Aircraft Ground Deicing Fluid Endurance Times on Composite Surfaces

The objective of this study was to investigate the performance of non-aluminum test plate material on fluid endurance time. To satisfy this objective, the performance was compared to the endurance time measured using standard aluminum test plates, which is the current standard for developing holdover times (HOT) used during ground deicing precipitation conditions.

Comparative testing, during the winter of 2004-05, was conducted by APS to determine the correlation between fluid endurance measured on aluminum and non-aluminum surfaces. Testing was conducted during natural snow and simulated freezing precipitation conditions. Additional testing was conducted in natural frost conditions.

Data from the tests performed during the winter of 2004-05 comparing the fluid endurance time measured using composite material and aluminum material test plates were analyzed. The results indicated that during snow conditions and simulated freezing precipitation conditions, the endurance time measured using the composite test plate was slightly greater than the endurance time measured using the aluminum test plate. The results also indicated that during natural frost conditions, the measured endurance time using a white painted composite test plate was shorter than the endurance time measured using the white painted aluminum test plate; this raises a concern for the current holdover times.

It should be noted that these conclusions are preliminary given that the composite material used is Kevlar, one of multiple composite materials used in aircraft construction. The structure, material thickness, and finish need to be explored further in order to verify the validity of the test surface used to represent composite aircraft materials. It is recommended that testing be continued.