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FRICITION METER COMPARISON STUDY 2011
The friction requirements are an essential part of the winter maintenance quality requirements in public roads in Finland.

The road authorities determine the methods and devices to be used in friction measurements.

In the early spring 2011 the Traffic Agency financed a test series for two main groups of meters:
- A: Friction meters to be used when braking
- B: Other friction meters

The group A meters are accurate enough for winter maintenance quality control. The group B meters were designed e.g. for road weather monitoring.

The devices were tested both on the road and on the special test tracks.
GROUP A:
FRICITION METERS TO BE USED DURING BRAKING

"TRADITIONAL FRICTION METER"
- The initial speed from the vehicle speed sensor
- The braking time from the brake light cable
- The final speed from the vehicle speed sensor

"NEW TYPE OF FRICTION METER"
- Deceleration from the device acceleration sensor

60 km/h → Braking → ≈ 40 km/h
MAIN RESULTS FOR THE GROUP A METERS

TRADITIONAL FRICTION METER (Eltrip-45n)
+ less sensitive to the braking time
+ less sensitive to the human (user) mistakes
- complicated installation (needs professionals)
- unable to measure friction on hills

FRICTION METERS USING ACCELERATION SENSOR (Gripman, μTEC, Eltrip-7kmb)
+ easy to install
+ Gripman and μTEC were able to measure friction on hills
- Loose attachment or position changes after calibration affect to the result
The share of measurements, in which the difference between two meters is equal or less than 0.02.

Gripman
Eltrip-7kmb
μTEC

Physical friction
MAIN RESULTS FOR THE GROUP A METERS

- Smooth ice on test track: 0.10
- Lowest acceptable friction for smaller roads in certain conditions: 0.22
- Packed snow (calibration): 0.29
- Friction limit for motorways: 0.30

- Difference between new and used tyres, when using quality tyres: 0.02
- Difference between new tyres of good and poor quality: 0.04
- Difference between vehicle types (passenger car <> SUV): 0.04
GROUP B FRICTION METERS

DSC111

RCM411
MAIN RESULTS FOR THE GROUP B METERS

Results from the road

- RCM411 friction average ± 15 sek.
  
- DSC111 friction average ± 15 sec.
The friction meter testing is important before using them more widely. Both the Finnish tests and the tests in other Nordic countries have revealed weaknesses, the manufacturers have repaired afterwards.

The quality requirements for friction meters have been made in the basis of the tests carried. In the future, the friction meter manufacturer needs to present a report card of the conformity with the quality requirements, if they want their meters to be used in the winter maintenance quality control in Finland.

The best acceleration sensor meters have achieved the level, which is good enough for winter maintenance quality control.

The best optical meters seems promising. Their role in the road weather monitoring will increase in the near future, but they are still too unreliable for the winter maintenance quality control.