

Breaking Away from Runway Overruns

The FAA's New Rules for Runway Condition and Braking Action

by Matthew McDaniel

There is a premise among professional pilots that some FAA rules are intentionally vague and often open to interpretation in order to provide operational flexibility (within reason). For years, such has been the case with runway condition assessments and braking action reports. For example, most pilots who have operated under Federal Aviation Regulations (FAR) Part 91K, 135, or 121 have had hard limits for what runway conditions and braking action reports would permit or prohibit a runway's use. Yet, pilots and controllers alike understand the "game" and what is sometimes necessary to complete the mission, while also remaining firmly within the rules.

Playing the Game

Consider this theoretical situation between a King Air charter operation (Part 135) and Air Traffic Control (ATC). Assume the charter operator's Operating Specifications (OpSpecs) state that landing is prohibited with braking actions, or Mu-reading equivalents, of less than Fair, with the most recent report being controlling. An airliner is cleared to land on runway 18 and is given the most recent Mu readings for that runway of .30/.30/.30 [touchdown, mid and roll-out zones,

respectively]. A Mu (or co-efficient of friction) measurement of .30 is generally considered to be the bottom of the Fair braking action range, before entering the Fair-to-Poor range of .29 to .26 [see Figure 1]. After landing, the airliner reports braking action as "Poor." The King Air on approach is told of this latest report. The pilot responds that he cannot land with braking action reported as less than Fair and is,

thus, issued a holding clearance and told that airport operations will not be taking the next Mu-readings for 40 minutes. Meanwhile, a corporate jet (operating under Part 91), overhears this exchange, completes an approach and landing, subsequently reporting braking action as "Fair" (knowing full well that his report will supersede the previous airliner's report, thereby allowing the King Air to accept an

Current (New) Braking Action Terminology	Corresponding Runway Condition Code (RwyCC)	Previous Braking Action Terminology	Approximate Corresponding Mu Measurements**
[None, but assumes a Dry condition]	6	[None]	[None]
"Good"	5	"Good"	.40 and above
"Good to Medium"	4	"Good to Fair"	.39 to .36
"Medium"	3	"Fair"	.35 to .30
"Medium to Poor"	2	"Fair to Poor"	.29 to .26
"Poor"	1	"Poor"	.25 to .20***
"Nil"	0	"Poor to Nil"	.20 to .18***
[None]	[None]	"Nil"	.17 or less***

Figure 1: Comparison of New and Previous Braking Action Information*

*The two left columns reflect the new system and terminology, effective Oct. 1, 2016. The two right columns reflect the previous system and terminology, now superseded, presented strictly for comparative purposes.

** No official correlation between pilot-reported braking action terminology and Mu measurements exists under the previous or the new rules and systems, and sources vary slightly on these values. Under the new rules, a RwyCC of 0 is considered "Nil" braking action, rendering that runway closed to all flight operations.

*** Mu readings of less than .25 are considered unreliable and, thus, should be considered to indicate the potential of Nil braking action.

Assessment Criteria		Control/Braking Assessment Criteria	
Runway Condition Description	RwyCC	Deceleration or Directional Control Observation	Pilot Reported Braking Action
<ul style="list-style-type: none"> Dry 	6	---	---
<ul style="list-style-type: none"> Frost Wet (Includes damp and 1/8 inch depth or less of water) 1/8 inch (3mm) depth or less of: <ul style="list-style-type: none"> Slush Dry Snow Wet Snow 	5	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	Good
-15°C and Colder outside air temperature: <ul style="list-style-type: none"> Compacted Snow 	4	Braking deceleration OR directional control is between Good and Medium.	Good to Medium
<ul style="list-style-type: none"> Slippery When Wet (wet runway) Dry Snow or Wet Snow (any depth) over Compacted Snow Greater than 1/8 inch (3 mm) depth of: <ul style="list-style-type: none"> Dry Snow Wet Snow Warmer than -15°C outside air temperature: <ul style="list-style-type: none"> Compacted Snow 	3	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	Medium
Greater than 1/8 inch(3 mm) depth of: <ul style="list-style-type: none"> Water Slush 	2	Braking deceleration OR directional control is between Medium and Poor.	Medium to Poor
<ul style="list-style-type: none"> Ice 	1	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	Poor
<ul style="list-style-type: none"> Wet Ice Slush over Ice Water over Compacted Snow Dry Snow or Wet Snow over Ice 	0	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	Nil

Figure 2: Table 1-1 of Advisory Circular 91-79A CHG 1: Operational Runway Surface Condition Matrix (RCAM) Braking Action Codes and Definitions

This table indicates what runway contamination conditions and deceleration/control observations correspond to each of the six Runway Condition Codes (RwyCC). The revised Pilot Reported Braking Action terminologies are also included.

NOTE: The unshaded portion of the RCAM is associated with how an airport operator conducts a runway condition assessment.

NOTE: The shaded portion of the RCAM is associated with the pilot's experience with braking action.

NOTE: The Operational RCAM illustration will differ from the RCAM illustration used by Airport Operators.

NOTE: Runway condition codes, one for each third of the landing surface, for example 4/3/3, represent the runway condition description as reported by the airport operator. The reporting of codes by runway thirds is expected to begin in Oct. 1, 2016.

approach and landing clearance). This newer report is relayed to the holding King Air charter flight, who then accepts a new approach clearance and lands uneventfully. This is in no way an unrealistic or uncommon scenario. Similar situations play out at airports around the world

regularly, often with ATC being proactive in soliciting braking action reports while indirectly letting landing aircraft know what approaching aircraft might require to "get in." It's a game that pilots, controllers and regulators know happens and those who believe otherwise are

either in denial or do not operate in the system often enough to have seen or heard it unfold firsthand. Each aircraft is likely reporting in a perfectly honest way, but runway conditions and braking actions do not affect all aircraft types the same. So, as one might imagine, such situations can also lead to overrun incidents or accidents as aircraft of varying capabilities utilize the reports of aircraft with very different performance parameters. The FAA has recently made several significant changes to bring more clarity, and more rigid requirements to Takeoff and Landing Performance Assessments (TALPA) and runway condition and braking action reporting. These changes address such issues as the example given, as well as rejected takeoff situations.

The TALPA Initiative

Beginning on Oct. 1, 2016, a new format of Field Condition (FICON) Notices to Airmen (NOTAM) will be utilized to report runway conditions determined via the new TALPA procedures at federally obligated airports. These changes are a result of findings from the TALPA Aviation Rulemaking Committee. Originated in 2006, the project was designed to provide airport operators with a common method for accurately determining contaminated (non-dry) runway conditions, in order to reduce the risk of runway overruns. Such information can then be utilized by pilots, dispatchers, operators and other flight planners to calculate minimum runway lengths for landings or rejected (aborted) takeoffs, when combined with the manufacturer's aircraft specific data. In overly simplistic terms, the former subjective assessments of runway conditions have been replaced with more objective means. Now, runway conditions are based on both the type and depth of the contaminate and are expressed using a corresponding runway condition code [see Figure 2]. Such specific information can be better applied to aircraft-specific performance charts for calculating the most accurate runway requirement data.


Braking Action Changes

Also effective Oct. 1, 2016, Mu reports will be replaced by Runway Condition Codes (RwyCC), which may take Mu measurements into account, but will also incorporate specific contamination types and depths. While braking action reports from pilots will continue to be solicited and used, the acceptable terminology has changed. The most significant change is that the term, "Fair" has been replaced with "Medium" to better conform to International Civil Aviation Organization (ICAO) standards [see Figure 1]. Along with this, a report of "Nil" will no longer be acceptable for an active runway. Instead, a braking action of "Nil" (as ascertained by pilot reports or RwyCC) will render that runway unusable and necessitate its immediate closure. This eliminates the option of using such a runway by operators who could otherwise do so legally; a decision which has led to many runway overrun incidents and accidents in the past. This

has been especially true with turboprop operators who often rationalized the use of a runway with Nil braking action by considering their slower landing speed, reverse thrust prop capabilities (beta plus power), and a greater headwind or less crosswind on that runway. Accident history has proven those perceived "positives" do not outweigh the negative of little or no runway braking action. Thus, any such runway is now considered closed, by definition, and cannot be considered re-opened until braking action can be measured and reported as something greater than "Nil."

Information Assessment: Good!

Many regulatory and operational changes made by the FAA in the past have been accompanied by corresponding educational information that is difficult to find or challenging to translate from regulatory language. Not so with TALPA and the changes highlighted here. Below are just a few of the many resources available for a deeper understanding of these changes and what they mean for your operations and missions:

- The FAA website has a page dedicated to TALPA with a multitude of links corresponding to specific operators and the various regulatory sections effected. See URL: <http://www.faa.gov/about/initiatives/talpa/>
- Advisory Circular 25-31 "Takeoff Performance Data for Operations on Contaminated Runways," dated 12-22-2015
- Advisory Circular 25-32 "Landing Performance Data for Time-of-Arrival Landing Performance Assessments," dated 12-22-2015
- Advisory Circular 91-79A, dated 04-28-2016
- Current edition of the Aeronautical Information Manual (AIM) 

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