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15. Supplementary Notes (Funding programs, titles of related publications, etc.)

Several research reports for testing of de/anti-icing technologies were produced on behalf of Transport Canada for previous winters. These are available from the Transportation Development Centre (TDC). Thirteen reports (including this one) were produced as part of this winter's research program. Their subject matter is outlined in the preface. This project was co-sponsored by the U.S. Federal Aviation Administration.

16. Abstract

This report documents exploratory research activities conducted by APS Aviation Inc. during the winter of 2002-03. Five studies are included in this report:

Temperatures of applied Type IV fluids
During actual deicing operations, heat exchange may occur between the heated Type I fluid and the Type IV fluid standing inside the truck. A field survey was conducted at a number of airports in order to document the typical temperature of Type IV fluids sprayed from trucks during actual deicing operations. Sixty-two tests were carried out during this survey, wherein the anti–icing fluids were sprayed at an average temperature 14°C higher than the OAT. The truck type did not appear to affect the temperature differential, whereas the increased heating hours and lower OATs did appear to increase the temperature differential.

Lag time for application of Type IV fluid following Type I fluid
The objective of this exploratory test program was to determine the difference in endurance times of fluid applied without prior application of Type I fluid; fluid applied with a 0–minute lag time between application of Type I; and Type IV fluid and fluid applied with a 3–minute lag time between fluid applications. No significant differences in endurance times of the three application types were found.

Effectiveness of fluid coverage
The adherence of Type I fluids on test surfaces is crucial for protection from contamination. APS Aviation has been asked to investigate the effectiveness of Type I fluid coverage. Experimental work was conducted with different Type I fluids and test surface combinations. Tests were conducted on plates and also run on a Canadair RJ Wing. The limited test results showed that the coverage effectiveness depends significantly on the surface roughness. Adherence was less effective with propylene-based Type I fluids.

Taxiing effects on holdover time
Operational data were collected to examine the nature of aircraft exposure to wind and snow during the departure phase of operations when holdover times apply. The analysis distributed expenditure of holdover times among the various stages of a routine departure during deicing operations. For the departure runway studied, it was shown that the combination of taxi–way orientation, speed of taxiing, and direction and speed of wind did not cause non-symmetrical exposure to wind, and thus to snow-catch. A pilot survey produced suggestions for improving the effectiveness of HOT utilization.

Surface temperature profiles: day versus night
The objective of this study was to examine whether there is a differential in the temperature of an anti-iced surface versus air temperature during typical snow conditions and whether that differential is different during the day as opposed to night. Due to the limited number of tests, a conclusion cannot be made at this time.

17. Key Words	18. Distribution Statement
Deicing Fluids, Typical Temperature, Fluid Coverage, Adherence, Taxiing, Exposure to Wind, Snow-Catch, Day versus Night, Radiation Effect, Exploratory Aircraft Ground Icing Research.	Limited number of copies available from the Transportation Development Centre

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