IMAG : SKID RESISTANCE FOR AERONAUTICAL PAVEMENT

Measure of the longitudinal controlled slip LFCI IMAG

Vectra

CEN/TS 15901-15

Description

IMAG is an automatic device for measuring the slipperiness of aeronautical pavements. It is the result of cooperation between the Service Technique de l'Aviation Civile / Direction Générale de l'Aviation Civile and Aéroports de Paris.

The IMAG is covered by patent 89.16834. A weighted, towed weighted and towed at constant speed (up to 140 km/h), is braked at a selected slip rate (0 % à 100 %).

The use of IMAG enables :

- An operational assessment of winter slipperiness winter season under operating conditions.
- Functional evaluation of skid resistance outside the winter season (measurement on water film) : asset management of runways and taxiways (e.g. : need for degumming).

A measuring wheel placed in the center of the trailer is weighted down and towed at constant speed. The system automatically variable braking.

A set of sensors continuously measures the following forces :

- Fh : the horizontal tensile force exerted by the rolling resistance of the measuring tire.
- C : the braking torque of the measuring wheel.
- Fv : the vertical load on the measuring wheel.
- The very design of the IMAG (Fv and C force measurements), enables improved grip analysis
- Continuous Fv measurement takes into account wheel wheel load shedding caused by road surface defects in the pavement under test
- The C torque can be used to determine the presence of any contaminants on the pavement.

Two friction parameters are thus determined :

- μ force = Fh/Fv (longitudinal drag coefficient).
- μ torque = (C/R)/Fv (coefficient of friction), where R is the radius of the measuring wheel.

European standards CE Normes européennes

Made in France Fabriqué en France

Highlights

Functional measurement mode
→ Measurement of the pure friction coefficent (functional mode)

Operational measurement mode
→ Measurement of drag coefficient under contaminant conditions (operational mode)

High ending specs
→ Representativeness of measured friction
→ Accuracy of friction measurement
→ Measurement up to 140 kph
→ Slip ratio from 0 to 100%

Features

IMAG	
Composition	3-wheel trailer towed by a motor vehicle. Support chassis with 2 load-bearing wheels fitted with speed sensors (speed and distance measurement). Measuring frame articulated on the support frame, including a measuring wheel fitted with a smooth PIARC tire: Dimensions 165 x 380 PIARC type, Inflation pressure: 150 kPa, Load on measuring wheel: 175 daN. In addition, the device measures the following temperatures: road surface and ambient air.
Coefficient of friction measurement system	Braking of the measuring wheel of the moving device, at a variable slip rate. Continuous measurement of horizontal traction force on the wheel, braking torque and dynamic wheel load. In order to ensure excellent grip representativeness and measurement accuracy, the IMAG performs 1 measurement every 5 mm, i.e. 200,000 measurements per km. The measurement signal is processed and converted into two friction coefficients: a pure friction coefficient (linked to surface quality only) and a drag friction coefficient (linked to the presence of "contaminants" on the road surface): Measurement speed up to 140 km/h ; Usual speeds: 40, 65 and 95 km/h.
Operation	Integrated system for monitoring the operating elements of the measuring device. The link between the IMAG and the microcomputer, which allows measurements to be displayed in real time, is made via a wireless connection. Tractor vehicle, fitted with a standard hitch, of sufficient power to enable the test speed to be reached quickly.
Additional equipment	An autonomous wetting system is required for use of the IMAG in functional mode (outside the winter season). This system ensures constant wetting in front of the measuring wheel, regardless of vehicle speed.

Applications

- Measurement of the intrinsic skid resistance of aeronautical pavements under standard conditions (functional mode, wetting activated)
- Measurement of the skid resistance of aeronautical pavements in degraded conditions (operational mode, in ambient conditions (contaminant: paraffin, deteriorated atmospheric conditions, etc.)