ICAO

ENVIRONMENT

Climate Adaptation Synthesis

Changing icing conditions

Factsheet

2018

Aviation and Changing Icing Conditions

Icing condition may change due to changing climate and temperatures, increasing the likelihood of both ground and airborne icing. Runway conditions may be affected. Requirements for de- and anti-icing will change.

Potential Effects

Ground icing:

Aircraft icing:

- De-icing requirements will change, increasing in some areas and decreasing in others. For example, increased temperatures in some regions may lead to a reduction in de-icing.
- Increased de-icing requirements and operational risks from freezing rain.
- Increased use of de-icing fluids increases their concentration in run-off, resulting in the possible breaching of certain environmental limits. This is because it increases concentrations of chemical pollutants in the water supply as it runs off the airfield, which can cause various water issues. In many places, discharges from airports (e.g., runoff, treated wastewater) are regulated; the airport must meet water quality standards regarding these discharges. Water quality is tested on a regular basis to ensure that standards are being met.

Runway and taxiway icing:

- Runway operations may be affected, causing the delay or cancellation of flights. For example, rain and freezing rain can decrease traction on runways and taxiways and also require the use of de-icing products prior to take-off.

Airborne icing:

- In-flight icing is a safety risk. When ice forms on an airframe, it alters the airflow around the wings, causing a loss of aerodynamic lift. Ice may also block the pitot tubes. This may be a particular risk for the northernmost parts of some transatlantic flight tracks.

Adaptation and Resilience Measures

Measures identified to mitigate changing icing conditions include ensuring that future development and contingency plans include climate change. However, a better understanding of this risk is required to be able to predict and plan for future scenarios. More specific measures include:

Ground icing: Consideration should be given to both protecting underground infrastructure from freeze-thaw damage and to strategies for the use of de-icing agents. For example, some remote northern airports use portable forced air heaters to reduce ice build-up on aircraft. Operators could also

consider adopting changes to both engine and wing de-icing procedures including increased use of glycol-based de-icing and anti-icing agents.

Airborne icing: Aircraft manufacturers may also need to assess airframes for performance in changing climatic conditions. For safety reasons, regulations for twin-engine aircraft operations over oceanic airspace should be reviewed.

Sources and Additional Information:
2018 ICAO CAEP WG2 Task O7.0 Climate Adaptation Synthesis Analysis