

# Paved Runway Condition Assessment Matrix and New Winter Operations AC Overview



Federal Aviation  
Administration

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# Paved Runway Condition Assessment Matrix

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# Origin of the Matrix

- ➔ **8 December 2005, landing overrun Chicago's Midway Airport**
- ➔ **The FAA chartered the Takeoff Landing Performance (TALPA) Aviation Committee (ARC)**
- ➔ **Representatives from:**
  - ➔ Airports
  - ➔ Airplane Manufacturers
  - ➔ Airplane Operators (121/125/135/91K)
  - ➔ Regulatory Authorities
  - ➔ Industry Associations



# Proposed New Method for Assessing Pavement Conditions

- **Use of a Condition Code as “shorthand” for conditions, to replace Mu reports to pilots and operators**
- **New way of describing conditions, based on defined terms and increments**



# Airport Operator's Matrix

PAVED RUNWAY CONDITION ASSESSMENT TABLE

Airport Estimated Runway Condition Assessment				Pilot Reports (PIREPs) Provided To ATC And Flight Dispatch
Runway Condition Assessment – Reported		Downgrade Assessment Criteria		
Code	Runway Description	Mu (μ)	Deceleration And Directional Control Observation	PIREP
8	Any Temperature: • Dry	-	-	Dry
6	Any Temperature: • Wet (Smooth, Grooved or PFC) • Frost Any Temperature with 1/8" or less of: • Water • Slush • Dry Snow • Wet Snow	40μ or higher	Braking deceleration is normal for the wheel braking effort applied. Directional control is normal.	Good
4	At or Colder than -13°C at any depth: • Compacted Snow	39-36μ	Brake deceleration and controllability is between Good and Medium.	Good to Medium
3	Any Temperature: • Wet (Slippery) At or Colder than -3°C and Greater than 1/8" of: • Dry or Wet Snow Warmer than -13°C and at or Colder than -3°C at any Depth: • Compacted Snow	35-30μ	Braking deceleration is noticeably reduced for the wheel braking effort applied. Directional control may be slightly reduced.	Medium
2	Any Temperature and Greater than 1/8" of: • Water • Slush Warmer than -3°C at greater than 1/8" : • Dry or Wet Snow Warmer than -3°C at any Depth: • Compacted Snow	29-26μ	Brake deceleration and controllability is between Medium and Poor. Potential for hydroplaning exists.	Medium to Poor
1	At or colder than -3°C at any Depth of: • Ice	25-21μ	Braking deceleration is significantly reduced for the wheel braking effort applied. Directional control may be significantly reduced.	Poor
0	Any Temperature and any Depth of: • Wet Ice • Water on top of Compacted Snow • Dry or Wet Snow over Ice Temperature Warmer than -3°C at any Depth: • Ice	20μ or lower	Braking deceleration is minimal to non-existent for the wheel braking effort applied. Directional control may be uncertain.	Nil

# Primary Columns

Airport Estimated Runway Condition	
Runway Condition Assessment – Reported	
Code	Runway Description
8	Any Temperature: • Dry
6	Any Temperature: • Wet (Smooth, Grooved or PFC) • Frost Any Temperature with 1/8" or less of: • Water • Slush • Dry Snow • Wet Snow
4	At or Colder than -13°C at any depth: • Compacted Snow
3	Any Temperature: • Wet (Slippery) At or Colder than -3°C and Greater than 1/8" of: • Dry or Wet Snow Warmer than -13°C and at or Colder than -3°C at any Depth: • Compacted Snow
2	Any Temperature and Greater than 1/8" of: • Water • Slush Warmer than -3°C at greater than 1/8" : • Dry or Wet Snow Warmer than -3°C at any Depth: • Compacted Snow
1	At or colder than -3°C at any Depth of: • Ice
0	Any Temperature and any Depth of: • Wet Ice • Water on top of Compacted Snow • Dry or Wet Snow over ice Temperature Warmer than -3°C at any Depth: • Ice

# Downgrade Columns

ion Assessment		Pilot Reports (PIREPs) Provided To ATC And Flight Dispatch
Downgrade Assessment Criteria		
Mu (μ)	Deceleration And Directional Control Observation	PIREP
-	-	Dry
40μ or higher	Braking deceleration is normal for the wheel braking effort applied. Directional control is normal.	Good
39-36μ	Brake deceleration and controllability is between Good and Medium.	Good to Medium
35-30μ	Braking deceleration is noticeably reduced for the wheel braking effort applied. Directional control may be slightly reduced.	Medium
29-26μ	Brake deceleration and controllability is between Medium and Poor. Potential for hydroplaning exists.	Medium to Poor
25-21μ	Braking deceleration is significantly reduced for the wheel braking effort applied. Directional control may be significantly reduced.	Poor
20μ or lower	Braking deceleration is minimal to non-existent for the wheel braking effort applied. Directional control may be uncertain.	Nil

# Another Way To Look At It...

	Dry	Wet		Contaminated											
Type	N/A	Any	Slippery When Wet	Frost	Standing Water or Slush		Wet Snow or Dry Snow		Compacted Snow			Ice		Wet Ice, Water Over Compacte d Snow, Dry or Wet Snow Over Ice	
Depth	N/A	N/A	N/A	N/A	1/8" or less	Greater than 1/8"	1/8" or less	Greater than 1/8"	Any	Any	Any	Any	Any	Any	Any
Temp	Any	Any	Any	Any	Any	Any	Any	-3°C or Colder	Warmer than - 3°C	-13°C or Colder	Warmer than -13°C; and, at or colder than - 3°C	Warmer than - 3°C	-3°C or Colder	Warmer than - 3°C	Any
Rwy Code	6	5	3	5	5	2	5	3	2	4	3	2	1	0	0

# Basic Steps of Assessment

- **Determine whether the runway is dry, wet or contaminated**
- **If contaminated, identify the type, depth and percent coverage**
- **Determine the contaminant/runway surface temperature, or OAT if surface temperature is unavailable**
- **Determine the Runway Condition Code**
- **Report the Code and the Field Conditions Description**
- **Pilots will use the Runway Condition Code when they calculate landing performance requirements**



# Testing in Winter 2009-2010

- **Validate correlation between matrix and pilot braking reports**
- **Determine the usability for airport operators**
- **Determine the usability for pilots**



# Airports and Airlines



Kotzebue (OTZ)

Bethel (BET)

Kodiak (ADQ)

Cordova (CDV)

Juneau (JNU)

Ketchikan (KTN)

Wrangell (WRG)

*Alaska Airlines*

Minneapolis-St. Paul (MSP)

Traverse City (TVC)

Grand Rapids (GRR)

Pinnacle Airlines

# Next Steps with Matrix

- **Complete 2009-2010 Winter Validation**
- **Group of Industry and FAA will evaluate results and revise Matrix if/as necessary**
- **Proceed with rulemaking incorporating Matrix**



# New Winter Operations AC Overview

Michael J. O'Donnell, AAE



# AC 5200-30

## *Airport Winter Safety and Operations*

- **Runways must be closed upon receipt of a “NIL” braking action report**



- **Recommendation for reporting Mu readings changed.**



# Application

- **Certificated airports are required to follow the requirements of paragraphs 5-6 and 5-7 as of the effective date of this AC.**
- **Certificated airports had to submit revised Snow and Ice Control Plans to the FAA no later than April 30, 2009 for approval.**



# Snow and Ice Control Plan

- **The SICP must include:**
  - instructions and procedures for handling the various types of winter storms encountered by the airport and
  - how to notify airport users in a timely manner of other than nominal runway conditions, including, but not limited to:
    - runway closures, and
    - when any portion of the movement area normally available to them is covered by snow, slush, ice, or standing water.





# Reporting

- **SICPs must contain provisions for informing all airplane operators of any pavement condition that is worse than bare and dry.**
- **This advisory circular contains significant changes to FAA recommendations regarding reporting of friction values.**
- **Continued transmittal of Mu values is permissible with the understanding that the numerical value has no particular significance other than to provide changing runway condition trend information when associated with previous or subsequent runway friction measurement values.**



# Reporting

- **Report runway surface conditions in terms of contaminant types and depths.**



- **When the cleared runway width is less than the full runway width, also report the conditions on the uncleared width (runway edges) if different from the cleared width.**

# Clearing Guidance

- The airport operator should check with airport users regarding their minimum runway width requirements.
- The minimum width required will vary by airplane type, but is generally 100' for transport category airplanes.



# One “NIL” Report

- **FAA Flight Standards Service has determined:**

**NIL = UNSAFE**

- **PIREP or Airport assessment of NIL requires that the runway be closed before the next flight operation. The runway must remain closed until the airport operator is satisfied that the NIL condition no longer exists.**

# Two “POOR” Reports

- When previous PIREPs have indicated GOOD or MEDIUM (FAIR) braking action, two consecutive POOR PIREPS should be taken as evidence that surface conditions may be deteriorating and require the airport operator to conduct a runway assessment.
  - If the airport operator has *not already* instituted its continuous monitoring procedures, this assessment must occur before the next operation.
  - If the airport operator *is already* continuously monitoring runway conditions, this assessment must occur as soon as practicable in accordance with their SICP.

# Requirement to Improve from “POOR”

- The airport operator must take all practicable steps using all available equipment and materials that are appropriate for the condition to improve the braking action.
- If the runway cannot be improved, the airport operator must continuously monitor the runway to ensure braking action does not become NIL.



# Continuous Monitoring

- **Observing which exit taxiways are being used.**
- **Maintaining a regular program of friction testing to identify trends in runway traction.**
- **Monitoring runway physical conditions including air and surface temperatures, contaminant types and depths.**
- **Monitoring pilot communications.**
- **Monitoring weather patterns.**

# Airport-ATC Coordination

- A Letter of Agreement specifying how all pilot braking reports (PIREPS) are immediately transmitted to the airport operator may be desirable.
- Under FAA Order 7110.65, *Air Traffic Control*, Air Traffic Controllers will not issue takeoff or landing clearance for any runway deemed “unsafe.”



*Air*

# NEXT REVISION

- Conducting runway assessments
- Guidance on reopening a closed runway



**U.S. Department  
Of Transportation**  
Federal Aviation  
Administration

## Advisory Circular

**Subject:** Airport Winter Safety and  
Operations

**Date:** xx/xx/xx  
**Initiated by:** AAS-100

**AC No:** 150/5200-30D  
**Change:**





# Questions??

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