Confronting snowfall and pavement icing at airports in order to prevent long delays in scheduled flights has always been a challenge for airliners and the airport authorities. To address these concerns, electrically conductive asphalt and Portland cement concrete (ECON) is currently a focus area of pavement design, which applies a potential difference to a surface conductive concrete layer, heating up the pavement to melt the snow and ice.

This study develops a finite element (FE) model of ECON in ANSYS, validated through experimental data, for evaluating its thermal performance considering different climatic conditions. The sensitivity of the heat generation to material parameters of the ECON is investigated to determine the required accuracy for measuring each parameter and possible errors in the results. Initial results of the temperature increase on the top surface of FE model are consistent with the available experimental data which indicates that a FE model would be promising for performing feasibility studies and use in preliminary design and control strategy development of the conductive pavement systems.

### Project Overview

**Focus of This Poster**
- Numerical Modeling
- Economic Feasibility Analysis
- Environmental Analysis
- Life Cycle Assessment

**Integration of PV and Electrical Energy Storage Systems**

**Heated Pavement System Design and Analysis**

**Hydronic System**

**Electrically Conductive Concrete/Asphalt**

In addition to numerical modeling, economic and environmental aspects of deploying heated pavement systems will be studied.

### Future Steps of Numerical Modeling

- Modeling the melting process of ice/snow
- Calculation of energy consumption for ice/snow removal process
- Validation of model with more experimental data from DSM airport
- Study the technical performance of the system for different scenarios

### Reference

Tuan, C. Y. (2004). Concrete Technology Today: Conductive Concrete for Bridge Deck Deicing
