

# FAA SAFO 15009 - Turbojet Braking Performance on Wet Runway – SAPOE Recommendations

NBAA Conference - Friends/Partners  
Aviation Weather (FPAW)  
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- The Society of Aircraft Performance and Operations Engineers is a member based organization promoting the safety and efficiency of flight through knowledge of aircraft performance and weight and balance principles.
  
- Formed in 2007 – Membership is composed of airlines operations and performance engineers, engineers from aircraft manufacturers, engine manufacturers, performance vendors, regulatory agencies, consultants, pilots, representatives of trade groups, professors and students.
  - Currently 207 Members (and growing)
  
  - 112 different companies represented
  
  - Multiple countries and every continent (except Antarctica) represented
  
- [www.sapoe.org](http://www.sapoe.org)

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Society of Aircraft Performance and Operations Engineers



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

## SAFO

Safety Alert for Operators

SAFO 15009  
DATE: 8/11/15

Flight Standards Service  
Washington, DC

[http://www.faa.gov/other\\_visit/aviation\\_industry/airline\\_operators/airline\\_safety/safo](http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo)

*A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.*

**Subject:** Turbojet Braking Performance on Wet Runways

**Purpose:** This SAFO warns airplane operators and pilots that the advisory data for wet runway landings may not provide a safe stopping margin under all conditions.

**Background:** Landing overruns which occur on wet runways typically involve multiple contributing factors such as long touchdown, improper use of deceleration devices, tailwind and less available friction than expected. Several recent runway landing incidents/accidents have raised concerns with wet runway

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- “This SAFO warns airplane operators and pilots that the advisory data for wet runway landings may not provide a safe stopping margin under all conditions”
  - SAFO recommendations are not regulatory requirements. However local FAA offices may consider these recommendations during approval of operations program changes.
  - This SAFO references the [Runway Condition Assessment Matrix \(RCAM\)](#) developed through the TALPA ARC process and used by aircraft manufacturers in development of time-of-arrival landing performance data.

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- “The root cause of the wet runway stopping performance shortfall is not fully understood at this time ...data indicates that **30 to 40 percent of additional stopping distance** may be required in certain cases where the runway is **very wet**, but not flooded.”
  - 30 to 40 % additional stopping margin is not well-defined nor is the reference clearly stated.
  - Very wet is a new term that does not have a prior nor present standard definition.

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- Defining “Very Wet” Runway – the FAA provides clues on how to achieve this within the SAFO text ....
  - “For **non-grooved or non-PFC runways**, experience has shown that wheel braking may be degraded when the runway is very wet. If **active moderate or heavy precipitation exists**, the operator should consider additional conservatism in their time-of-arrival assessment.”
  - “For **grooved or PFC runways**, experience has shown that wheel braking is degraded when the runway is very wet. If **active heavy precipitation exists**; the operator should consider additional conservatism in their time-of-arrival assessment.”

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- **“Recommended Action:** Directors of safety and directors of operations (Part 121); directors of operations (part 135, and 125), program managers, (Part 91K), and Pilots (Part 91) should take appropriate action within their operation to address the safety concerns with landing performance on wet runways discussed in this SAFO.”
  - “Possible methods of applying additional conservatism when operating on a runway which experience has shown is degraded when very wet are **assuming a braking action of medium or fair** when computing time-of-arrival landing performance or increasing the factor applied to the wet runway time-of-arrival landing performance data.”

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## ■ What's Next?

- “In 2015 a committee of manufacturers and regulators will further investigate the issues with wet runway braking performance shortfalls. Airport and aircraft operators will be included in this investigation.”
  
- The referenced committee is the ARAC Flight Test Harmonization Working Group (FTHWG). This group has been tasked by the FAA with a number of topics involving Part 25 certification of aircraft, including performance issues.



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- Questions?

## Thanks for your attention!

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**TABLE 1-1. OPERATIONAL RUNWAY CONDITION ASSESSMENT MATRIX (RCAM) BRAKING ACTION CODES AND DEFINITIONS**

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

From AC91-79A, Mitigating the Risks of a Runway Overrun Upon Landing

