

Weather extremes

Vulnerability and adaptation at Swedish airports

Henrik Littorin
Head of Public Affairs
Swedavia
henrik.littorin@swedavia.se
+46 734 33 19 98

Swedavia AB

- Swedavia was founded 1 april 2010.
- Swedavia owns, operates och develops 14 Swedish airports.
- Swedavia is a company with the Swedish State as the only owner.
- Swedavias head office is at Stockholm-Arlanda Airport.
- Swedavia has approximately 2 600 employees.
- Swedavias turnover is approximately 500 MEUR.

Swedavias airports



Airports operated by Swedavia:

- Kiruna Airport
- Luleå Airport
- Umeå Airport
- Åre Östersund Airport
- Stockholm-Arlanda Airport
- Stockholm-Bromma Airport
- Göteborg Landvetter Airport
- Visby Airport
- Ronneby Airport
- Malmö Airport

Airports operated by Swedavia but will be sold:

- Örnsköldsvik Airport
- Sundsvall Härnösand Airport
- Karlstad Airport
- Ängelholm Helsingborg Airport

Air traffic

- Swedavias airports will handle approximately 27 million passengers and 240 000 landings during 2010.
- Domestic passengers are approximately 40 % of total passengers.
- Swedavias airports will handle approximately 175 000 tonnes of freight and mail during 2010.

What has been done recently?

- *Vulnerability analysis report from the aviation sector*
 - Report conducted by LFV and The Swedish Civil Aviation Authority, 2007.
- *The Consequences of Climate Change and Extreme Weather Events*
 - Swedish Government Official Report, 2007.

Vulnerability

- Heavy snowfall
- Heavy rainfall/flooding
- Changed frost conditions
- Ice
- Storms/thunder
- Ash

1995 - 2010

Storms during winter season are the main extreme weather events that has (during short periods of time) affected Swedish air traffic.

Heavy snowfall

- Vulnerability
 - Visibility and friction
 - Passengers, staff and freight unable to get to the airport
- Adaptation
 - “Over-Dimensioned” snow clean-up organisation
 - Cat II
 - Cooperation with road and rail to secure accessibility

*Climate forecasts indicate less heavy snowfalls
in Scandinavia in the future*

Heavy rainfall/flooding

- Vulnerability

- 60 % of Swedish airport can be affected by flooding but only a few small airports severely affected by flooding or rising sea levels
- Old and under-dimensioned storm water systems
- Drainage
- Higher ground water levels

- Adaptation

- Re-build and renovate storm water systems to meet an increased frequency of heavy rain (already strained and in need of renovation)
- Load bearing capacity to be considered when renovating
- >20 MEUR the coming 50 years but mostly part of continuous renovation

*Climate forecasts indicate increased heavy rainfalls
in Scandinavia in the future*

Changed frost conditions

- Vulnerability
 - Reduced ground frost penetration
 - Superstructure on airside underdimensioned (dimensioned according to depth of ground frost and not traffic load)
- Adaptation
 - Thicker superstructure
 - At the moment this will be done within regular renovations
 - Approx. 30 MEUR the coming 50 years

Climate forecasts indicate a somewhat warmer climate in Scandinavia in the future

Ice

- Vulnerability
 - More days every year with temperatures in the range which calls for de-icing and skid prevention in Northern Sweden.

- Adaptation
 - More de-icing and skid prevention in northern Sweden
 - ...but less in southern Sweden
 - Total need of de-icing and skid prevention will probably decrease
 - Cost saving at around 5 MEUR/year 2050

Climate forecasts indicate a somewhat warmer climate in Scandinavia in the future

Storms/thunder

- Vulnerability
 - Crosswinds and thunder represent a threat to aviation
 - Many airports lack alternative airports within easy reach
 - Many airports lack reserve power systems to keep air traffic running normal in case of power failure
 - Totally dependent on computerised systems (airports, airlines, ANSPs)
- Adaptation
 - Reserve systems dimensioned according to airport size but too expensive to have “over-dimensioned” reserve systems at smaller airports
 - More advanced air navigation technology - safer to land in strong crosswinds but more vulnerable to power failure

Climate forecasts have no real indications regarding more storms and thunder in Scandinavia in the future

Ash

- Vulnerability
 - Affecting different parts of aircraft technology
 - Hard to measure actual ash concentration
 - Airspace coordination
 - Global guidelines
- Adaptation
 - Global guidelines
 - Different ash concentration zones
 - More sophisticated measure tools
 - Single European Sky