

# Operational Friction Measurement



# Topics

**Meeting the Operational  
Friction Requirement**

**Runway Surface  
Information**

**Runway Surface Friction  
Index**

**Types of Friction Devices**

**Method of Measurement**

**Safety Concerns**

**Friction Numbers**

**Harmonization**

**Device Deficiencies**

**Lack of Confidence**

**Performance Criteria**

**Cooperation**

# MEETING THE OPERATIONAL REQUIREMENTS

**Snow/ice – goal –surface conditions for aircraft operating safety**

**Objective – Bare and Dry**

**Runway Condition Reports  
Provide information for  
Pilot use.**



# Runway Surface Information

**Regulatory Requirement**

**Inspections**

**Reporting**

**Frequency – As  
conditions change**



# Runway Condition Information

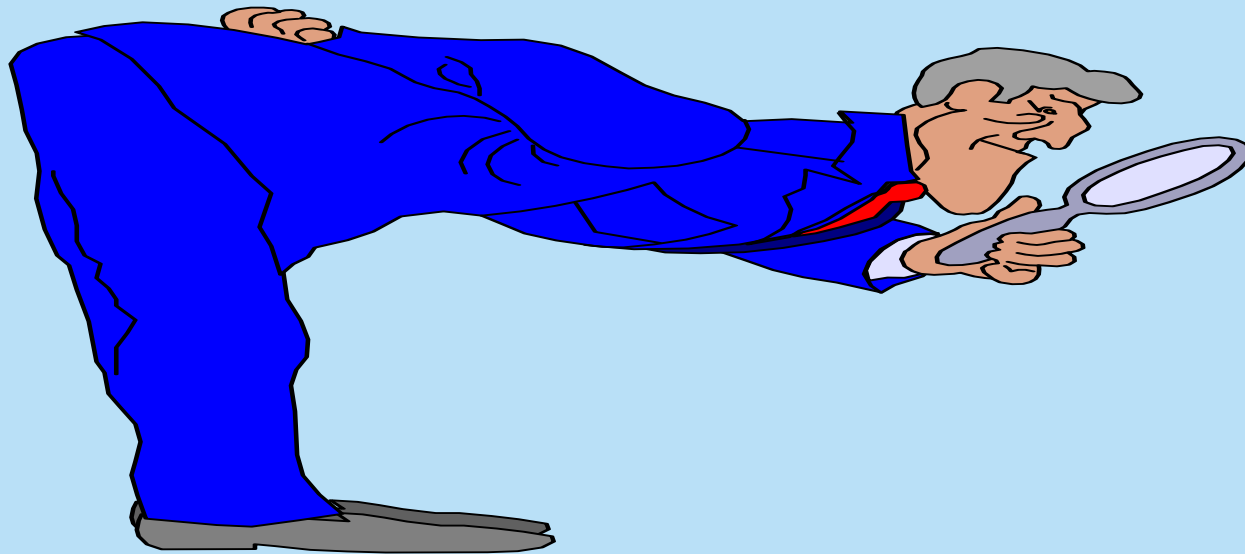
**Asked to provide as much information as possible**

**Airports assume the information being provided is needed and used by aircraft operator**



# TALPA-ARC

**Provides direction on what surface conditions are important for reporting and accuracy of data necessary**

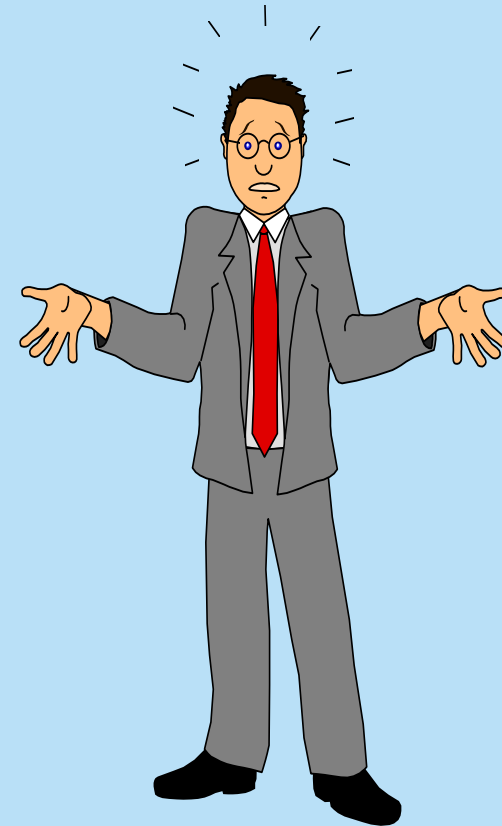


# Friction Information

**Airports do provide info on Friction**

**Regulatory Agency sets criteria on what to use, how and manner of reporting**

**It is assumed that the friction information is needed and used by pilots.**



# Friction Measuring Devices

Generally two types

**Decelerometers**



**Continuous Friction Measuring Devices**







# **METHOD OF MEASUREMENT**

**DIFFERENT DESIGNS**

**DIFFERENT SLIP RATIOS**

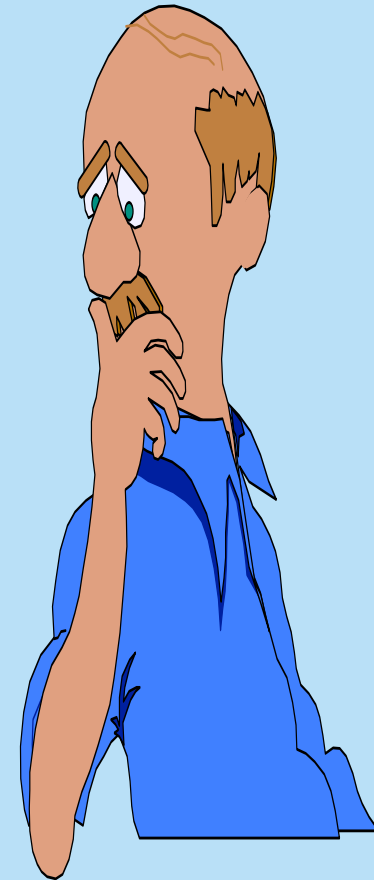
**DIFFERENT TIRES**

**DIFFERENT LOADS ON TIRES**

# Friction device numbers

**Because of the differences in design,  
slip ratios, tires used, etc. etc.**

**Friction numbers of the devices used  
are not the same when used on the  
same surface at the same time.**



# **Safety Concern**

**Different Friction index numbers being reported  
(CRFI, Saab number, Griptester number, etc. etc.)**

**Need for Harmonization to a common index**

# **Harmonization Attempts**

## **The Joint Winter Runway Friction Measuring Program**

**Partly successful**

**Identified serious shortcoming of current friction measuring devices**

**Shortcomings affected ability to harmonize devices successfully**

# **Device Shortcomings**

**Repeatability Issue**

**Reproducibility Issue**

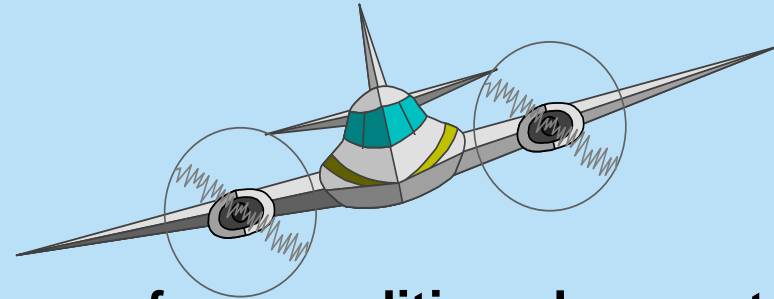
**Time Stability issue**

**All leading to high uncertainty of the friction number,  
scatter, etc.**

# **Impact of shortcomings**

**Lack of Confidence in ability of current Friction Devices to provide accurate and reliable information is most likely the reason for the current thinking which is to “not measure and report friction” for operational use.**

# A word of caution



**Approaches based primarily on runway surface conditions have yet to be fully tested.**

**The runway reporting phase, although in place, will require training of staff, and monitoring to ensure surface contaminants are put into the “proper boxes”.**

**A major part of the proposed approach is that aircraft manufacturers will provide data to relate the “boxes” to aircraft braking. This would be put in the flight manual for airline pilots to use.**

**A methodology to evaluate the effectiveness of both has to be developed then implemented.**

**All phases should be in place and tested to fully assess effectiveness.**



# **Raising the Safety Bar**

**Just because the current devices cannot provide the results necessary, we should not lose sight of the fact that knowledge of the surface friction is an important part to ensuring safety.**

**Knowing what it is and relating this to aircraft braking is still considered to be the goal to try to achieve.**

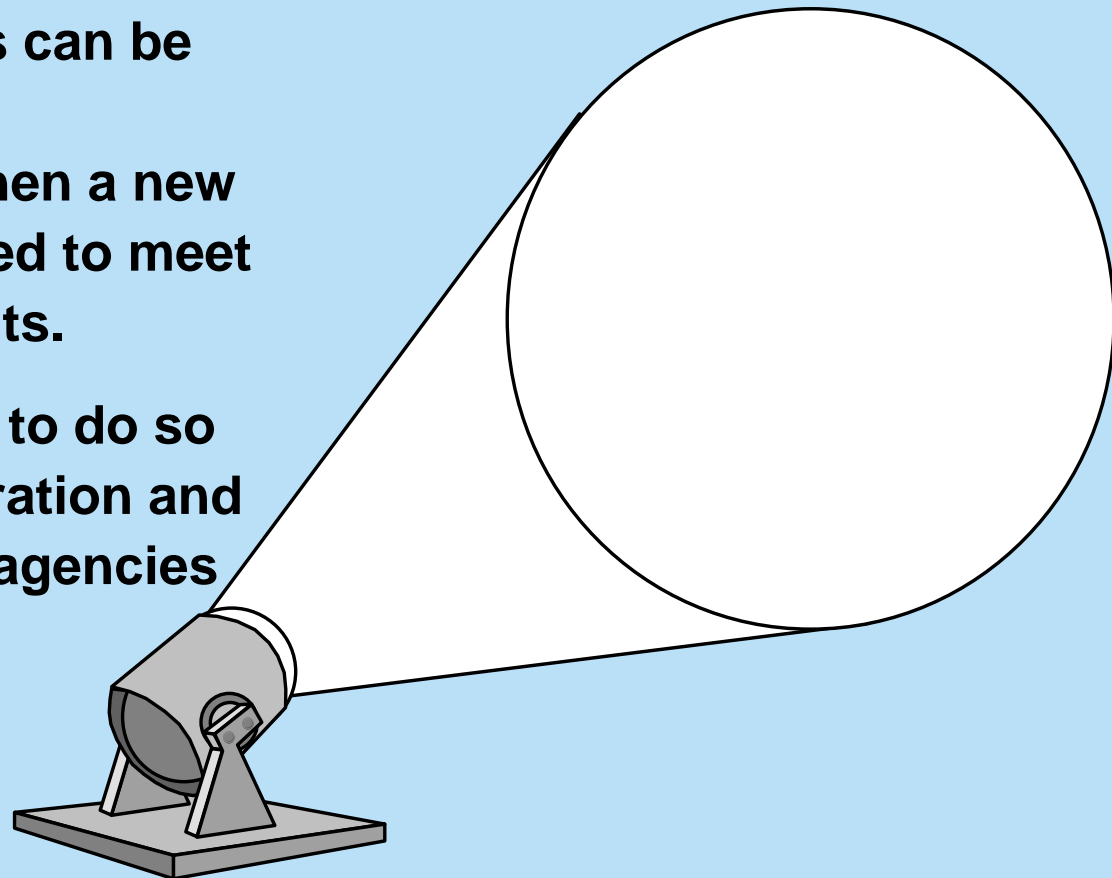
# OVERALL RECOMMENDATION

- **We believe that friction measurements are needed**
- **Changes to current devices are necessary**
- **Clear direction on operational performance requirements of devices is needed**
- **High level performance criteria are required**

# Looking forward

**It may very well be that some current friction devices can be redesigned to meet requirements. If not, then a new device can be developed to meet everyone's requirements.**

**Requires a willingness to do so and meaningful cooperation and input from all affected agencies**



**Thank you**