PAPWORTHS CONSTRUCTION TESTING EQUIPMENT

Melbourne Office
Niddrie
(03) 9938 3830
r.barnes@pcte.com.au

Perth Office
Nowergup
(08) 9407 5363

Website
www.pcte.com.au

Sydney Office
Brookvale
(02) 9939 7177

Pundit Lab– Ultrasonic Pulse Velocity Tester

Figure 1: Pundit Lab

Introduction

The pulse velocity in a material depends on its density and its elastic properties. These in turn are related to the quality and the strength of the material. It is therefore possible to obtain information about the properties of components by sonic investigations. The world known Pundit offers users a reliable and accurate method for determining the sonic properties of materials.

Materials

An essential tool for investigating a wide range of materials:

- Concrete
- Ceramics and Refractories
- Timber
- and many others

Applications

Ultrasonic testing can be used for:

- The homogeneity of a material
- The presence of voids, cracks or other internal imperfections or defects
- Changes in the concrete which may occur with time (i.e. due to the cement hydration) or damage from fire, frost or chemical attack
- The strength or modulus of a material
- The quality of the concrete in relation to specified standard requirements

Test Method

Ultrasonic testing in its most basic mode is called time of flight. This refers to timing the arrival of an ultrasonic pulse from one transducer to another through a solid medium. The ultrasonic pulse in this instance is a p-wave (or compression wave). The ultrasonic pulse velocity (UPV) is calculated by dividing the distance between the transducer by the time of arrival.

Access for Testing

Pundit offers three methods of transmission. These can be seen in the image below. The method of transmission is determined by access to the concrete elements surfaces and the characteristic being tested.

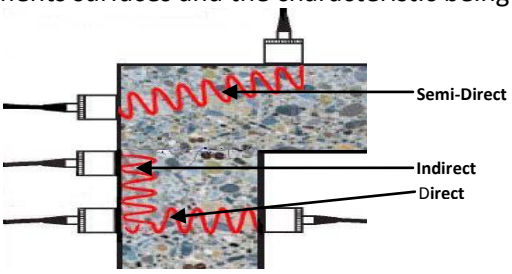

Figure 2: Methods of Ultrasonic Testing

Pundit Lab has an automatic function for indirect (surface wave) measurements. Pundit Lab is calibrated in accordance with EN 12504-4.

Field Features for Pundit

Crack Depths

The Pundit has an automated feature which allows crack depths (BS method) to be determined perpendicular to the concrete surface.

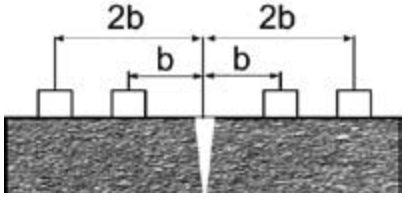

Figure 3: Crack Depth using BS1881 pt 203

Combining of UPV's with Rebound for Strength

This is a method (often referred to as the Rebultra method) by which the concrete strength can be calculated using a combination of the rebound value of the concrete and the UPV. Using these two independent factors will give greater accuracy, but must be calibrated using local materials.

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Pundit Link Analysis Software

The Windows based software Pundit Link, developed by Proceq SA, unlocks the full capabilities of the Pundit Lab, providing the user with:

- waveform visualization and analysis
- interactive adjustment of trigger point
- on-line time data acquisition
- full remote control of the instrument
- export of data to third party applications

System requirements: Windows XP, Windows Vista, Windows 7, USB port. An Internet connection is necessary for future software and firmware updates. See figure 3 on the following page for a screenshot.

Transducer frequencies

Comes standard with 54kHz transducers, although a range of frequencies are available from 24kHz to 150kHz. There are also exponential transducers available for dry coupling and wood applications.
There are also a new range of 250 kHz shear wave transducers available.

Form Supplied

Comes standard with:

- Pundit Unit
- Two 54kHz transducers
- Two 1.5m transducer cables
- Ultrasound couplant
- Calibration Bar
- USB charger with USB-cable
- Pundit link Software
- Operating Manual

Relevant Standards

- EN12504-4 (Europe)
- ASTM C 597-02 (North America)
- BS 1881 Part 203 (UK)
- ISO1920-7:2004 (International)

Specifications

Range	0.1 – 9999 µs
Accuracy	0.1µs
Display	79 x 21 mm passive matrix OLED
Transmitter	12 V, 250V, 350V, 500V, AUTO
Battery	4 x AA batteries, primary or rechargeable
Mains Power	Via USB Charger
Operating Temp	-10° to 60°C
Instrument dimensions	172 x 55 x 220 mm
Instrument weight	1.316 kg (incl. batteries)

About PCTE

PCTE have over 30 years experience in the measurement and testing of concrete. With experience in research, consulting and construction they are able to assist you in reviewing issues and developing solutions. PCTE can provide more than just the equipment. They can provide leading technical support for your business.

Other Equipment

The full Proceq range of equipment is available for insitu non-destructive concrete measurement, including Schmidt Hammers, Covermeters, Half Potentials, Resistivity and Permeability. The Olson Instrument range includes the NDE360, CTG, Freedom Data PC and DAS as well as the resonance tester. We also supply Intelli-Rock maturity, temp and humidity logging systems, corrosion rate monitoring equipment, and Ground Penetrating Radar.

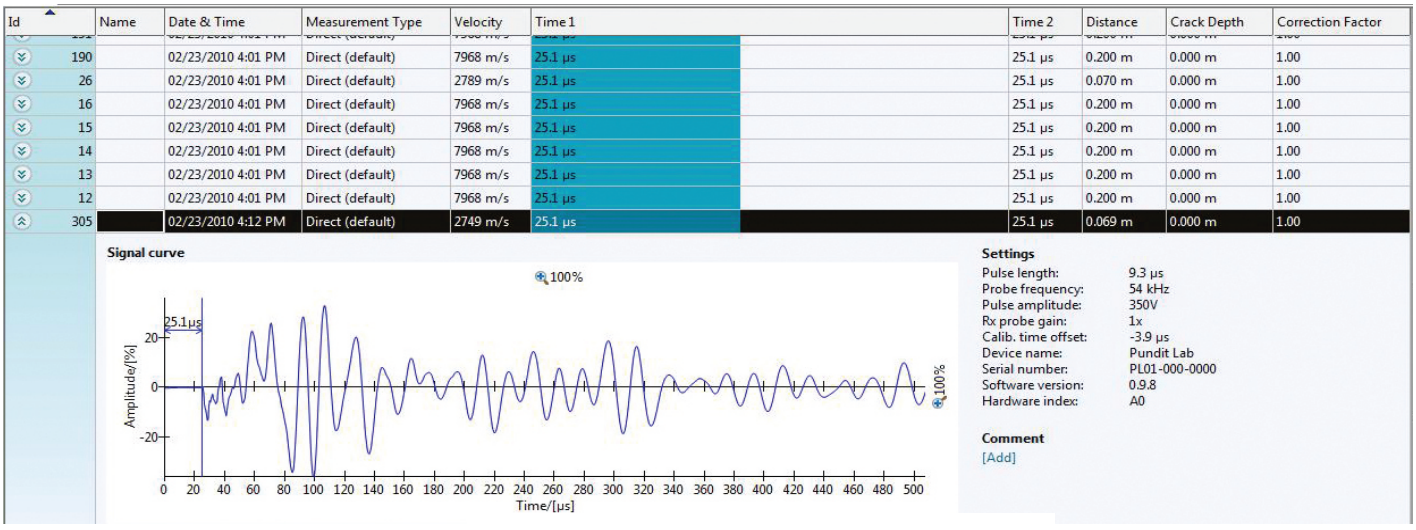

Figure 4: Pundit Link Analysis Software