

Vikasonic

measuring the early setting and hardening with ultrasonic waves

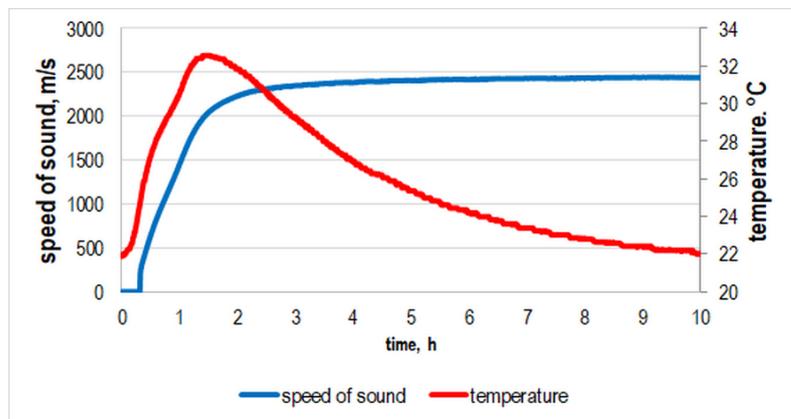
The early setting is usually measured with the penetrometer or the Vicat apparatus. A significant disadvantage of these currently applied methods for the assessment of setting and hardening behaviour is that these methods give only a snapshot in time of the material properties and the hydration process cannot be continuously monitored.

In the last years many studies have shown the possibility of using ultrasonic waves to monitor setting times and to characterize strength estimation, and to detect concrete uniformity, and changes in properties of cementitious materials with time. In cooperation with a German dry mix company, Schleibinger developed a special ultrasonic unit with an integrated data logger and a special designed setup for mortar specimen.

Measurement principle

Fresh mortar is placed between two ultrasonic transducers. The ultrasound signal is generated by a signal source, is then transmitted through the mortar and detected by the second transducer. The time the signal needs to go through the sample to the receiver is measured to calculate the velocity.

During the hardening of the sample transit times are continuously measured. Due to the change of the consistency of the sample this results in different wave velocities. If plotted in a graph a characteristic curve which capture the hardening and setting of tested material can be obtained.



Measurement setup

The Vikasonic is supplied with the measurement cell. Each cell is made up of two ultrasonic transducers. The speed of sound and the elastic modulus are calculated and recorded as well. Additionally, a thermocouple can be connected to the Vikasonic providing the temperature measurement of the sample during the hydration. The measurement is done continuously and the measurement data are recorded digitally to a USB stick,

supplied with the Vikasonic. The data recorded can be easily imported e.g. to the Excel worksheet or other programmes.

In addition to the laboratory application, the device can also be taken to the construction site and can be used to detect e.g. voids, cracks, defects and internal damages of the building materials. Especially in the freezing and thawing test of concrete Vikasonic can be used to estimate the frost damage non-destructively.

Advantages

- compact
- easy to handle
- no mechanical moving parts
- maintenance-free
- power supply: mains or battery driven
- autonomous measurement
- continuously data recording
- temperature measurement

Technical specifications*:

transit time measurement range	2 μ s ... 24000 μ s
transmitter excitation voltage	~ 200V, ~1000V, ~1500V
frequency	54 kHz, 80 kHz (others on request)
accuracy	\pm 0.1 μ s
puls rate	0.2s, 0.5s, 1s, 5s
puls width	\leq 1 μ s
thermocouple	-10 ... +100 °C
power supply	Mains or battery
mains input	110V ... 240V, 50/60Hz
battery	3x AA cell
display	LCD 56mm x 38mm

Order information:

U0010	Vikasonic incl. test cell, transducers and thermocouple
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*Changes are reserved for technical progress.

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