Current Status of Runway Friction Measurement Equipment and Data Collection Procedures

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For

Pavement Evaluation 2010 Conference
Roanoke, Virginia; October 25-27, 2010

FRICTION LEVEL CLASSIFICATION FOR RUNWAY PAVEMENT SURFACES

FAA A.C. 150/5320-12C; March 18, 1997

	40 mph			60 mph		
	Minimum	Maintenance Planning	New Design/ Construction	Minimum	Maintenance Planning	New Design/ Construction
Mu Meter	.42	.52	.72	.26	.38	.66
K. J. Law 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

ASTM Revised FAA Table 3-2 at 40 mph

PRELIMINARY

Device	Min	Mntn	N Con	N Grv	Notes	Fit	Rsq	Std Err	CV	N
SFT85	0.48	0.63	0.81	0.87		F60=0.506*FR60+0.160	0.858	0.021	0.074	14
SARSYS	0.40	0.57	0.78	0.86		F60=0.469*FR60+0.195	0.807	0.807	0.067	13
RFT	0.40	0.56	0.75	0.82		F60=0.496*FR60+0.191	0.869	0.869	0.054	14
DND GT	0.39	0.51	0.65	0.70		F60=0.633*FR60+0.157	0.849	0.849	0.075	14
NASA GT	0.40	0.54	0.71	0.77		F60=-0.559*FR60+0.171	0.866	0.020	0.055	14
RT3	0.45	0.58	0.76	0.81		F60=-0.542*FR60+0.171	0.785	0.032	0.047	14
NAC DFT	0.38	0.49	0.63	0.67		F60=-0.675*FR60 + 0.154	0.822	0.019	0.047	13
Russia	0.47	0.56	0.69	0.72	1	F60=0.696*FR60 + 0.114	0.926	0.008	0.039	11
MuMeter	0.45	0.53	0.65	0.69	2	F60=0.728*FR60 + 0.115	0.708	0.044	0.114	14
FAA BV11	0.41	0.58	0.78	0.86		F60=0.474*FR60 + 0.192	0.811	0.028	0.102	14
SC BV11	0.40	0.54	0.72	0.78	3	F60=0.538*FR60 + 0.181	0.639	0.039	0.139	11

Notes: Refers to various test run anomalies. **Abbreviations:** **Min** = minimum; **Mntn** = maintenance; **N Con** = new construction; **N Grv** = new grooved; **Rsq** = correlation coefficient; **Std Err** = standard error; **CV** = coefficient of variation (standard deviation divided by the mean); **N** = number of data points

ASTM Revised FAA Table 3-2 at 60 mph

PRELIMINARY

Device	Min	Mntn	N Con	N Grv	Notes	Fit	Rsq	CV	N
SFT85	0.29	0.45	0.67	0.76		BS95=0.454*BS642 + 0.575*BS64 -0.0.92	0.956	0.042	14
SARSYS	0.27	0.44	0.67	0.76		BS95=0.239*FS642 + 0.772*FS65-0.077	0.986	0.067	13
RFT	0.25	0.4	0.6	0.68		BS95=0.219*FS642 + 0.738*FS65 -0.078	0.946	0.054	14
DND GT	0.22	0.32	0.51	0.58	4	BS95=1.094*FS642 -0.034*FS65 +0.06	0.881	0.075	14
NASA GT	0.26	0.38	0.55	0.62		BS95=0.367*FS642 + 0.538*FS65 -0.014	0.833	0.055	14
RT3	0.25	0.4	0.65	0.73		BS95=1.127*FS642 -0.094*FS65+0.067	0.937	0.047	14
NAC DFT	0.35	0.43	0.57	0.62		BS95=0.701*FS642 + 0.188*FS65+0.175	0.637	0.047	13
Russia	0.43	0.56	0.7	0.72	1	BS95=-1.881*FS642 + 3.426*FS65 -0.771	0.889	0.039	11
MuMeter	0.21	0.54	0.72	0.7	2	BS95=-12.85*FS642 + 16.67*FS65 -4.69	0.253	0.114	14
FAA BV11	0.22	0.38	0.62	0.73		BS95=0.678*FS642 + 0.257*FS65+0.006	0.956	0.102	14
SC BV11	0.15	0.45	0.68	0.73	3	BS95=-2.307*FS642 + 4.23*FS65 -1.171	0.956	0.139	7

Notes: Refers to various test run anomalies. **Abbreviations:** **Min** = minimum; **Mntn** = maintenance; **N Con** = new construction; **N Grv** = new grooved; **Rsq** = correlation coefficient; **CV** = coefficient of variation (standard deviation divided by the mean); **N** = number of data points

TALPA – ARC Charter

Takeoff and Landing Performance Assessment – Aviation Rulemaking Committee

Provide advice and recommendations to:

- Establish aircraft certification and operational requirements on contaminated runways
- Identify landing distance assessment requirements including minimum safety margins
- Develop practical standards for runway condition reporting (RCR) and minimum surface conditions for continued operations

Airport Runway Condition Assessment

(ARCA) Table

Runway Condition Report - Data Collection Sheet

Airport

Runway

Date

Local Time (24 hr)

Initials

Flight #

Is the portion of the Runway that is being maintained MORE THAN 25% covered with a contaminant?

☐ **Yes, assign Runway Condition Codes and complete the Matrix Report** (blue box)

☐ **No, DO NOT assign Runway Condition Codes but complete all other sections of the Matrix Report if any contamination is present** (blue box)

"Matrix Report . . . _ _ _ **Rwy** _ _ _ ___/___/___ _ _ _ **(%)** _ _ _ **(inch)** _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

(Airport) (Rwy #) (Rwy Condition Codes) (% Coverage - 10, 25, 50, 75, or 100%) (Highest Depth only for Slush, Wet Snow or Dry Snow and Standing Water [Water 1/8 " or less report as WET with no depth]) (Contaminant Type [Report in terms in worksheet below, Water 1/8 " or less report as WET])

(Remarks to be transmitted)

"

(Date) (Time)

Misc. Data

°C Outside Air Temp

Active Precip? Yes or No

Adjusted Runway Condition Codes

(ONLY If Downgrade or Upgrade Assessments Used)

Requires an explanation in the comments section below

Rwy Treatment Used?

Time Applied

☐ Sand ☐ Deicing Chem

Rwy Mu *Before (If Applicable) After*

☐ Decel ☐ CFME

1st Rwy Third

- For Coverage **25% or Less**, Enter Code 6
- Circle (or Mark) any contaminant below that covers **more than 25%** of the Rwy Third. Record the most restrictive code in the box to the right. →
- Circle (or Mark) Depth Only for: Water, Slush, Wet Snow, Dry Snow, or Any Snow OVER Compacted Snow

Dry 6 | Wet (Damp) 5 | Frost 4 | Below Min Friction Level Classification - Wet Slippery 3

Water or Slush

GREATER Than 1/8" 2 | 1/8" or LESS 5

Slush

GREATER Than 1/8" 3 | 1/8" or LESS 5

Wet Snow or Dry Snow

Depth

1/8" or Less | 1/4" | 1/2" | 3/4" | 1" | 2" or More

Dry or Wet Snow OVER Compacted Snow 3

Compacted Snow

15°C or Colder 4 | Warmer than -15°C 3

Ice 1 | Wet Ice, Water OVER Compacted Snow, Snow OVER Ice 0

2nd Rwy Third

- For Coverage **25% or Less**, Enter Code 6
- Circle (or Mark) any contaminant below that covers **more than 25%** of the Rwy Third. Record the most restrictive code in the box to the right. →
- Circle (or Mark) Depth Only for: Water, Slush, Wet Snow, Dry Snow, or Any Snow OVER Compacted Snow

Dry 6 | Wet (Damp) 5 | Frost 4 | Below Min Friction Level Classification - Wet Slippery 3

Water or Slush

GREATER Than 1/8" 2 | 1/8" or LESS 5

Slush

GREATER Than 1/8" 3 | 1/8" or LESS 5

Wet Snow or Dry Snow

Depth

1/8" or Less | 1/4" | 1/2" | 3/4" | 1" | 2" or More

Dry or Wet Snow OVER Compacted Snow 3

Compacted Snow

15°C or Colder 4 | Warmer than -15°C 3

Ice 1 | Wet Ice, Water OVER Compacted Snow, Snow OVER Ice 0

3rd Rwy Third

- For Coverage **25% or Less**, Enter Code 6
- Circle (or Mark) any contaminant below that covers **more than 25%** of the Rwy Third. Record the most restrictive code in the box to the right. →
- Circle (or Mark) Depth Only for: Water, Slush, Wet Snow, Dry Snow, or Any Snow OVER Compacted Snow

Dry 6 | Wet (Damp) 5 | Frost 4 | Below Min Friction Level Classification - Wet Slippery 3

Water or Slush

GREATER Than 1/8" 2 | 1/8" or LESS 5

Slush

GREATER Than 1/8" 3 | 1/8" or LESS 5

Wet Snow or Dry Snow

Depth

1/8" or Less | 1/4" | 1/2" | 3/4" | 1" | 2" or More

Dry or Wet Snow OVER Compacted Snow 3

Compacted Snow

15°C or Colder 4 | Warmer than -15°C 3

Ice 1 | Wet Ice, Water OVER Compacted Snow, Snow OVER Ice 0

Pilot Braking Action Reports: Aircraft Type_____**Braking Action Reported** _____**Time of Report**_____

Comments for Evaluation Team on Accuracy and Usability of the Matrix Reporting System _____

_____ Use reverse side if more space is needed.

Future Activities

- Complete analysis of TALPA 2009-2010 data (10 airports, 2 airlines)
- Collect more winter data in 2010-2011
- Continue use of CFME's to better define Runway Condition Report
- Preparation of draft CFME certification standard by ASTM E17 Committee for assessment of new equipment