

# Cross-Hole Analyzer (CHAMP)

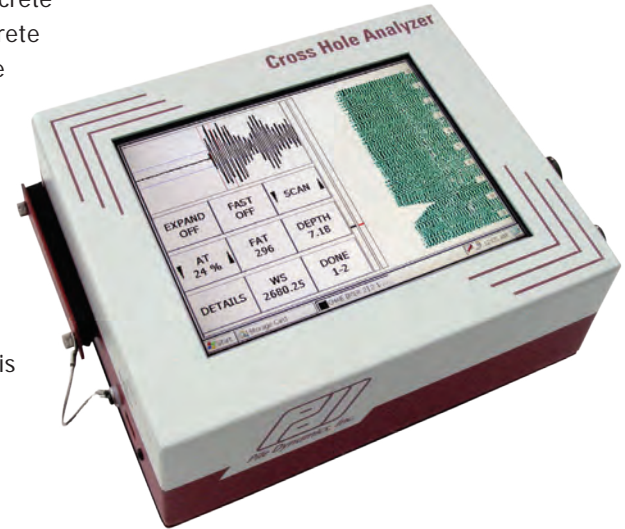
For crosshole and single hole sonic logging



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.

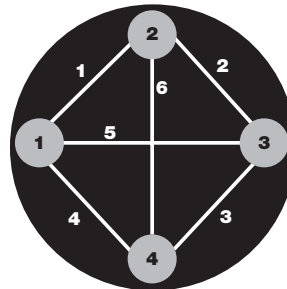
- Small
- Light weight
- Rugged
- Easy touch screen operation
- Color LCD visible even in direct sunlight
- Battery lasts an entire day of normal testing

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.



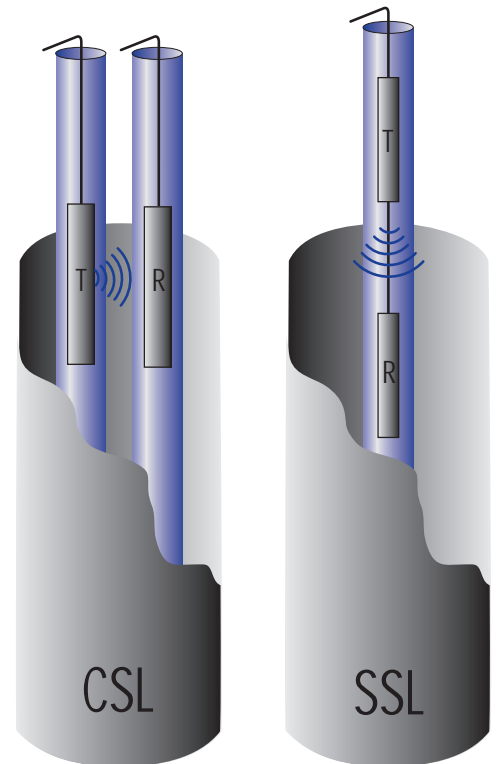
## The Test:

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, the CHAMP displays and records the strength of the received signal, as well as the time from signal emission to signal arrival at the receiver, versus 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. The optional Motorized Probe Deployment System relieves the operator from pulling the cables manually, making testing more comfortable.



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



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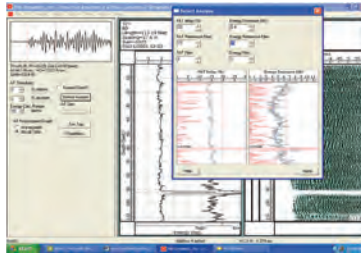
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# CHA-W Data Processing Software

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).



CHA-W screen

Performs data quality checks.

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

Optional Tomosonic software outputs 2D and 3D views of the shaft.

## CHAMP Specifications

### Physical

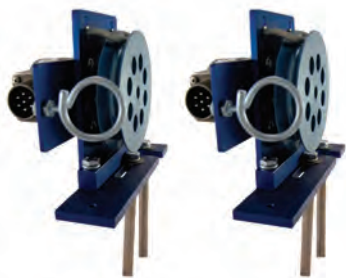
Size: 115 x 190 x 240 mm Weight: 4.2 kg  
Screen: 21.3 cm VGA sunlight readable touch screen display  
Operating temperature range: 0 to 40°C.  
Power: Internal 12V battery (lasts at least 5 hours in data collection mode)

### Electronic

PCMCIA drive including removable memory card > 128 MB  
Analog to digital converter resolution: 12 bits  
Sampling rate: 500 kHz, 1 MHz and 2 MHz, user selectable  
(equivalent measuring accuracy 2µs, 1µs and 0.5µs)  
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  
User manual included  
One year warranty and lifetime technical support  
Dual high resolution encoders independently track the depth and direction of probe movements. Probes may be at different levels during pulling. Data may be taken in upward or downward direction. Encoders are placed directly on tubes, or on a tripod or are part of optional motorized probe deployment system.



Depth encoders



Motorized Probe Deployment System

## Probes Specifications

### Physical

Diameter: 25 mm Length: 215 mm  
Element: Ceramic  
Enclosure: Oil Filled Nickel Plated Brass



Transmitter and receiver with weights.

Shells pressure tested to 300m water depth  
Optional centralizers and bottom extension weights for deeper shafts.  
Probe Cable: 60 m, 100 m or 150 m, heavy duty polyurethane jacket

### Electronic

Transmitter frequency (nominal): 45 kHz  
Receiver tuned to 45 KHz nominal  
Transmitter voltage: 200, 400, 600 or 800 Volts (user selectable), powered by 12 V source in the CHAMP, for safety.  
Maximum probe separation: 3 m

## Motorized Probe Deployment System

### Main Unit

Size: Two 380mm x 480mm x 405mm spools Weight: 11.3Kg each  
Includes 60 m cable, detachable from spool  
Includes depth encoder for each probe, attached to frame

### Motor Control Unit

Size: 240mm x 160mm x 90mm  
Weight: 1.6 Kg  
Powered by either external battery (8 hours duration), 12VDC car battery, or 100 – 240 VAC with 12VDC converter  
Fast charger to recharge the external battery in 4 hours  
Variable probe pull rate: 0.150 to 0.915 m/sec (low, medium, high speed selection) Resettable circuit breaker motor protection  
Operating temperature range: 0° to 40°C Storage temperature range: -10° to 65°C

### Other

Includes pulley for placement at the tube  
Includes roller guide for routing cable through re-enforcement rebar cage or over casing



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