

# Cross-Hole Analyzer (CHAMP)

## For crosshole and single hole sonic logging

The Cross-Hole Analyzer (CHAMP) determines the quality and consistency of the concrete of drilled shafts, slurry walls, bored piles, cast-in-situ piles and other types of concrete foundations. It may be used for crosshole sonic logging (CSL) of drilled shafts or single hole sonic logging (SSL) of smaller augered cast-in-place piles.

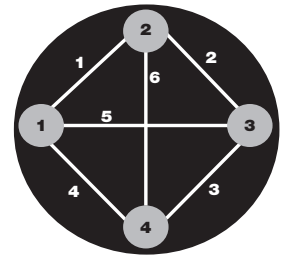
- Small
- Light weight
- Rugged
- Easy touch screen operation
- Color LCD visible even in direct sunlight
- Battery lasts an entire day of normal testing



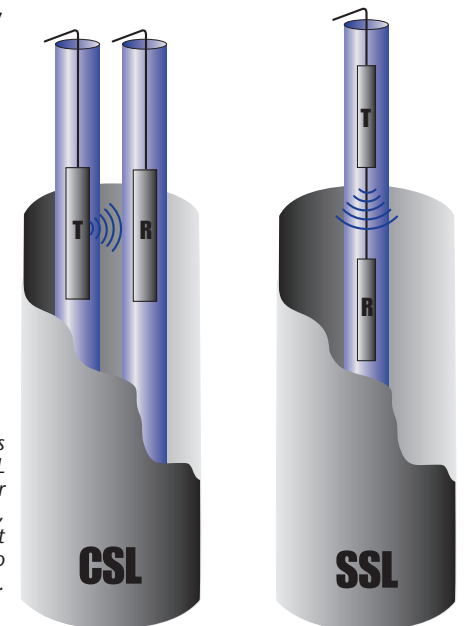
The CHAMP performs essential real time analysis (waterfall diagram) on site. Data is transferred to a computer for review and additional analysis with CHA-W and Tomosonic Software, and for report preparation.

### THE TEST:

Shafts that will be tested with the CHAMP are built with steel (preferred for CSL) or PVC (required for SSL) tubes that span their length. A transmitter in one tube sends a high frequency signal that travels through the concrete and is detected by a receiver in another tube (or in the same tube for SSL). As these sensors are raised and/or lowered along the length of the foundation, they progressively scan the concrete for signal strength versus time and depth. In CSL, scanning various tube combinations for the entire shaft allows evaluation of concrete quality and defect location along the length and by quadrant.



Shaft cross section with four tubes, six paths are tested.



Shaft schematics showing one tube (SSL test, right) or one pair of tubes (CSL test, left), with signal being sent from transmitter (T) to receiver (R).

The CHAMP meets or exceeds the requirements of ASTM D6760-08 and several other crosshole sonic logging codes and standards. Visit [www.pile.com](http://www.pile.com) for a listing.



**Quality Assurance for Deep Foundations**

30725 Aurora Road Cleveland Ohio 44139 USA

tel: +1-216-831-6131 fax: +1-216-831-0916

Email: [info@pile.com](mailto:info@pile.com) [www.pile.com](http://www.pile.com)

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## DATA PROCESSING SOFTWARE

### CHA-W

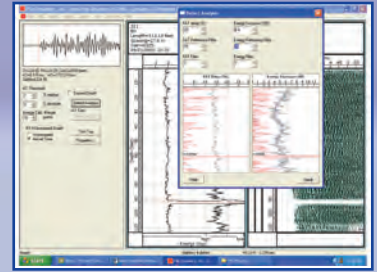
Performs data quality checks.

Provides powerful tools for data analysis:

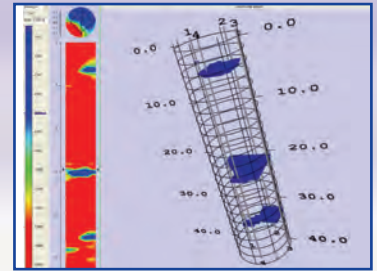
- Edge Finder for First Arrival Time detection.
- Defect Analysis for easy defect identification.
- Two methods of signal strength evaluation (energy or amplitude).

Outputs user customized graphs and tables:

- Sonic Map - Signal strength versus time and depth in traditional waterfall diagram.
- First Arrival Time - Signal travel time from transmitter to receiver, versus depth.
- Wave-speed Plot - Wave-speed (an indicator of concrete strength) versus depth.
- Wave-speed Table - Wave-speeds, means and standard deviations.
- Energy or Amplitude Plot - Signal strength versus depth.
- Defect location graphically (horizontal red line) and in table format.



CHA-W screen



Tomosonic screen

### TOMOSONIC\*

Tomosonic optical tomography software produces 2-D and 3-D color coded images that help visualize local defects. Views include horizontal and vertical slices and a three dimensional representation of the shaft.

## CHAMP Specifications

### Physical

Size: 115 x 190 x 240 mm

Weight: 4.2 kg

Screen: VGA sunlight readable touch screen display

Screen Size: 21.3 cm

Operating temperature range: 0 to 40°C.

Power: Internal 12V battery (lasts at least 5 hours in data collection mode)

### Electronic

PCMCIA drive including removable memory card  $\geq$  128 MB

Analog to digital converter resolution: 12 bits

Sampling rate: 500 kHz, 1 MHz and 2 MHz, user selectable

Scan rate: 32 scans/s (pull rate allows up to approx. 1.5 m/s)

User adjustable gain, trigger and transmission power level

User selectable record size: 250, 500, and 1,000 points

### Other

Operates in English or SI units

Windows® CE operating system

Furnished with CHA-W software (CHA-W is compatible with

Windows® 2000, XP and Vista)

User manual included

One year warranty

Lifetime technical support

The CHAMP supports dual high resolution encoders to independently track the depth and direction of probe movements. Probes may be at different levels during pulling. Data can be taken in both upward and downward movements of the probes. The encoders may be placed directly on the tubes or on a tripod for CSL tests. SSL is always performed with a tripod.

Probes are sturdy: their oil-filled brass shells are pressure tested for water depths up to 300 m. Transmitter probes have an exclusive safety feature, they are powered by a 12 volt source in the probe and transformed to higher voltages within the probe itself. These higher voltages allow testing between access tubes more than 3 m apart. The probes may be fitted with bottom extension weights for deeper shafts and centralizers to position the probes in the center of the tubes.

## Probes Specifications

### Physical

Diameter: 25 mm

Length: 215 mm

Cable length: 60 m, 100 m or 150 m

Cable jacket: Heavy duty polyurethane

Element: Ceramic

Enclosure: Nickel Plated Brass

### Electronic

Transmitter frequency (nominal):

45 kHz

Receiver tuned to 45 KHz nominal

Transmitter voltage: 200 – 800

Volts (user selectable)

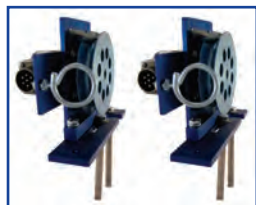
### Other

Independent depth encoder

for each probe.



Transmitter and receiver with weights.



Depth encoders for direct placement on tubes.



Tripod assembly with dual encoders.



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**GSP** mbH

Steubenstraße 46

Tel: +49 621 33 13 61

info@gsp-mannheim.de

D-68163 Mannheim

Fax +49 621 34 35 8

www.gsp-mannheim.de