ACRP Problem No. 12-10-09

Airport Winter Operations Guidebook

ACRP Staff Comments: The results of ACRP Synthesis 12: Preventing Vehicle--Aircraft Incidents During Winter Operations and Periods of Low Visibility and ACRP Synthesis 11: Impact of Airport Rubber Removal Techniques on Runways would serve as input to this research.

TRB Aviation Group Committees Comments: AIRCRAFT/ AIRPORT COMPATIBILITY CMTE - This proposal has merit, given the acuteness of the issue and the safety elements. Previous research in this area should be identified and cataloged, similar to the sustainability databases.

Review Panel Comments: Not recommended — FAA AC's and other materials already address this in a comprehensive manner.

AOC Disposition: Approved and funded at $400,000. A compendium of best practices would be valuable. Expectations are changing, and airports would benefit from guidance on how to work with airlines and other stakeholders on addressing this change. The research could also examine new equipment and consider winter operation anomalies. The research should consider ACRP Problem Statement 12-02-25, Climate Change Adaptation Planning: Risk Assessment Model Pilot. The project panel needs to include airline representation.
I. PROJECT TITLE: Airport Winter Operations Guidebook

II. RESEARCH PROBLEM STATEMENT-

Recent events at Heathrow during which extensive snow fall totally disrupted operations at one of the world’s leading international airports illustrates the importance of adequately preparing for winter operations. This guidebook will serve as a compendium of best practices for airport winter operations and provide a methodology to determine optimal levels of investment in staffing and equipment for efficient airport winter operations.

Scope

Factors to be included in the guidebook will include:

- meteorological conditions, a description of the types of weather encountered during the winter and the challenges posed by each to airport operations

- operational measures, a description of operational controls that can be utilized to minimize the adverse impacts of severe weather such as departure metering

- operational plans, a description of how operational plans are developed to maximize the effectiveness and the efficiency of airport snow fighting operations

- chemical treatment, a description of the available chemicals for snow and ice control including the cost, handling, method of application and environmental impact

- equipment, a description of available snow plowing, blowing, brushing and melting equipment including cost, speed, effectiveness, maintainability and service life

- personnel, a description of the recruiting, training and organization of winter operations teams and the establishment and staffing of “snow desks”

- friction monitoring, a description of available equipment and procedures to measure and report runway friction conditions during winter operations

- investment analysis, A description of a methodology to assist airport operators in assessing the optimal levels of investment in staffing and equipment given expected winter weather and the nature of the aviation activity at the airport

- future research, an exploration of needed research in the field of winter operations
III. OBJECTIVE -

To prepare a guidebook for the conduct of airport winter surface maintenance operations. This guidebook will research best practices in airport winter maintenance and will provide guidance to airport operators on determining the optimal level of investment justified for this activity given expected winter conditions and the nature of the aviation activity at the airport.

IV. RESEARCH PROPOSED

This project will be comprised of the following tasks:

a) Carry out a comprehensive literature search on the subject of airport winter operations for a range of airports to include information from equipment and chemical suppliers.

b) Obtain the winter operations plans from a representative range of airports dealing with severe winter weather and recognized for their competence in doing so as well as the inventories of their winter maintenance fleet and staffing practices.

c) Review and compare the winter operations plans. Prepare questions on any outstanding issues and follow up as necessary to permit a comprehensive comparative analysis of the respective winter operations plans and costs.

d) Carry out a detailed comparative analysis of the respective plans. Compare the performance of each airport in terms of performance metrics such as dollars per square meter of surface per centimeter of snow fall. Compare the performance of each plan in terms of total cost which includes the unit cost above plus the industry (air carrier) delay costs. From this analysis determine airport industry best practices with due consideration for safety implications.

e) Prepare a compendium of industry best practices from the review including observations on the impacts of meteorology, operations planning, equipment, staffing and environmental controls.

f) Prepare a methodology (assisted as appropriate by computer spreadsheets) to assist airport officials in determining optimal levels of investment in winter surface maintenance operations (i.e. the balance point where the added cost of speeding winter operations is balanced by the cost saving realized by the airport user community at an acceptable level of safety).

g) Prepare a comprehensive report on the research findings including recommendations for future research.
V. ESTIMATE OF THE PROBLEM FUNDING AND RESEARCH PERIOD -

It is estimated that:

**Recommended Funding:** the cost of this project will be $500,000

**Research Period:** and the project will require 18 months to complete.

VI. URGENCY AND PAYOFF POTENTIAL -

Winter surface maintenance represents a significant cost to those airports in northern climes. At the same time failure to perform winter maintenance well represents a significant cost to airport users. For example at Toronto-Pearson the cost of delaying flight operations to permit snow clearing has been estimated at over $300,000 per hour a factor which led to a decision to increase the investment in snow fighting so as to reduce the time required to clear a runway from over 35 minutes to 11 minutes. The question faced by airport operators is how do you make such a determination and sell it to the user community who must pay. Having the proposed guidebook would provide a useful tool in carrying out this analysis and ensuring that optimal investments were being made. The guidebook would also provide a useful benchmarking tool of best practices in this important airport maintenance area.

VII. RELATED RESEARCH -

The FAA has conducted research and documented findings regarding winter operations including the following circulars:

- 150 – 5200 – 300 Airport Winter Safety & Operations
- 150 – 5220 – 20 Winter Equipment

VIII. PERSON(S) DEVELOPING THE PROBLEM

Lloyd A. McCoomb, Ph.D., P.Eng.
President and Chief Executive Officer
Greater Toronto Airports Authority
P.O. Box 6031, 3111 Convair Drive
Toronto AMF, Ontario, Canada, L5P 1B2
Tel: (416) 776 3010   Fax (416) 776 3339
IX. PROCESS USED TO DEVELOP PROBLEM STATEMENT

This problem statement arise from my long personal experience managing airports augmented by the comments provided on the draft by key staff at Toronto-Pearson International Airport in the Operations and Facilities Branches.

X. DATE AND SUBMITTED BY

Submitted by:

Lloyd A. McCoomb, Ph.D., P.Eng.
President and Chief Executive Officer
Greater Toronto Airports Authority

14 February, 2012