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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 for previous winters on behalf of Transport Canada. These are available from the Transportation Development Centre (TDC). Nine 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 Federal Aviation Administration.

16. Abstract

The objective of this study was to determine the maximum amount of ice pellet contamination that will flow off an anti-iced aircraft at takeoff. To satisfy this objective, simulated takeoff runs were performed with the National Research Council (NRC) Falcon 20 research aircraft at the Ottawa Airport. Nine runs were performed with simulated precipitation rates ranging from 25 g/dm^2/h to 167 g/dm^2/h. Eight runs were conducted with Type IV anti-icing fluids and one run was completed with an ethylene glycol-based Type I deicing fluid.

The testing was completed by APS and personnel from the NRC. The NRC provided the Falcon 20 aircraft and flight crews and collected the Falcon 20 flight data. APS coordinated and provided support for the Falcon 20 tests. APS personnel recorded all non-flight related test data.

The test wings were treated with de/anti-icing fluids using a one-step operation. Simulated ice pellets were then applied over the test fluid until specified levels of contamination were achieved. Data such as fluid thickness, wing temperatures, and fluid freeze points were recorded. The aircraft was then operated through a simulated takeoff run. The behaviour of the fluid during the takeoff run was documented with high-speed digital still cameras and video cameras.

The contamination present on the wings was almost completely eliminated during the simulated takeoffs. In general, a small film of fluid remained on certain wing surfaces, most notably on the trailing edge of the aircraft. The leading edge was cleared of any contamination during the takeoff run, even at very high precipitation rates. Some contamination was observed on the trailing edge during one run at a very high precipitation rate (136 g/dm^2/h). The Type I EG run showed a small amount of ice had adhered to the wing surface at the end of the simulated takeoff.

Further testing is recommended as a result of the observations made during the tests. It is recommended takeoff tests be conducted in natural snow and mixed precipitation as a comparison for the ice pellet tests. It is also recommended tests be conducted in the wind tunnel if feasible.

17. Key Words	18. Distribution Statement
Anti-icing, deicing, deicing fluid, holdover times, precipitation, endurance times, Type I, Type II, Type III, Type IV, aircraft, ground, test, winter	Limited number of copies available from the Transportation Development Centre

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