APL : LONGITUDINAL EVENESS (ROUGHNESS PROFILE)

Continuous longitudinal evenness measurement
Receipt of the pavement layer

mlpc EN 13036-6

NF P98-218-3
Méthode LPC 46
Device qualified mlpc®

Description

The APL system -Longitudinal Profile Analyzer- enables continuous measurement of the longitudinal evenness of road pavements, runways and, more generally, any roadway used by motor vehicles, whatever the pavement structure and type of surfacing.

The measurement is based on a survey of the pavement's longitudinal profile, in one or two traces. Analysis of this profile enables the uni characteristics of the pavement surface to be deduced.

The sensor consists of a trailer connected to a towing vehicle via a universal joint. Profile unevenness is translated into electrical signals by means of a double transformation.

The trailer represents a "quarter-vehicle" unit whose wheel axle permanently follows the road profile thanks to its ballasted chassis and adapted suspension. Vertical movements E of the wheel axle translate into angular deflections ß of the wheel arm.

A low-frequency pendulum provides the inertial angular deflections that are measured and translated into profile elevation values. The pendulum's decoupling function minimizes the effects of vertical excitations from the towing vehicle.

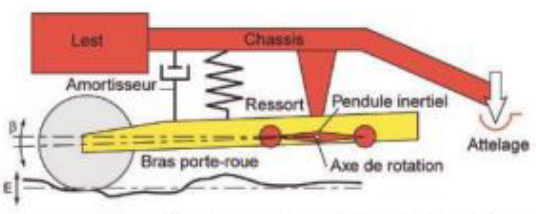
The result of the measurement is the longitudinal profile of the pavement of the roadway, in one or two traces generally located in the treads of the traffic lanes. The system, comprising one or two trailers, is controlled and managed by specialized acquisition electronics on board the towing vehicle.

It produces files of digital values amplitudes of profile gradients measured with a longitudinal step of 0.05 m. The wavelengths contained in the profile measured by APL depend on the measurement speed. At a nominal speed of 72 km/h, APL records wave lengths between 0.7 m and 50 m without distortion or attenuation.

European standards CE Normes européennes

Made in France Fabriqué en France

Schéma de principe



La mesure de l'angle β entre l'axe du bras porte-roue et l'axe du fléau du pendule donne l'élévation E de la route

Features

Metrological characteristics	
Vertical amplitude	± 80 mm (3.15 in), resolution ≤ 0.1 mm (0.004 in)
Horizontal Distance	Resolution < 0.05 m (2 in), precision ≤ 0.1%,
Bandwidth frequency	0.4 Hz – 30 Hz
Measurement speed	From a few km/h to 144 km/h (89.5 mi/h)
No longitudinal acquisition	<0.05 m Independence of weather and road conditions conditions of the road,
Multi-index	Virtually all uni indicators can be calculated (IRI, NBO, ...) Evaluation of measurements in the vehicle or in the laboratory
Varied presentation of results	Profile graph, Tables of indicator values, itinerary diagrams, Portability of elevation, profile and uni indicator value files profiles and indicators in text format to any database
Dimensional characteristics	
Dimensions	L = 2.30 m ; l = 0.55 m ; h = 1.22 m, L = 1.96 ft; l = 1.31 ft; h = 5.9 ft (signaling included)
Weight	120 kg (1,808 lbs)
The APL2015 operating software	The APL2015 operating software offers a very wide range of range of measurement processing modules, allowing allowing : • The calculation of the main uni indicators used in the world • Assistance in the application of the French regulatory texts (technical note 2015 and technical guide uni 2014), • A free module to determine the criteria for of wearing courses that can be adapted to any country. • Expertise of the measured profiles (Power Spectral Density Power Spectral Density, local defect analysis, ...).

Standard equipment

The profile sensor is a light-weight, single-cycle trailer-type device consisting of:

- An unsprung light-alloy wheel-carrying arm, housing the pendulum system for measuring profile variation amplitudes and the sensor for locating their positions.
- A ballasted, welded tubular chassis, suspended by a spring-damper system designed to guarantee constant response of the assembly over the device's bandwidth.
- It is fitted with signaling devices complying with current applicable regulations. The electronic/computer module, installed in the towing vehicle, is a unit equipped with a microcomputer and all the electronic elements required for signal processing and acquisition.
- A light cycle wheel whose circularity and balance are meticulously checked.
- The operator station is equipped with a touch-sensitive flat screen and a keyboard/mouse, while the driver has a dedicated display.