

Technology Offer

Method and mobile equipment for measuring road layers' thickness

Summary

A Romanian research team from Transylvania has developed a method and a mobile equipment for measuring the road layers' thickness, without destroying the material, and it is meant for use in the road constructions with agglomerate-containing binder. The research team is looking for industrial partners interested in research cooperation agreements, services agreements and technical cooperation agreements.

Creation Date	02 September 2015
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Expiration Date	06 October 2016
Reference	TORO20150902001

Details

Description

A research team from Transylvania, Romania, has developed a method and a mobile equipment for measuring the road carpet thickness.

This invention relates to a mobile equipment for measuring through a non-destructive method of propagation time through the road layer structure, determines the propagation speed and the thickness of the two layers on the road and provide power adjustment provided by the transmitter. Mobile equipment for non-destructive thickness measurement of layers is intended for use in road construction.

According to the invention, the method consists in emitting an ultrasound impulse at the surface of a road carpet to be measured, propagating the impulse up to meeting a reflecting surface, where it is reflected, being received, after a $[\Delta] t$ time, at the surface of the carpet, the thickness (h) of the carpet being given by the expression $h = [\Delta] t \cdot v / 2$, where (v) is the impulse propagation velocity in the material, for a good precision of the measurements, the $[\Delta] t$ time being obtained by averaging great number of measurements carried out in a single point. The equipment consists of two transducers secured one near the other, on the surface of a layer to be tested, namely, an emitting transducer (TE) supplied with impulses from a low frequency impulse generator (GI) and a receiving transducer (TR), for receiving the impulses reflected by a reflecting surface separating the layer to be tested from the following layer, a comparator module (CO) for taking over the signals transmitted by the receiving transducer (TR) and a command and control module (MCC) which commands the impulse generator (GI) and processes the received data, in order to determine the layer to be tested, the obtained results being displayed on a display (DSP).

Equipment according to the invention is in the modular form and contains the console operator (COP), on whose front panel keyboard lies (TT) and the display (DSP) this is fixed on the top of a mobile trolley (CM), which is connected via conductors to connection box with transducers (CT), fixed on the bottom of the mobile trolley (CM), which contains two transducers (TE) and

(TR), fixed by pressing the bottom of the box (CT), mobile trolley (CM) enable optimum fixation of the two boxes, their interconnection and the mobility of the whole equipment.

The initial condition is that during measurement to ensure a permanent acoustic coupling between the active surfaces of the pressure (TE) and (TR) and the surface of the material to be measured by means of an acoustic coupler material (MC), so as to be a superficial tension enough to form a pellicle regardless of pitch and roughness of the surface layer of the sample. Applications in the field of non-destructive control, materials science, equipment for measuring the quality of road construction road through non-destructive methods and measurement of the thickness of the layers of road materials (composites, asphalt, etc.).

The Transylvanian research team is interested in finding industrial partners interested in research cooperation agreements, services agreements and technical cooperation agreements.

Advantages and Innovations

The advantage of the method is that it allows the evaluation of the characteristics of the road serving the quality following and continuously steadiness of road layers, compared to the classical methods used, which are hard to use long and complex machines requiring and the data it provides cannot be used immediately by creating a gap between the results and the decision correct.

The advantages of mobile equipment are: ensure operative notification by displaying more parameters (time and propagation velocities, thicknesses for a layer or two layers), is an autonomous, contains high-performance electronics with micro-controller and allows the removal of errors through the mediation of a large number of data collected during the measurement in a single point and it the interface to the computer which provides external data store.

As novelties:

- Ensures the decrease of working comparatively to the medical imaging systems that have high frequencies above 1 MHz, through the use of two transmitters with piezoelectric elements with low resonance frequency (50-100 kHz), in order to increase depth of insight and optimum transmission of ultrasound in non-homogeneous materials type asphalt;
- Ensures optimal acoustic coupling with an intermediate material (wet cement, water, or petroleum jelly) (MC), and warns the malfunction of equipment in case of lack of pressure acoustic coupling with a surface contact at layer road investigated, by displaying the shellfish poisoning (DSP), thus shortening the time to check the good functioning;
- Ensures the accuracy of measurement through the mediation of the results of a large number of measurements made on a single point (64 or 128 data collected) and the establishment of a margin of error of measurement.

Stage of Development

Under development/lab tested

IPR Status

Patent(s) applied for but not yet granted, Copyright

Keywords

Technology

01001002	Digital Systems, Digital Representation
01003008	Data Processing / Data Interchange, Middleware
02006004	Installations related to construction (energy, lighting, ...)
03007	Sound Engineering/Technology

Market

02007003	Operating systems and utilities
02007007	Applications software
02007024	Programming services/systems engineering
08005	Other Industrial Products (not elsewhere classified)

NACE

M.72.1.9	Other research and experimental development on natural sciences and engineering
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Open for EOI : **Yes**

Dissemination

Send to Sector Group

Sustainable Construction

Client

Type and Size of Organisation Behind the Profile

R&D Institution

Year Established

0

Already Engaged in Trans-National Cooperation

No.

Languages Spoken

English

Client Country

Romania

Partner Sought

Type and Role of Partner Sought

Type and role of partner sought: industry, academic and research organization.

Specific area of the partner: road construction industry and research.

The task to be performed by the industrial partner sought is the technological transfer of method and equipment under license agreement and technical cooperation agreement.

The task to be performed by the academic or research organization partners is research cooperation for joint development of method and equipment.

Type and Size of Partner Sought

SME 51-250

Type of Partnership Considered

License agreement

Technical cooperation agreement

Research cooperation agreement