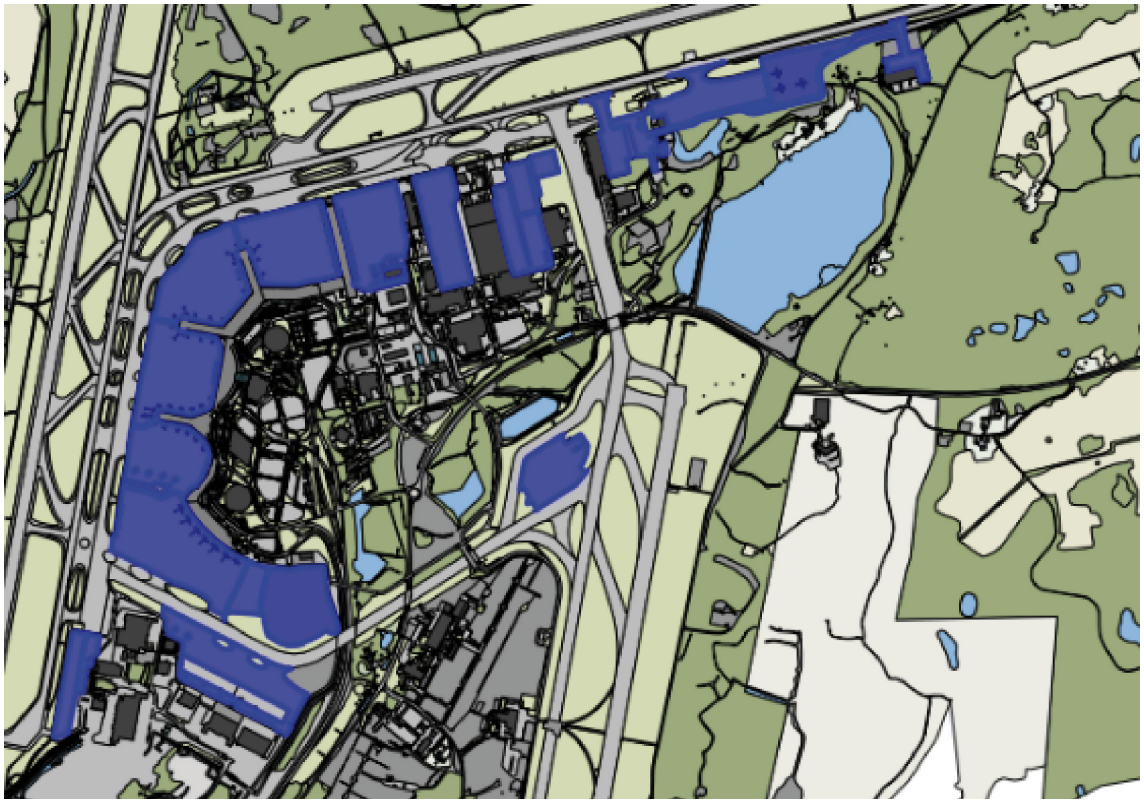
- Preparing the airport apron (ramp) GP and LOC areas

Clearance of stairs around the airport terminals is carried out when necessary, but other tasks assigned Priority 1 always have higher priority. Until winter field maintenance staff arrive, ground handling companies are responsible for keeping these clean and performing anti-skid treatment using grit and hand-held equipment kept in the vicinity.

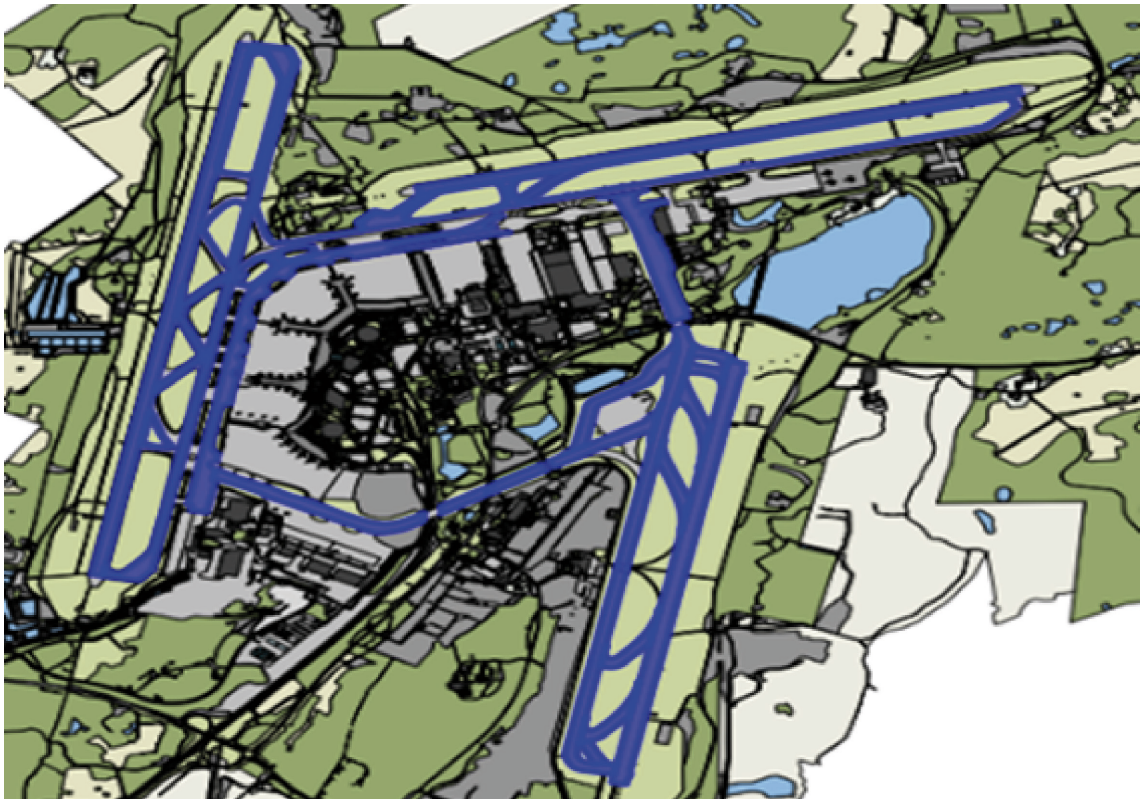
Clearance of the City Route (‘Cityvägen’) and Inner Transport Route (‘Inre Transportvägen’) is done as soon as there is room for this in the other snow removal activities under Priority 1. If this is urgent, contact the Snow Coordinator.

Clearing closer to 5 meters around parked aircraft is carried out by the ground service companies.

Aprons, parking stands and roads



TWY & RWY



3.6 Reporting/NOTAM/SNOWTAM

Measures for winter field maintenance consist of:

- Inspection of the movement.

- Reporting of conditions in the movement area.
- Improvement measures of such a scope that the aim is achieved for each part of the facility.

Winter field maintenance at Stockholm Arlanda is carried out in such a way and to such an extent that airport operations can continue without jeopardising aviation safety and if possible without interfering with air traffic.

In a weather situation where improvement work or measurement of friction values cannot be carried out at the same time as air traffic, the Operations Manager or someone appointed by that person shall decide, in consultation with the airport's air traffic management unit, to close part or all of the movement area. In such a case, the length of the closure shall be determined and announced via NOTAM.

At the airport, up-to-date information about the quality of field maintenance and about winter field maintenance shall also be made available at the airport's air traffic management unit.

3.7 Reporting

Whenever conditions with water, snow, slush, ice or frost occurs the aerodrome operator reports the runway surface condition using a runway condition report (RCR) including a runway condition code (RWYCC) and a description of the contaminant type, depth and coverage.

The runway condition report contains information about the aerodrome location indicator, time, runway, runway condition code, per cent coverage contaminant, depth and condition description. For reporting the runway is divided into three sections of equal length.

The runway condition code is specified using numbers in accordance with the runway condition assessment matrix (RCAM):

Runway condition assessment matrix (RCAM)			
Assessment		**Downgrade assessment criteria**	
Runway condition code	**Runway surface description**	**Aeroplane deceleration or directional control observation**	**Pilot report of runway braking action**
6	• DRY	---	---
5	• FROST • WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth): ***Up to and including 3 mm depth:*** • SLUSH • DRY SNOW • WET SNOW	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	GOOD
4	• SPECIALLY PREPARED WINTER RUNWAY ***−15ºC and Lower outside air temperature*:** • COMPACTED SNOW	Braking deceleration OR directional control is between Good and Medium.	GOOD TO MEDIUM

3	• SLIPPERY WET • DRY SNOW or WET SNOW (any depth) ON TOP OF COMPACTED SNOW ***More than 3 mm depth:*** • DRY SNOW • WET SNOW ***Higher than −15°C outside air temperature:*** • COMPACTED SNOW	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	MEDIUM
2	***More than 3 mm depth of water or slush:*** • STANDING WATER • SLUSH	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM TO POOR
1	• ICE	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR
0	• WET ICE • WATER ON TOP OF COMPACTED SNOW • DRY SNOW or WET SNOW ON TOP OF ICE	Braking deceleration is minimal to non- existent for the wheel braking effort applied OR directional control is uncertain.	LESS THAN POOR

3.8 It quickly gets heavy!

The line of snow left behind by the PSB machines can weigh about 120 kg per metre, so Stockholm Arlanda's snow throwers have high capacity.

Airside has gigantic asphalt and concrete surfaces, as much as 3,2 million square metres. A two-centimetre snowfall on the terminal aprons means that some 1,200 lorry loads must be carried to the airport's snow dumps. There are two snow dumps at the airport which together can contain up to 750,000 cubic metres of snow in a season.

Snow dump, airside

The water that melts from the snow dumps is collected in ponds and is then transported in pipelines to a municipal water treatment plant.

Snow lines, airside

3.9 Least environmental impact possible

The runway anti-skid agent used at Stockholm Arlanda is called potassium formiate and consists of organic formic salts that decompose in a natural way.

Formiate-based anti-skid agents comply with international SAE AMS 1431B/1435A standards and have such properties that they do not damage aircraft at the airport, for instance, through corrosion.

Anti-skid is also carried out with sand, when sanding on the Airside the fraction must be approved in accordance with ICAO Doc 9137 Part 2 so as not to risk damaging aircraft.

4 Contact channels/Ordering of snow removal

4.1 Landside

Ordering of snow removal in areas that belong to landside is done via the shift's coordinator. The coordinator is contacted by telephone

For questions about snow removal on landside, contact the coordinator at 010-109 17 35. The coordinator, who is on site 24 hours a day during the winter season, coordinates snow removal operations on landside.

4.2 Airside

For questions concerning snow removal on airside, contact the Snow Coordinator at 010-109 15 00 The Snow Coordinator, who is on site 24 hours a day during the winter season, coordinates snow removal operations and has continuous contact with the APOC Supervisor and Watch Supervisor at the control tower (WS TWR).

4.3 New order for services

Orders on airside are placed via the Snow Coordinator at telephone 010-109 15 00.

Ordering on Landside is to Susanne 070-891 66 51 or Britt 070-897 86 82

For orders from external parties that do not have an agreement with Swedavia, the scope of the task, the contact person and billing information are to be provided to the recipient. The recipient documents the quantity of equipment, number of staff members and materials used.

5 Everyone has to help out

All companies and organisations at the airport contribute to keeping the airport operational. In heavy snowfall, it is especially important that everyone helps out in order to achieve as high a capacity as possible.

5.1 Parking stands

As always, it is important that equipment is parked in its assigned place. When it is snowing, equipment must also be moved temporarily to facilitate snow removal. This work is done in a coordinated fashion, following the Snow Coordinator's planning.

Parking stand surfaces must always be clear of such equipment as cables, cones, ladders, wheel chocks etc. This is especially important when there is snowfall since loose objects may cause damage to the snow removal equipment or even personal injury.

In the cargo area, large volumes of cargo and goods are handled within short periods. That means that coordination of snow removal activities is especially important to provide good logistics at the parking stands.

5.2 Keep updated on weather conditions

It is important that all companies and organisations at the airport follow public weather forecasts as a basis for their own work.

5.3 Resources

All companies and organisations must have specified resources/contact persons available at that company or organisation to move equipment. These must be made known to Swedavia's Winter Coordinator.

5.4 Right equipment and procedures

All companies and organisations must ensure that ground handling equipment and procedures have been prepared for use in winter conditions. Remember to use engine warmers as much as possible for the sake of the environment!

It is important to use good quality tyres and secure the load on baggage trailers, not least to avoid accidents.

5.5 Gritting of apron surfaces

At every parking stand, there are grit bins with scoops and shovels. The grit we use is sifted/cleaned using a screening curve where the grain passes through a 4.75 mm sieve. This grit is approved under EASA regulations.

The ground handling agent is responsible for taking the first step to prevent skidding in the form of gritting. Remember to put the equipment back after use so that it is in the right place the next time it snows.

5.6 Road salt

Note that road salt may not be used on airside.

6 Description of processes in a snowfall

The responsibility for day-to-day operations for snow removal at Stockholm Arlanda Airport lies with Swedavia's field maintenance department, via an established delegation of duties from the Head of Operations to each Snow Removal Supervisor, while ultimate responsibility lies with the person in charge of operations/airport director.

It is important that all parties involved (airport operator, airlines, ground handling companies, service providers and other ARN departments etc.) have taken the measures necessary to the greatest extent possible to keep the airport open and fully operational under winter conditions.

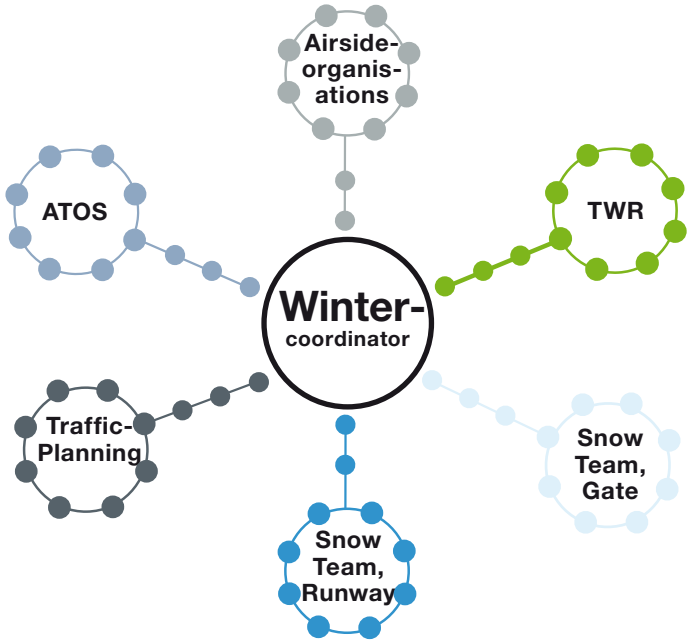
To maintain a high level of punctuality in air traffic at the airport, Stockholm Arlanda has set up a forum called the Tactical Traffic Forum (TTF).

TTF's mission is to ensure that the airport and its stakeholders have the right information, tools, preparedness, action plan and decision-making body in connection with snowfall and other expected situations and events that can affect the airport's capacity.

Each day, one scheduled check are held to determine the impact of weather on the next 24 hours of operations between the ATOS, WS TWR, Aicraft stand parkin and Snow Coordinator. The meteorological companies that we and TWR have agreements with are always included in this dialogue. If there is a risk of disruption, more frequent checks will be held. Planning for the weather forecast is up to 5 days.

Snow removal on the aprons is carried out in continuous dialogue between the Winter Coordinator, Traffic Planning and the Airport Technical and Operative Supervisor (ATOS) in order to best plan and carry out snow removal on the apron, with priorities based on the current traffic picture. It is important that ground handling companies can ensure necessary staff is on hand to move equipment in order to facilitate snow removal.

Winter field maintenance must ensure to the greatest extent possible that the snow is not thrown into ILS-critical areas and that visual aids and protected areas are not covered with large quantities of snow. If this cannot be avoided, removal and levelling are to begin immediately.



6.1 Winter services include:

- Continuous checking and reporting of winter conditions
- Dissemination of information and documentation for issuing NOTAM/SNOWTAM
- Initiation, coordination and execution of snow removal and anti-skid treatment on airside

6.2 Winter services will remain active as long as winter conditions prevail, which means:

- As long as there is ice, snow or sleet
- As long as anti-skid treatment or gritting needs to be carried out

6.3 When capacity is affected

When the weather forecast shows that there may be disruptions in capacity, a Tactical Traffic Forum (TTF) meeting is convened.

6.4 Tactical Traffic Forum (TTF)

The TTF's objective is to ensure that the airport and its stakeholders have the appropriate information, tools, preparedness, action plan and decision-making organisation in conjunction with snow fall or other anticipated situations and events that can affect the airport's capacity.

- The Swedavia APOC Supervisor or Ground Coordinator convenes the TTF.
- Participation is mandatory for all people given notice to attend to the TTF. A list of participants is compiled at each meeting.
- Each organisation/function is represented by one participant.
- Each participant shall be able to provide a report on the situation in their organisation.
- Each participant is responsible for distributing information in their organisation.

Venue: Preferably at APOC Supervisor office or TWR, specified when notice to convene the meeting is given.

Chairperson: APOC Supervisor or Ground Coordinator

Notice to convene a meeting: Provided well in advance via phone, text message (SMS) or e-mail.

Documentation: Minutes of the meeting are not kept, but a brief summary of the information from the meeting is published at www.swedavia.net/Arlanda

6.5 Tactical Weather Analysis

TVA is a meeting series with two meetings per week during the winter season. The purpose of TVA is to ensure that the airport and its stakeholders continuously create a common situational picture of the weather situation that may have an impact on the airport's capacity.

- Swedavia Ground Coordinator is convener of TVA.
- SMHI is the rapporteur.
- Each organization/function attends with one participant.
- Each participant must be able to give an account of their organization's situation.
- Each participant has the responsibility to spread information further within the respective organization.

Meeting place: Teams

Notice: Sent out before the winter season

Documentation: Protocol are written by the APOC Ground Coordinator and shared as agreed.

6.6 Distribution of information

Text message (SMS) via ARN OP INFO

In case of disruptions, a text message (SMS) is sent out by ARN OP INFO convening a meeting. Companies at the airport have assigned representatives who are included on the distribution list. These representatives are responsible for distributing the information in their own company.

There is also a special snow page at www.swedavia.net/Arlanda which gathers information about special conditions for the winter season. The current snow plan and summaries from the season's TTF meetings can be found here.

2024-11-07