

FAA Aircraft Icing Program Update



Federal Aviation
Administration

Presented to: SAE Aircraft Icing Conference

By: Mr. Jerry Ostronic, FAA Inspector

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A Little About Who I Am

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More About Me!

Team lead for The Takeoff and Landing Certification and Operational Performance Rulemaking Project

- Shared Position with Mr. Don Stimson
- Contaminated Runway Performance
- OpSpec C082, SAFO 06012

Team Lead, FAA Airbus A380 Certification and Operational Implementation Team

- Pilot Certified Airbus A380 in June
- Conducted 45 meter runway and narrow taxiway evaluations

FAA Focal Point for Aircraft Ground Deicing

- Shared Positions with Mr. Cliff Fiscus
- Also In-flight Icing from an Operational Aspect for Transport Category Airplanes
- Topic of my presentation

FAA Aircraft Ground Deicing Team

Who we are, and What we do!

Representatives from Flight Standards Operations and Maintenance Divisions

- Develop Aircraft Ground Deicing Regulations and Policies
 - Author Annual Winter Update FSAT (Now a Notice)
 - Other guidance material, Notices and Advisory Circulars (AC)
- Interface with industry groups and researchers
- Determine requirements and sponsor FAA aircraft ground deicing research

Representatives from FAA Research and Development FAA Technical Center Atlantic City NJ

- Advisors to Flight Standards
- Design and conduct research, analyze research data, report on research
 - Mostly done in cooperation with Transport Canada

Problem Areas in Recent History

ICE PELLETS



Prior to Winter 2006

No Anti-icing Fluid Holdover/Allowance Times

- **Stated on Anti-icing Fluid Holdover Charts Published by FAA and TC: no holdover times exist for ice pellets, heavy snow, hail, and moderate and heavy freezing rain.**
 - (JAR-OPS 1.345) *“Under certain meteorological conditions de-icing and/or anti-icing procedures may be ineffective in providing sufficient protection for continued operations. Examples of these conditions are freezing rain, ice pellets and hail, heavy snow, ... No Holdover Time Guidelines exist for these conditions.”*

How did aircraft operate in Ice Pellets Prior to 2005

FAA had no national policy for operations in ice pellets.

- The official assumption was that aircraft were not operating in ice pellet conditions.
- Un-officially we knew some air carriers were operating (with their FAA oversight office's approval) after conducting a pre-takeoff contamination check of the wings (that had been treated with Type IV anti-icing fluid) before takeoff

Winter 2005 FAA National Policy Prohibiting Operations in Ice Pellet Conditions (FAA Notice 8000.309)

Why?

- Human factors research conducted for Ground Ice Detection Systems (GIDS) showed that the human eye was very poor at seeing ice adhering to the wing surface treated with anti-icing fluid, and the human hand (tactile check) was only slightly better.
 - This research invalidated the practice of conducting a pre-takeoff contamination check in ice pellet conditions.
- With the increase in hard wing air carrier aircraft (no wing leading edge devices, which makes them far more critical to the effects of ice on the wing surfaces) we needed to establish a prohibitive policy

Testing Lead to 25 Minute Allowance Time in Light Ice Pellet Conditions Alone for 2006-2007 Winter (FAA Notice 8000.327)

Why Allowance Time and Not Holdover Time?

- Holdover time limit is the time under a given conditions that the anti-icing fluid will begin to show signs of failure. A sign of failure is when the precipitation is not absorbed into the anti-icing fluid but remain in its original state. Ice pellets are not absorbed into the anti-icing fluid like other forms of precipitation but remain as ice pellets imbedded in the fluid. Therefore under the term holdover time the fluid would have failed from the time the first ice pellet hit the fluid and the holdover time would have been zero.
- Additionally with a holdover time a pre-takeoff contamination check could be conducted after the expiration of the holdover time and if the fluid has not failed a takeoff could still be conducted. This is not the case with ice pellets.

Why not a pre-takeoff contamination check?

Ice Pellets Are Different!

Two Concerns

- **Are they adhering to the aircraft surface?**
 - No way to make this determination with a visual check
 - Could probably make this assessment with a tactile check, but
- **Will the now thickened fluid with the imbedded ice pellets still shear off the wing prior to liftoff?**
 - There is no way to make this determination (visually or tactilely)

Problems with 25 Minute Allowance Time

- **Light Ice Pellets alone, not mixed with other forms of precipitation, only occur about 30% of the time that ice pellets are present**
- **Provided no relief for moderate ice pellets**
- **Insufficient time for long duration ice pellet events at major airports**



Some Of The Most Extensive Anti-icing Fluid Testing Ever Conducted Winter 2006-2007

Wind Tunnel

- High speed photo analysis of fluid shear qualities
- Lift loss measurements

Live Aircraft Testing

- Supportive photo analysis of wind tunnel testing

Deicing Fluid Flat Plate Testing

- Supportive shear quality testing of wind tunnel testing
- Determining the effects of ageing anti-icing fluid with imbedded ice pellets

So Where Did All This Testing Get Us for Winter 2007-2008?



Ice Pellet Allowance Times 2007-2008

Currently Posted on AFS-200
Web Site

http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs200/

Signed Notice Last Thursday

	OAT -5⁰ C or Warmer	OAT Colder Than -5⁰ C
Light Ice Pellets	50 Minutes	30 Minutes
Moderate Ice Pellets	25 Minutes	10 Minutes
Light Ice Pellets Mixed with Light or Moderate Snow	25 Minutes	Operations Not Authorized
Light Ice Pellets Mixed with Light or Moderate Freezing Drizzle, or Light Freezing Rain (Operations Not Authorized below -10C OAT)	25 Minutes	10 Minutes (Operations Not Authorized below -10C OAT)
Light Ice Pellets Mixed with Light Rain (Operations Not Authorized below 0C OAT)	25 Minutes (Operations Not Authorized below 0C OAT)	Not Applicable (Operations Not Authorized below 0C OAT)

Ageing Of Fluid With Imbedded Ice Pellets

If the ice pellet condition stops, and the allowance time has not been exceeded, and the outside air temperature (OAT) has remained constant or increased from the temperature on which the allowance time was based, the operator is permitted to consider the Type IV anti-icing fluid effective without any further action up to 90 minutes after the start of the application time of the Type IV anti-icing fluid.

Some Examples:

If Type IV anti-icing fluid is applied with a start of application time of 10:00, OAT is 0°C, light ice pellets fall until 10:20 and stop and do not restart. The allowance time stops at 10:50; however, provided that the OAT remains constant or increases and that no precipitation restarts after the allowance time of 10:50, the aircraft may takeoff without any further action up to 11:30.

One Last Example:

On the other hand, if Type IV anti-icing fluid is applied with a start of application time of 10:00, OAT is 0°C, light ice pellets mixed with freezing drizzle falls until 10:10 and stops and restarts at 10:30 with the allowance time stopping at 10:25, the aircraft may not takeoff, no matter how short the time or type of precipitation after 10:25, without being deiced, and anti-iced if precipitation is present.

Pilot Assessment of Precipitation Intensities

Ambiguity in the regulations, some air carriers had authorizations for flightcrews to operate using their own determination of precipitation type and intensity when different from the officially reported weather and others did not.

- Guidelines in the upcoming Notice will level the playing field, require air carriers to have established procedures, increase standardization, establish limitations for its use, and require accountability procedures

Implementation of the Use of Liquid Water Equivalent for Precipitation Intensity

More accurate holdover times

- Anti-icing fluid failure time under a given temperature is a direct correlation to the amount of water the precipitation contains

Test data being validated now

- Targeting mid-season implementation for snow intensity levels at four test sites, DEN, MSP, PIT, and ORD

First step in a whole new way and level of accuracy in determining holdover times

- Will be expanded to all forms of precipitation
- Hopefully will be able to use data from current ASOS collection devices located at many airports
- Will lead to the implementation of a “check time” like system for holdover times

FAA/Industry Aircraft Ground Deicing Workgroup

- **Formed in Spring of 2007**
- **First meeting was held on April 17,2007**
- **Goal, to open up clear communications and provide for coordination between industry and the FAA on Aircraft Ground Deicing related issues**
- **Industry Co-chair Mr. Paul Railsback of ATA**
- **FAA Co-chair, yours truly**
- **Planned meetings twice per year spring and fall, and will spin off smaller subgroups to address particular issues**

Rewrite AC 120-60B

- **Very high priority for FAA Flight Standards**
 - Become sole guidance document for Aircraft Ground De/anti-icing programs
 - Receiving and storage of fluids quality control
 - Application equipment standards and requirements
 - Standardized application procedures for aircraft make and model
 - Standardized communication ground and flightcrew
 - Ground and flightcrew training program requirements
 - Record keeping requirements
 - Quality Control and Safety Management System requirement
 - Provide for method of authorizing contract (3 rd. party) aircraft ground deicing provider to provide deicing service
 - Provide for use of Holdover/Allowance Times by small air carrier operators

The Takeoff and Landing Certification and Operational Performance Rulemaking Project (Contaminated Runway Performance)

- **Aviation Rulemaking Committee (ARC)**
 - Order should be signed soon and published in Federal Register
- **Three Prong Approach**
 - Aircraft Certification
 - Require contaminated runway takeoff and landing performance data in the approved section of flight manual
 - Air Carrier Operations
 - Require assessment of landing distance at time of arrival, and before departure considering actual runway surface and metrological conditions
 - Airports
 - Require accurate, timely, standardized reporting of runway surface conditions
 - Establish minimum runway surface condition standards for flight operations
 - Research into better ways of providing flightcrews more accurate anticipated aircraft braking capability

Questions



Thank You

YOU Have Been a Great Audience!

