

## Surfer (UK1401) – UPV Tester

The UK1401 Surfer is an ultrasonic pulse velocity tester, it uses dry point contact transducers to determine an indirect UPV measurement, also known as a surface UPV.

The surfer is suitable for the measuring the velocity of ultrasonic compression waves [also known as P-Waves] in hard materials including concrete, rocks and ceramics.

It is commonly used to compare the relative quality or strength of concrete and rock, and also to estimate crack depths in concrete structures.

The Surfer's major advantage as a compact, handheld unit is immediate testing and feedback, the dry point contact transducers require no gel or grease to measure with.

### Applications

There are many applications for the Surfer, these are the jobs for which the surfer can be used, for detail on the measurement modes please look two sections below.

- The determination of the strength and integrity of concrete.
  - The Surfer includes an estimation of MPa compression strength with inbuilt calibration curves
- Detect close-to-surface flaws by velocity decreasing or increasing around a potential flaw
- Evaluation of the degree of anisotropy in composite materials
- Evaluation of the degree of concrete aging
- Automatically evaluation of crack depths perpendicular to the concrete surface
- Evaluation of porosity and fissuring in materials

### Features

The device features an ergonomic body made from light weight shock-proof plastic that makes it very convenient to work with in field.

- Built-in automatic gain regulation system
- Audible indication of test success
- Data logs up to 4000 readings with the ability to group readings
- USB data transfer to PC



### Technical Specifications

<b>Time measurement range</b>	15 - 100 $\mu$ s
<b>Velocity measurement range</b>	1500 - 9999 m/s
<b>Crack depth measurement range</b>	10-50 mm
<b>Measuring error</b>	$\pm$ 1%
<b>Working frequency</b>	50 kHz
<b>Operation temperature range</b>	-20° to +50° C
<b>Operation time</b>	100h
<b>Size</b>	200 x 120 x 35 mm
<b>Weight of electronic unit</b>	350g
<b>Quantity of objects in memory</b>	4000

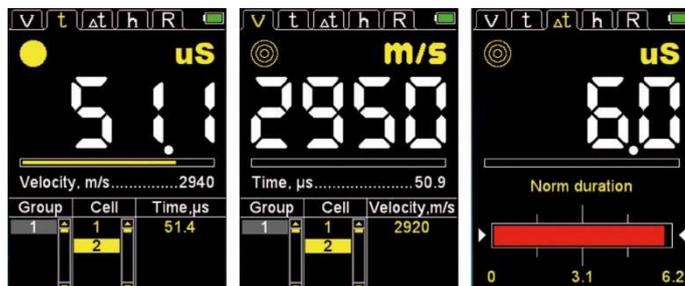


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## Measurement Modes

### Velocity & Transmission Time

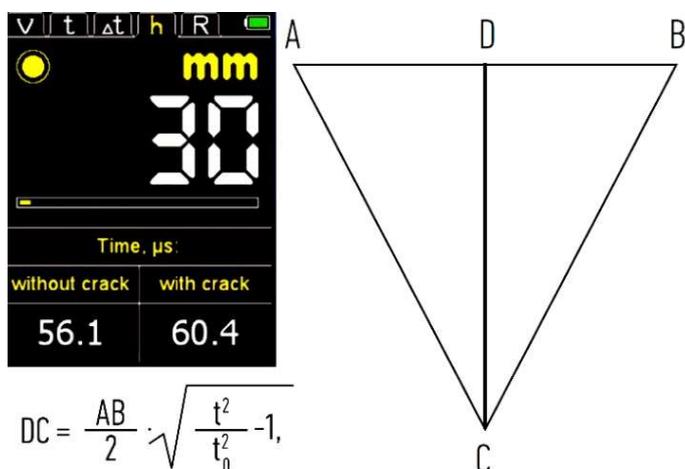
Time is the raw measurement recorded by the UK1401. As the DPC transducers are at a fixed 150 mm spacing the unit can also calculate compression wave velocity.



### Crack Depth

A trigonometric estimate of crack depth can be taken with the Surfer.

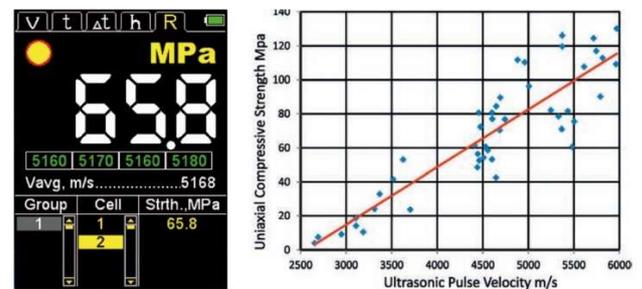
The instrument determines the crack depth DC comparing the propagation time  $t$  of the ultrasonic waves in the path without crack (path **ADB**) to crack interrupted propagation time  $t_0$  in the path with a crack (path **ACB**).



### Concrete Compressive Strength

Included with the Surfer firmware is a mode to estimate concrete compressive strength, with two correlation curves, one valid between 12.5 > 45 MPa and another between 45 > 75 MPa.

As with all correlated measurements the operator should consider creating and using their own correlation curve specific to local materials, but this mode offer a quick estimate.



## Other Equipment

PCTE supply three main ranges: NDT, Lab and Geotech Instrumentation.

NDT includes: Rebound Hammers, Covermeters, Ultrasonics, GPR, Corrosion Testing, Coating Testing and Foundation Testing

Lab includes equipment for: Concrete, Cement, Aggregate, Soil, Asphalt and Metal

Geotech Instrumentation includes: Strain Gauges, Piezometers, Inclometers, Extensometers, Tiltmeters, Load Cells and Dataloggers

## About PCTE

PCTE have over 30 years' experience in the measurement and testing of construction materials. PCTE can provide more than just the equipment, they can provide expert training. PCTE have a service centre in Sydney in which they can provide calibration, repairs and warranty repairs.