

# EASA WORKSHOP 2010

---

## Operational surface friction assessment : DGAC study (2008-2009)

---

Patrick LERAT / Benjamin SMAGGHE  
French Civil Aviation Technical Center  
DGAC / STAC / IA

Resources, territoires et habitats  
Énergie et climat  
Développement durable  
Prévention des risques  
Infrastructures, transports et mer

Présent  
pour  
l'avenir



Direction générale de l'Aviation civile, Service technique de l'aviation civile

Ministère de l'Écologie, de l'Énergie, du Développement durable et de l'Aménagement du territoire

# Contents

---

- Issues
- Goals of the study
- Current ICAO regulations
- French and international practices
- Information to be provided
- Examples of devices
- Conclusions

# Issues

Take off, landing and taxi = 2% of an average flight duration

BUT ACCIDENTS OCCUR

**20%** at take off or taxi and

**25% at landing**

**Surface friction characteristics are often involved**



3



# Issues



## Dops! Slipped off the runway

Passers-by taking a closer look at an aircraft after it skidded off the wet runway of Simon Bolivar Airport and into the Caribbean Sea, in Santa Marta, Colombia, on Tuesday, causing minor injuries to seven people, aviation officials said. The Brazilian-made Embraer 190 plane operated by Aero Republica was carrying 54 passengers and five crewmembers from Cali to Santa Marta on Colombia's north coast. — AP

# Issues

---

- *There are only recommendations from ICAO that provide information to pilots in case of contaminated runway*
- *Each country has to set its own rules*
- *Runway surface friction devices are generally not correlated*
- *How does contaminated runway impact aircraft performance?*

# Goals of the DGAC study

---

Conclusion that there is insufficient data available to transpose ICAO SARPS to national rules

## Goals of the study :

- ① To establish a report on practices for French and international airports
- ② To assess transmitted information
- ③ To emphasize the problem of providing the best information to pilots facing a contaminated runway

# Current ICAO regulations

---

## **EXAMPLES :**

*ICAO annex 14*

**2.9.9 Recommendation.—** *Whenever a runway is affected by snow, slush or ice, and it has not been possible to clear the precipitant fully, the condition of the runway should be assessed, and the friction coefficient measured.*

# Current ICAO regulations

---

## ICAO annex 14

**2.9.10 Recommendation.—** *The readings of the friction measuring device on snow-, slush-, or ice-covered surfaces should adequately correlate with the readings of one other such device.*

*Note.— The principal aim is to measure surface friction in a manner that is relevant to the friction experienced by an aircraft tire, thereby providing correlation between the friction measuring device and aircraft braking performance.*



# Current ICAO regulations

---

## ICAO annex 14

**2.9.11 Recommendation.—** *Whenever dry snow, wet snow or slush is present on a runway, an assessment of the mean depth over each third of the runway should be made to an accuracy of approximately 2 cm for dry snow, 1 cm for wet snow and 0.3 cm for slush.*

*Annexes 6 and 15 also provide recommendations and definitions*

# Practices

---

Meetings and contacts established during the study:

- Manufacturers
  - Airlines
  - Technical services (ADP...)
  - Airport operators
  - ATC
- ❖ French and International Airport operators and ATC were consulted through 2 different surveys

# Practices

---

ATC SURVEY deals with :

- Available information
- Type of contamination leading to assessment of the surface friction characteristics
- Ways of informing pilots
- Pilots' specific requests in case of contaminated runway by water or snow
- Available data to fill in SNOWTAM

# Practices

## SNOWTAM Extract :

(DEPOSITS OVER TOTAL RUNWAY LENGTH (Observed on each third of the runway, starting from threshold having the lower runway designation number)		F)
NIL — CLEAR AND DRY 1 — DAMP 2 — WET or water patches 3 — RIME OR FROST COVERED (depth normally less than 1 mm) 4 — DRY SNOW 5 — WET SNOW 6 — SLUSH 7 — ICE 8 — COMPACTED OR ROLLED SNOW 9 — FROZEN RUTS OR RIDGES)		
(MEAN DEPTH (mm) FOR EACH THIRD OF TOTAL RUNWAY LENGTH)		G)
(FRICTION MEASUREMENTS ON EACH THIRD OF RUNWAY AND FRICTION MEASURING DEVICE MEASURED OR CALCULATED COEFFICIENT or ESTIMATED SURFACE FRICTION 0.40 and above GOOD — 5 0.39 to 0.36 MEDIUM/GOOD — 4 0.35 to 0.30 MEDIUM — 3 0.29 to 0.26 MEDIUM/POOR — 2 0.25 and below POOR — 1 9 — unreliable UNRELIABLE — 9 (When quoting a measured coefficient, use the observed two figures, followed by the abbreviation of the friction measuring device used. When quoting an estimate, use single digit))		H)

# Practices

---

AIRPORT OPERATOR SURVEY deals with :

- Measurements of contaminant depth
- Characteristics of contamination
- Devices used to measure and assess surface friction characteristics
- Who takes the decision to assess runway friction characteristics?



# Practices

---

December 2008 → Distribution of surveys  
July 2009 → Participation statistics

France (61 airports have been surveyed) :

- ATC : 72 %
- AIRPORT OPERATOR : 47,5 %

International (246 airports have been surveyed) :

- ATC : 8,9 %
- AIRPORT OPERATOR : 14,9 %

# Practices : France

---

## MAIN CONCLUSIONS AFTER FRENCH ATC SURVEY (1/3)

- Airport operators mainly inform ATC if runways are likely to be contaminated
- Friction coefficient surface is measured in case of a runway being contaminated by snow or ice
- In case of contaminated runways, 3 main methods are used to inform pilots :
  - NOTAM/SNOWTAM
  - ATC
  - ATIS

# Practices : France

## MAIN CONCLUSIONS AFTER FRENCH ATC SURVEY (2/3)

### WATER on runways :

43 % of ATC have taken note that pilots have specific requests :

- depth of water : 88 %
- estimated surface friction : 44 %
- % of contaminated runway surface : 31 %
- measured surface friction coefficient : 6 %

### SNOW on runways :

80 % of ATC have taken note that pilots have specific requests but that all parameters are equally significant

16

# *Practices : France*

---

## **MAIN CONCLUSIONS AFTER FRENCH ATC SURVEY (3/3)**

Generally, ATC have the main data available in order to fill in SNOWTAM :

- Type of contaminant observed on every third of runway
- Average depth of contaminant
- Measured surface friction and/or estimated surface friction
- Used device

# Practices : France

## **MAIN CONCLUSIONS AFTER FRENCH AIRPORT OPERATORS SURVEY (1/2)**

- 34 % own a manual device to measure contaminant depth
  - ↳ time to perform is greater than 10 minutes in 80 % of cases
- 66 % assess a type of contaminant
- 55 % own a device to assess runway surface friction
  - ↳ 81 % own a decelerometer
  - ↳ time to perform is greater than 20 minutes in 24 % of cases



# Practices : France

---

## **MAIN CONCLUSIONS AFTER FRENCH AIRPORT OPERATORS SURVEY (2/2)**

Who takes the decision to assess runway surface conditions?

- 86 % ATC
- 67 % Airport operator
- 11 % Others (airport without ATC)

*After deicing operations, 68 % of airport operators assess surface friction characteristics*

# Practices : International

---

## Statistics :

- 22 ATC surveys answered
- 37 Airport Operators' surveys answered
- Airport operator always informs ATC if runway is likely contaminated
- 54 % of airport operators own a device to measure contaminant depth
  - ↳ time to perform is less than 10 minutes in 58 % of cases
- 92 % of airport operators own a device to assess runway surface friction
- Airport operator takes a decision to assess runway surface conditions for every situation.

# *Practices : global comments*

---

- Statistics have been classified according to climate and importance of airports
- In France, some ATC have asked Airport Operators to buy a device to assess runway surface friction
- Some Airport Operators emphasize that there is a lack of explanation in device documentation
- Devices are not always used adequately  
(in accordance with ICAO recommendations)

# *Information to be provided*

---

## AIRLINES, MANUFACTURERS :

- Type and depth of contaminants are required in order to decide aircraft performance
- Measured coefficient or estimated surface friction are required when contaminants are compacted snow or ice
- Depth of contamination is not always provided
- Information is not always updated

# Examples of devices

➔ continuous friction assessment devices



SARSYS



IMAG



# *Examples of devices*

---



# Examples of devices

➔ discontinuous friction assessment devices



Tapleymeter (mechanical)



Electronic decelerometer (type MK3)

# Conclusions

- High traffic airports own a device to assess runway surface friction
- Some small airports do not provide any information
- Devices are used to assess all types of contamination, which could provide wrong assessments
  - ↳ a guidance is in progress for French airports
- Different practises are used worldwide (e. g. measured coefficient or estimated surface friction,...)
- A good knowledge of airport infrastructures could be useful in bad weather conditions

# Conclusions

---

- Studies to come
  - ✚ French partnership with manufacturer to correlate Braking Action and devices (Airbus, DGAC)
  - ✚ French partnership with ADP to measure contamination depth on runway
- Friction Task Force in progress (ICAO) is working on
  - ✚ amendments Annexes 6,14, 15
  - ✚ circular on friction issues,.....
- Improvement to update aeronautical information ( ATIS, SNOWTAM,...)

# Civil aviation technical center



**Thank you for your attention !**

**[www.stac.aviation-civile.gouv.fr](http://www.stac.aviation-civile.gouv.fr)**

28