

ICAO Friction Task Force (FTF)

EASA Workshop Runway Friction and Aircraft Braking - The way forward -

Paris 11 March 2010

Presented by Armann Norheim, Rapporteur FTF

1836

There is no subject in science, perhaps, on which there is a greater diversity of opinion than in the laws which govern friction; and the previous experiments, though sufficient, in many cases, for practical purposes, yet by no means tend to bring the inquiry into any more settled state.

Nicholas Wood, Treatise upon railroads, 1836

REGULATORS

- Lack of a regulatory requirement to provide flight crews a consistent format of takeoff and landing data for all runway conditions
- Inadequate regulation for the provision of correct, up-to-date and timely runway condition reports

REGULATORS

No International Standard for Measuring and Reporting Runway Conditions

Flight Safety Foundation, May 2009

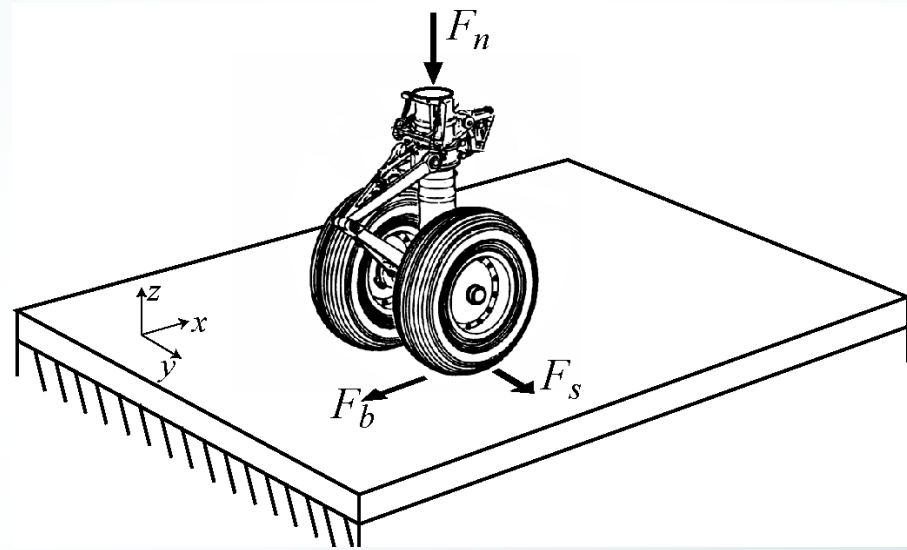
TWO ASPECTS

1. OPERATIONAL

2. MAINTENANCE

FRICTION

1. OPERATIONAL



2. MAINTENANCE

FRICTION

1. OPERATIONAL

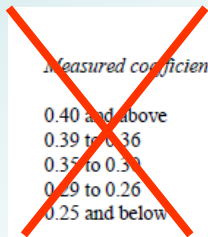
Where the rubber
hits the ground



2. MAINTENANCE

ICAO FRICTION TABLES

1. OPERATIONAL



<i>Measured coefficient</i>	<i>Estimated braking action</i>	<i>Code</i>
0.40 and above	Good	5
0.39 to 0.36	Medium to good	4
0.35 to 0.32	Medium	3
0.29 to 0.26	Medium to poor	2
0.25 and below	Poor	1

Compacted snow and Ice

Uncertainty friction
measurements

ICAO FRICTION TABLES

1. OPERATIONAL

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Revised
SNOWTAM
Assessment
Training



ICAO FRICTION TABLES

Maintenance program

Maintenance planning level

Minimum friction level

2. MAINTENANCE

Table A-1. Friction levels for new and existing runway surfaces

Test equipment	Test tire		Test speed (km/h)	Test water depth (mm)	Design objective for new surface	Maintenance planning level	Minimum friction level
	Type	Pressure (kPa)					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Mo-meter Trailer	A	70	65	1.0	0.72	0.52	0.42
	A	70	95	1.0	0.66	0.38	0.26
Skidometer Trailer	B	210	65	1.0	0.82	0.60	0.50
	B	210	95	1.0	0.74	0.47	0.34
Surface Friction Tester Vehicle	B	210	65	1.0	0.82	0.60	0.50
	B	210	95	1.0	0.74	0.47	0.34
Runway Friction Tester Vehicle	B	210	65	1.0	0.82	0.60	0.50
	B	210	95	1.0	0.74	0.54	0.41
TATRA Friction Tester Vehicle	B	210	65	1.0	0.76	0.57	0.48
	B	210	95	1.0	0.67	0.52	0.42
GripTester Trailer	C	140	65	1.0	0.74	0.53	0.43
	C	140	95	1.0	0.64	0.36	0.24

ICAO FRICTION TABLES

Minimum friction level

No longer allowed to fall below



”Slippery when wet”

2. MAINTENANCE

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ICAO FRICTION TABLES

Focus on drainage characteristics



2. MAINTENANCE

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ICAO FRICTION TABLES

Uncertainty friction measurements

EASA RuFAB project



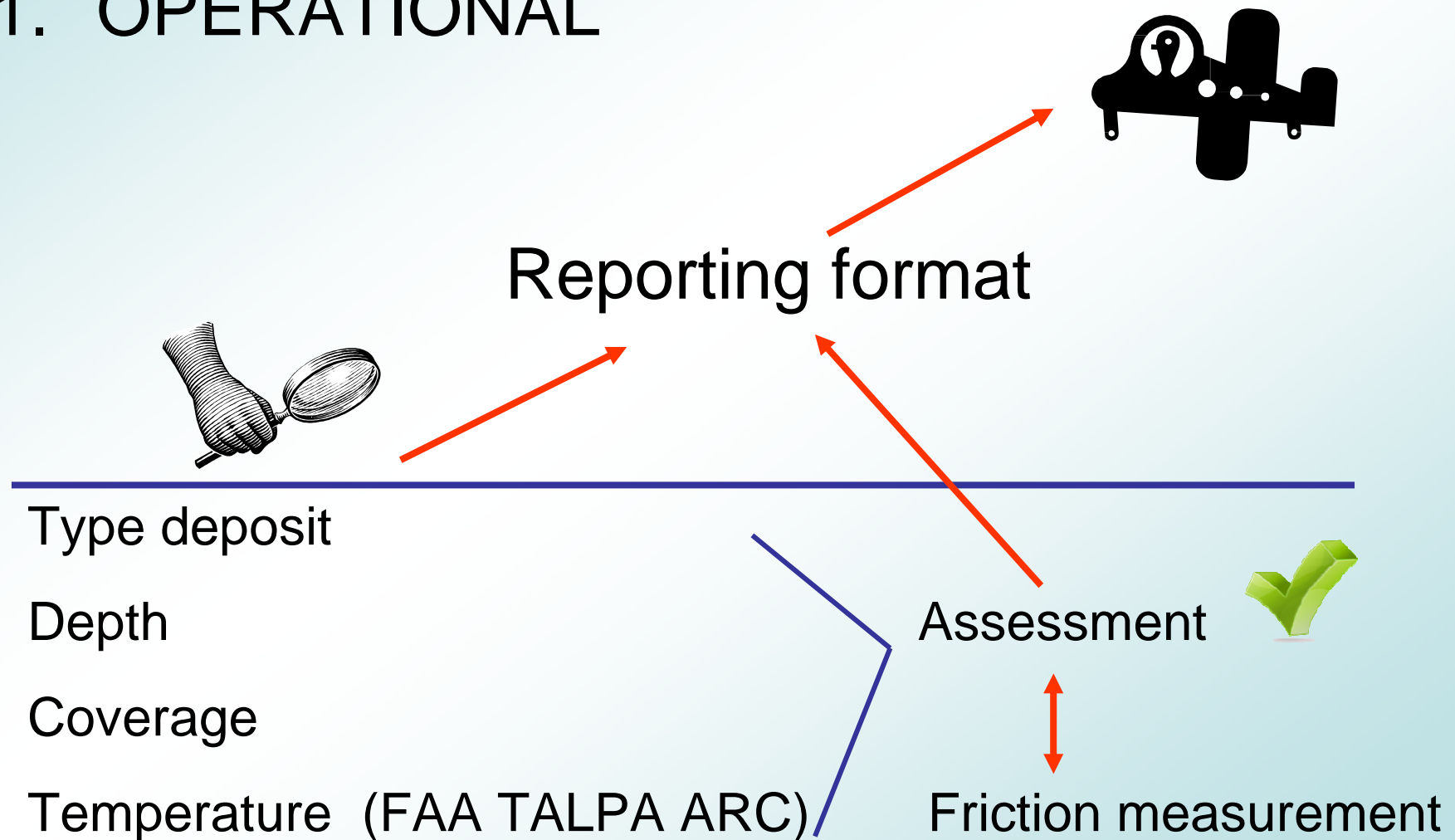
2. MAINTENANCE

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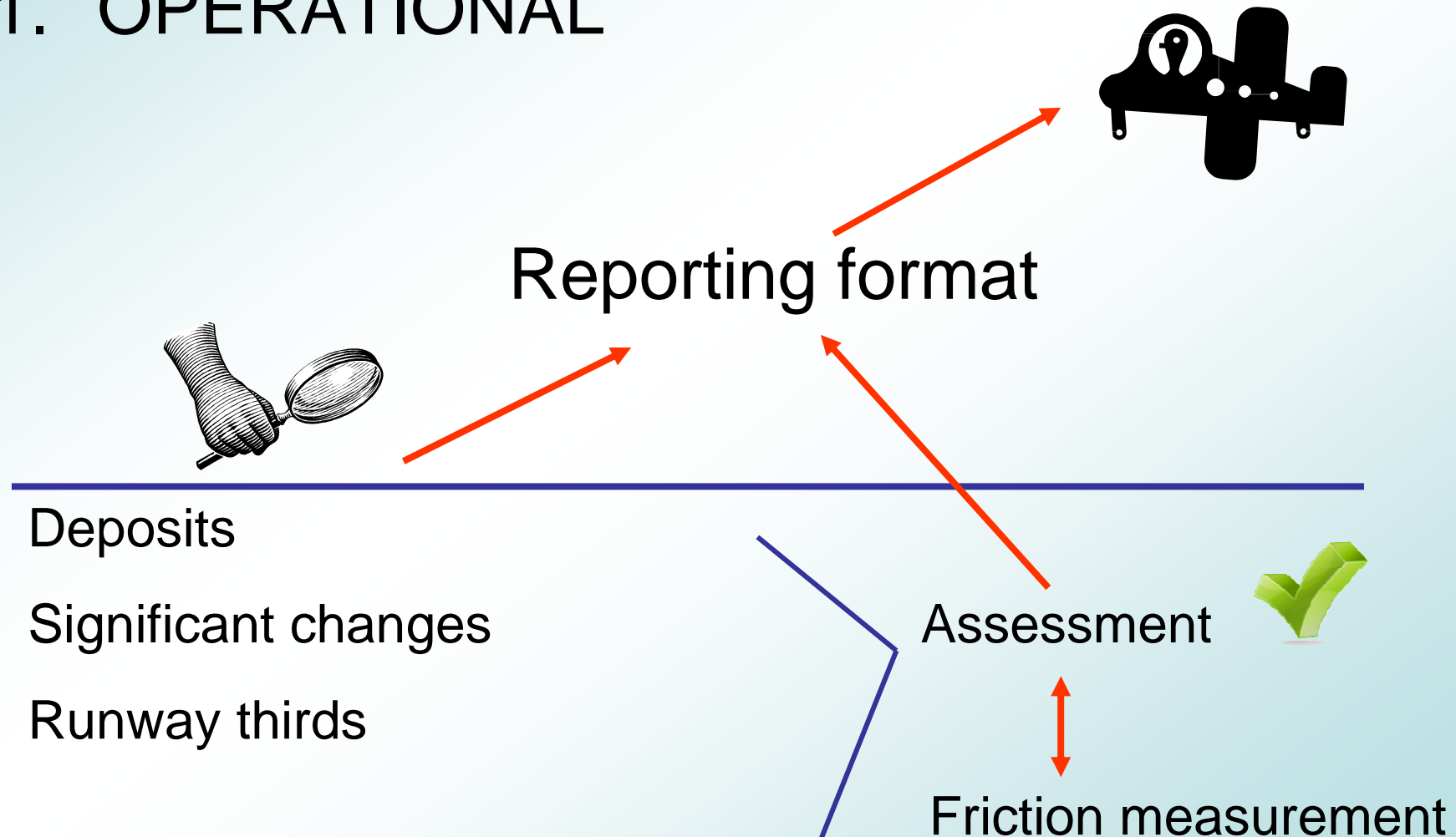
REPORTING

1. OPERATIONAL



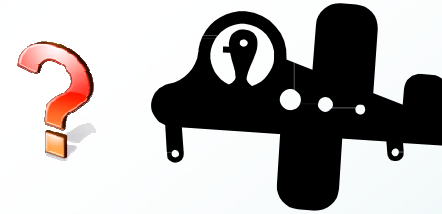
REPORTING

1. OPERATIONAL



ANNEX 6 – NEW DEFINITIONS

1. OPERATIONAL

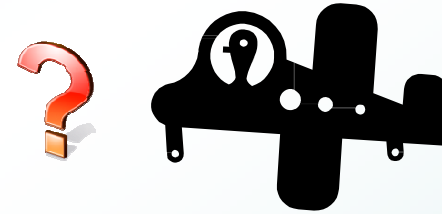


Reporting format

Global format – future activity

ANNEX 6 – NEW DEFINITIONS

1. OPERATIONAL



Reporting format

List of contaminants / deposits

Significant changes of the deposits

DEPOSITS

1. OPERATIONAL

Water on a runway



Snow, slush or ice on a runway



Mud, dust, sand, oil, etc



2. MAINTENANCE

Removed as rapidly and completely as possible to minimize accumulation

SUMMARY

1. OPERATIONAL



NEW

GLOBAL REPORTING FORMAT



Ground staff – AIS/ATM – Flight crew
Aircraft manufacturer – AFM – Aircraft operator

**HUMAN FACTOR
TRAINING**

Delivery 1-SARPs: ANNEX 14

Chapter 2 – Aerodrome data

- Training – Human factors
 - Revised Doc 9137, part 8
- Revised *Water on a runway*
- Revised *Snow slush and ice on a runway*
- Revised/included other contaminants
- Minimum friction level – not below

Delivery 1-SARPs: ANNEX 14

- Chapter 3 Physical characteristics
 - Drainage characteristics
 - Surface on stopway
- Chapter 10 – Aerodrome maintenance
 - Monitor trend and not below a minimum friction level

Delivery 1-SARPs: ANNEX 15

- Revised SNOWTAM
 - Focus on assessment
 - Removal friction table

As a consequence:

- Revised phraseology (ATM)
- Revised publication in AIP

Delivery 2: CIRCULAR

Currently being reviewed by the AOSWG.

Reflects state-of-the-art of current runway surface condition assessment, measurement and reporting and support the recommendations from FTF.

Delivery 3: ACTION PLAN

This EASA workshop might add topics to this action plan

ACTION PLAN

- Global reporting format
 - Ground staff reporting – Annex 14 and 15
 - AIS/ATM disseminating – Annex 11
 - Pilots use information – Annex 6 and 8

Overarching Annex's issues

ACTION PLAN

- Harmonizing definitions used in the reporting format
 - For reporting purposes
 - For aeroplane performance purposes
- List,define and harmonize runway contamination deposits – (Taxonomy)
- Link assessment and use of information

ACTION PLAN

- Cross Annex training
 - Ground staff – Annex 14
 - AIS/ATM – Annex 11
 - Pilots – Annex 6 and 8

ACTION PLAN

- Tools needed for aiding reporting
 - Gathering information – Annex 14
 - Dissemination of information – Annex 15, 11

Depends on outcome from the structure and content of the reporting format

ACTION PLAN

- Topics
 - **Surfaces – Wet skid resistant**
 - Construction
 - Maintenance
 - Approval
 - Documentation in AFM
 - **Rainfall rate – drainage capability**
 - Reporting
 - Publication

ACTION PLAN

- Topics
 - **Role of friction measuring devices**
 - Controlling uncertainty
 - Performance based approach?
 - Risk based approach?

FTF MEMBERS

1	Mr.	Armann	Norheim	Norway
2	Mr.	Angelo	Boccanfuso	Canada
3	Mr.	Kouichi	Kotani	Japan
4	Mr.	Jean-Claude	Deffieux	France
5	Mr.	Francois	Watrin	France
6	Mr.	Philippe	Aliotti	France
7	Mr.	Rick	Marinelli	USA
8	Mr.	Etienne	Pavard	ICCAIA
9	Mr.	Paul D.	Giesman	ICCAIA
10	Mr.	Paul	Fraser-Bennison	UK
11	Mr.	Thomas	Bos	IFALPA
12	Mr.	Antonio	Travaglione	IFATCA
13	Mr.	Klaus-Peter	Schmidt	Germany
14	Mrs.	Susanne	Hofmann	Germany
15	Mr.	Harry	Van Dijk	Netherlands
16	Mr.	Antony	Van Der Veldt	IATA
17	Mr.	Ian	Witter	ACI World