

CAPWAP® 2006

For reliable Dynamic Load Tests on any type of deep foundation

CAPWAP – CAse Pile Wave Analysis Program – determines static soil resistance and simulates a static load test.



CAPWAP calculates:

- Static shaft resistance, magnitude and distribution
- Static end bearing
- Stresses at any point along the shaft
- Energy transferred from the ram to the foundation

from force and velocity data measured by the **Pile Driving Analyzer®** on a foundation impacted by a ram.

Based on these results, CAPWAP simulates a static load test and predicts the instantaneous load settlement behavior of the tested foundation.

CAPWAP 2006 has an improved mathematical model that enhances the analysis of drilled shafts and augered cast-in-place piles. Numerous automatic search and help functions make CAPWAP an efficient and reliable analysis tool.

TYPICAL CAPWAP ANALYSIS

Forces and velocities measured at the top of a foundation during ram impact are related (complementary) quantities; foundation characteristics and soil resistance parameters govern this relationship. The basic CAPWAP procedure uses this fact and consists of the following steps:

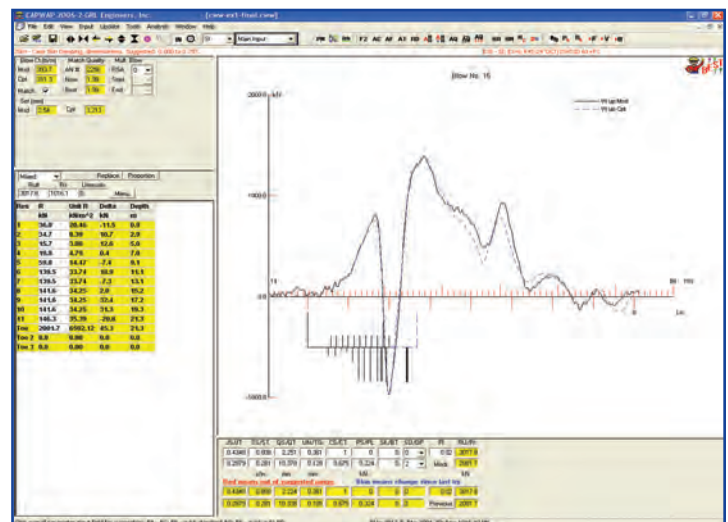
1. Retrieve force and velocity data from the Pile Driving Analyzer.
2. Setup pile model.
3. Assume soil resistance parameters.
4. Perform analysis using one of the measured quantities as an input and calculate the complementary quantity.
5. Compare measured with computed quantity.
6. If match is not satisfactory, adjust soil parameters such as resistance, quake and damping and go to step 4.
7. Output soil model, satisfactory match and simulated static test.

HELP FEATURES

CAPWAP guides the user to properly adjust the large number of variables that affect the signal matching process. Arriving at bearing capacity results is an efficient and rewarding process thanks to:

- Automated signal matching option (AC)
- Best match for individual or groups of variables (AQ)
- Automatic resistance distribution (AF)
- Automatic toe parameters check (AT)
- Static resistance – damping exchange (RD)
- Extensive expert help system
- Background manual

A training class prepares the software novice. Continuing technical support from Pile Dynamics is available to all registered users.



CAPWAP Analysis Screen



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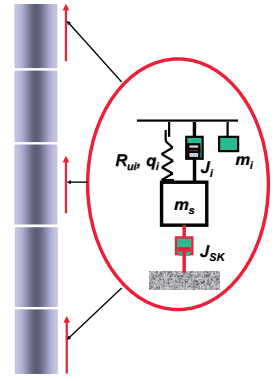
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THE CAPWAP PILE AND SOIL MODEL

CAPWAP is a signal matching program with an extended, Smith-type soil and continuous pile model. CAPWAP calculations are based on one-dimensional wave propagation theory. Calculations can be performed in English, SI or Metric units.

In its default mode, CAPWAP models the deep foundation as a series of 1 m long uniform sections with multiple elastic properties. Pile damping, splices, non-uniformities and multiple pile or shaft materials may also be modeled.

The soil resistance is typically lumped into individual resistance forces at 2 m intervals with elasto-plastic static, linearly viscous and mass related dynamic properties. Radiation damping is represented by an additional mass and dashpot. The user has the option of using individual toe resistance parameters such as a plug mass, a resistance gap and a true Smith damping approach. CAPWAP options include Residual Stress Analysis (RSA) for end of drive situations and Multiple Blow Analysis (MBA) to analyze restrrike tests.

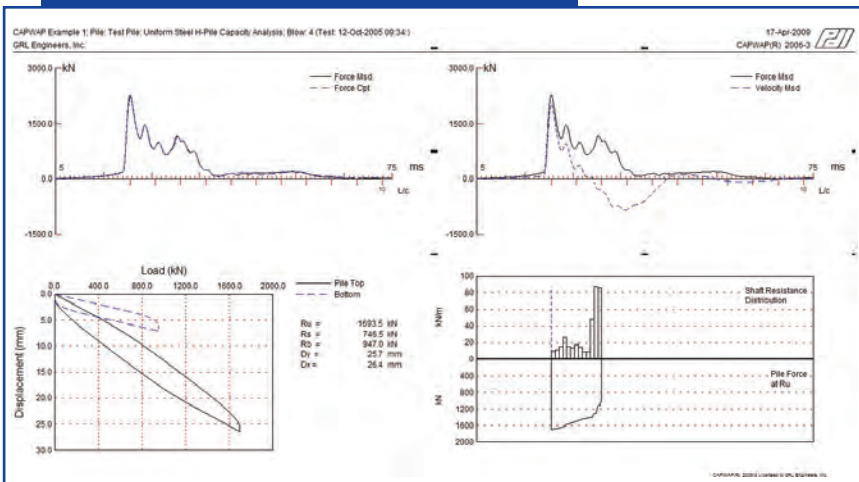


CAPWAP Soil Resistance and Pile Model

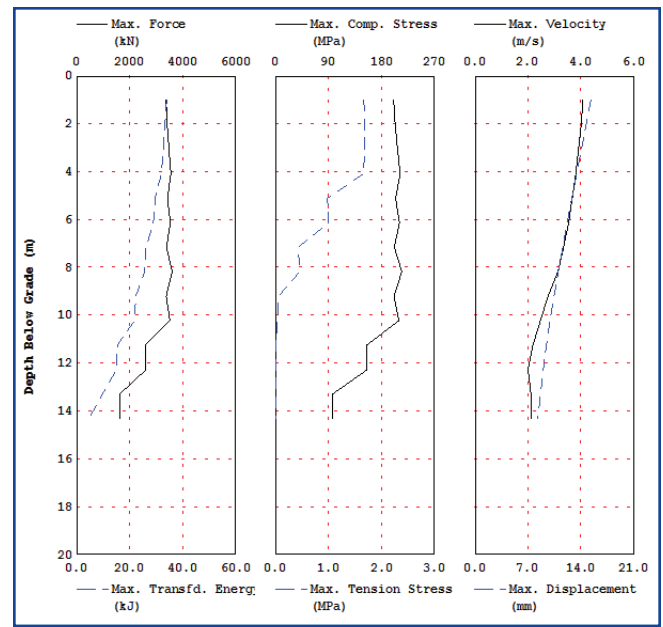
OUTPUT

- Simulated static test
- Resistance distribution
- Forces and stresses along the shaft
- Shaft and toe damping and quake
- Measured and computed forces and velocities
- Maxima of displacement and velocity
- Transferred energy
- CASE Method results

CAPWAP-calculated variables as a function of depth below sensors (from left: force in pile; transferred energy; tensile and compressive stresses; maxima of displacement and velocity.)



CAPWAP output (counter clockwise from top right: measured signals; signal match; simulated static test; resistance distribution; pile model.)

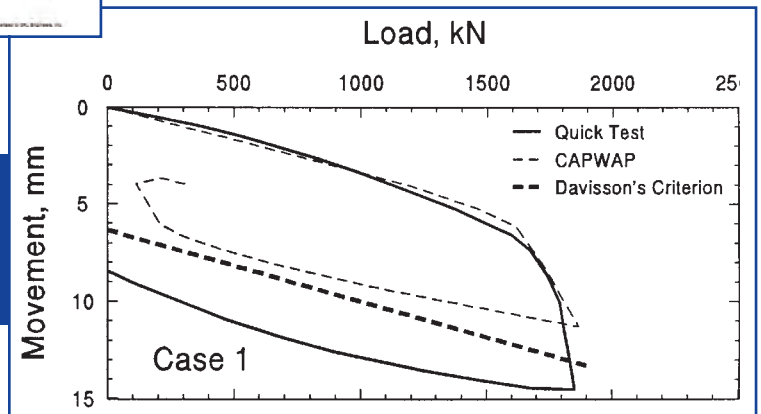


CORRELATIONS

Correlations between Load-Set Curves from static load test and from CAPWAP simulated tests on a variety of soils and types of foundations have been extensively published and are available at www.pile.com/reference.

Minimum Requirements

- Windows 2000, XP, or later • 30 MB of hard disk space
- CD-ROM Drive • USB Port for hardware key license
- Program to be operated by a person with engineering education at a institution of higher learning with additional preparation by Pile Dynamics or its representatives.



Load-Set Curves (measured from static load test and simulated by CAPWAP) of a 12 inch prestressed concrete pile, driven into sandy, clayey silts. CAPWAP analysis performed on an end of drive record. Static test performed within two hours of pile driving.



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