



Aircraft Performance on Winter-Contaminated Runways

- AN OPERATOR'S POINT OF VIEW

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Introduction

- ***Finnish Commuter Airlines***

- ATR 42-500
- ATR 72-212A
- ERJ 145 LU
- ERJ 170



- Approx. 50 % of domestic air traffic, over 100 flights per day
- Approx. 20 % of Helsinki-Vantaa airport takeoffs and landings





Agenda



- Operational performance assessment
 - Real-time, actual contaminant information
 - Operationally most significant contaminant
 - μ_{rep} calculations
- Directional control on a slippery runway
- Conclusions: An operator's wish list





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Use of actual contaminant information

- Only with accurate actual, “real-time”, information flight crew can assess performance and promote safe operations
- Communicate actual runway conditions to the flight crew in terms directly relating to aircraft performance calculations
 - Eg. Finncomm ERJ145 operations to Kemi-Tornio KEM/EFKE:
 - Co-operation and communication between airport maintenance personnel and flight crew
- Rapidly changing conditions





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Operationally most significant contaminant

- Extensive contaminant information to pilots
 - “Which contaminant should I use for performance assessment?”
- Finavia Airport Operations Project:
 - Implementation of new reporting system
 - Generates the operationally most significant contaminant
 - Provides instant runway condition reports to flight crew
 - Data archive for post-analyses





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μ_{rep} calculations

- Insufficient performance data in AFM
- Correlation between reported friction and effective friction

JAA, EASA	ICAO
Dry	Dry
Damp (eq. Dry)	Moist, Damp
Wet	Wet or Water patches
Compacted snow	Compacted or Rolled snow
Ice (wet)	Ice
Standing water	Standing water
Slush	Slush
Loose snow	Dry snow
	Wet snow
EASA CS 25	Rime or Frost
Wet snow	Frozen ruts or ridges
Specially prepared winter runway	Measured or estimated surface friction

- The safety aspect
 - EASA vs. ICAO contaminants
- The economic aspect
 - Payload maximization
 - Intersection takeoffs
 - Crosswind limitations





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Directional control

- Crosswind limits on a contaminated runway
 - JAR / CS 25 requires only demonstrated crosswind on dry runway
 - Aircraft crosswind capabilities on contaminated runways to be considered in certification specifications





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Conclusions: An operator's wish list

- Ensure safety and enable operations
 - Appropriate performance data available in AFM
 - Crosswind guidance values provided by manufacturer
 - Contaminant information
 - Instant reporting system
 - Operationally most significant contaminant for operational performance assessment
 - Elimination of subjective estimates and deceiving terms
- R&D on correlation between reported and effective friction
 - Standardization of friction measurement equipment



Thank you!

