

Bauer Spezialtiefbau

Cross Hole Ultrasonic Logging

Integrity testing of concrete by ultrasonic

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Description

Sonic or transmission testing is a frequently used test procedure to verify the integrity of concrete in piles and diaphragm walls. The Technical Services Department of BAUER Spezialtiefbau GmbH of Schrobenhausen, Germany, uses a **Cross Hole Ultrasonic Monitor (CHUM)**.

Bauer brings to bear its extensive experience gained over many years in the application of this test procedure on numerous sites both in Germany and overseas.

Measuring principle

Vertical access tubes attached to the reinforcement cage are inserted into a pile or trench. The actual spacing between the tubes must be known and can be up to five metres.

In two adjacent access tubes, ultrasound transmitter and receiver probes are moved simultaneously from the bottom upward until the entire shaft is scanned. Both access tubes are filled with water to facilitate optimal transmission of the sonic signal from the transmitter into the concrete and from the concrete into the receiver. Both the signal travel time between transmitter and receiver and the intensity or strength of the signal arriving at the receiver are recorded.



Cross-Hole Ultrasonic Monitor (CHUM) unit set up on site
(www.Piletest.com)

The signal travel time is directly proportional to the distance between transmitter and receiver probes and, thus, the spacing of the access tubes. The signal travel time is also inversely proportional to the speed of propagation of the sonic signal in concrete. The speed of signal propagation is primarily dependent on the shear modulus of the concrete and thus on the quality of the concrete.

For two parallel access tubes an increase in signal travel time indicates a reduction in the quality of the concrete. The „softer“ the concrete, the lower is the sonic energy arriving at the receiver. This sonic energy or signal strength is also recorded concurrently with the signal travel time. A similar relationship applies to dampening or impedance of the sonic signal.

The test is carried out in accordance with the EA Piles 2012 (Chap. 12.3, 2nd edition). If anomalies or variations in signal travel time or signal strength are detected, these can be defined more accurately by comparing the results of all scans carried out on different pairs of access tubes (see: layout plan).