Safety Alert for Operators (SAFO)

Turbojet Braking Performance on Wet Runways

Presented to: ICAO SAM Regional Seminar on the GRF for Runway Conditions

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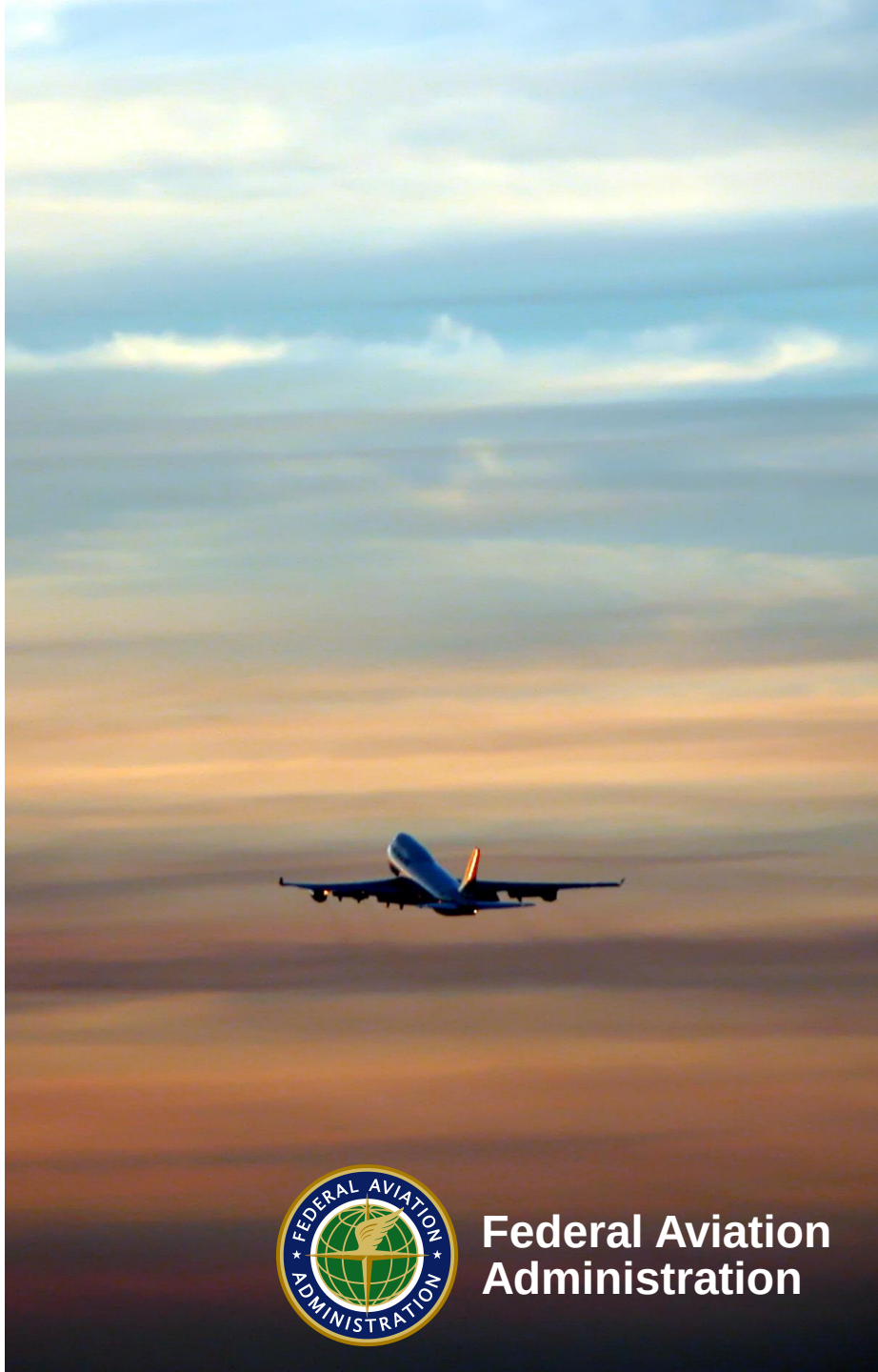

SAFO 19003

U.S. Department
of Transportation
Federal Aviation
Administration

SAFO
Safety Alert for Operators

SAFO 19003
DATE: 7/2/19

Flight Standards Service
Washington, DC

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 cancels and replaces SAFO 15009 and warns airplane operators and pilots that the advisory data for wet runway landings may not provide a safe stopping margin especially in conditions of Moderate or Heavy Rain.

SAFO Recommended Action

Recommended Action: Directors of Safety and Directors of Operations (Part 121); Directors of Operations (parts 135, and 125), Program Managers, (Part 91K), and Pilots (Part 91) should ensure pilots verify, prior to initiating an approach, that the aircraft can stop within the Landing Distance Available using a RwyCC of "2" whenever there is the likelihood of moderate or greater rain on a smooth runway or heavy rain on a grooved/PFC runway.

Runway condition assessment matrix (RCAM)			
Assessment criteria		Downgrade assessment criteria	
Runway condition code	Runway surface description	Aeroplane deceleration or directional control observation	Pilot report of runway braking action
6	• DRY	---	---
5	• FROST • WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) ***Up to and including 3 mm depth:*** • SLUSH • DRY SNOW • WET SNOW	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	GOOD
4	***−15°C and Lower outside air temperature***: • COMPACTED SNOW	Braking deceleration OR directional control is between Good and Medium.	GOOD TO MEDIUM
3	• WET ("slippery wet" runway) • DRY SNOW or WET SNOW (any depth) ON TOP OF COMPACTED SNOW ***More than 3 mm depth:*** • DRY SNOW • WET SNOW ***Higher than −15°C outside air temperature***[1]: • COMPACTED SNOW	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	MEDIUM
2	***More than 3 mm depth of water or slush:*** • STANDING WATER • SLUSH	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM TO POOR
1	• ICE [2]	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR
0	• WET ICE [2] • WATER ON TOP OF COMPACTED SNOW [2] • DRY SNOW or WET SNOW ON TOP OF ICE [2]	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	LESS THAN POOR

Runway Design…

Runway Maintenance…

- **Structural pavement failure such as:**
  - rutting, raveling, cracking, joint failure, settling,
  - or other indicators of distressed pavement can also contribute to runwayfriction losses.

Friction Surveys …

TABLE 3-1. FRICTION SURVEY FREQUENCY

NUMBER OF DAILY MINIMUM TURBOJET AIRCRAFT LANDINGS PER RUNWAY END	MINIMUM FRICTION SURVEY FREQUENCY
LESS THAN 15	1 YEAR
16 TO 30	6 MONTHS
31 TO 90	3 MONTHS
91 TO 150	1 MONTH
151 TO 210	2 WEEKS
GREATER THAN 210	1 WEEK

Friction Classification Levels

TABLE 3-2. FRICTION LEVEL CLASSIFICATION FOR RUNWAY PAVEMENT SURFACES

	40 mph			60 mph		
	Minimum	Maintenance Planning	New Design/ Construction	Minimum	Maintenance Planning	New Design/ Construction
Mu Meter	.42	.52	.72	.26	.38	.66
Dynatest Consulting, Inc. Runway Friction Tester	.50	.60	.82	.41	.54	.72
Airport Equipment Co. Skiddometer	.50	.60	.82	.34	.47	.74
Airport Surface Friction Tester	.50	.60	.82	.34	.47	.74
Airport Technology USA Safegate Friction Tester	.50	.60	.82	.34	.47	.74
Findlay, Irvine, Ltd. Griptester Friction Meter	.43	.53	.74	.24	.36	.64
Tatra Friction Tester	.48	.57	.76	.42	.52	.67
Norsemeter RUNAR (operated at fixed 16% slip)	.45	.52	.69	.32	.42	.63

Rubber Removal Frequency

TABLE 4-1. RUBBER DEPOSIT REMOVAL FREQUENCY

NUMBER OR DAILY TURBOJET AIRCRAFT LANDING PER RUNWAY END	SUGGESTED RUBBER DEPOSIT REMOVAL FREQUENCY
LESS THAN 15	2 YEARS
16 TO 30	1 YEAR
31 TO 90	6 MONTHS
91 TO 150	4 MONTHS
151 TO 210	3 MONTHS
GREATER THAN 210	2 MONTHS

Note: Each runway end should be evaluated separately, e.g. Runway 18 and Runway 36.

Runway Condition Reporting…

Informational Resources

- **SAFO 19003 - Turbojet Braking Performance on Wet Runways https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/**
- **AC 150/5320-12C Measurement, Construction, and Maintenance of Skid- Resistant Airport Pavement Surfaces**

  https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5320-12

- **AC 150/5320-6, Airport Pavement Design and Evaluation.**
- **in chapter 2 and AC 150/5380-6.**