

# PDA/DLT-series

## Pile Driving Analysis/Dynamic Load Testing



Dynamic Load Testing (DLT) is a frequently used worldwide technique to evaluate the bearing capacity of piles. The Profound PDA/DLT-system is used for both DLT and for Pile Driving Analysis (PDA) as a powerful tool to control the pile driving process and reduce risks involved. During testing the instrumented pile is monitored, whereby the Profound PDA/DLT-system directly displays and saves the measurement data. The PDA/DLT-system meets national and international standards, such as ASTM D4945-12.

### Dynamic Load Testing

The Dynamic Load Test (DLT) is a considerably faster and cost-effective alternative for a Static Load Test (SLT). With the Profound PDA/DLT-system the bearing capacity of several piles can be assessed in a single day. DLT is used for cast-in-place, prefabricated concrete piles and all types of steel piles.

The load is applied by an impact hammer or a suitable drop weight onto the prepared pile head. The generated compression wave travels down the pile and reflects upwards. This reflected wave contains information about the shaft friction, toe resistance and possible pile defects. The measured signals are processed and automatically stored by the PDA/DLT-system. The data can easily be retrieved for further review, graphical presentations or reporting in full accordance with ASTM D4945-12. DLT has been in use worldwide for decades and extensive correlations between simulated and actual static load tests have proven the reliability of this method.

### Pile Driving Analysis

During pile driving the performance of the hammer, the condition of the cushion, the behaviour of the pile and the driving resistance of the soil are accurately monitored and analysed.

The Profound PDA-USB conditioner directly processes the signals from the sensors and immediately shows a variety of results from the velocity and force signals obtained for each hammer blow on the screen of the notebook. A selection of the available graphs, all presented as a function of time and scaled in SI units, include: force and velocity x impedance, downward and upward travelling waves, transferred energy, driving resistance and the estimated static resistance. In addition other important parameters such as maximum compression and tension stresses in the pile, shaft friction and toe resistance can be shown as a function of blow number or penetration.



*The PDA-USB conditioner allows for optimum flexibility in the choice of a rugged notebook.*

### Flexible and efficient in the field

An experienced qualified engineer can set up a pile test within 15 minutes, whereby the pile is instrumented with sets of combined strain and acceleration sensors. The robust and compact PDA-USB conditioner is connected to a Windows® notebook and directly checks and shows correct connection as well as status of the sensors.

The complete PDA/DLT-system is used both for PDA and DLT. The accompanying PDA/DLT software for monitoring and reporting includes many features to further facilitate signal processing and interpretation.

### Analysis Software

Pile Driving Prediction software (PDPWAVE) is delivered within the standard PDA/DLT package and is used for pre-analysis. Signal matching software DLTWAVE is essential to provide an estimate of the ultimate bearing capacity from a DLT. It provides the soil resistance distribution along the pile shaft and a static load displacement graph.

### Key advantages of the PDA/DLT-system

- Fully digital signal processing
- Optimum flexibility and reliability
- Integrated sensor condition testing
- Immediate presentation of acquired data on screen
- Flexible USB based conditioner
- Easy mounting and handling of sensors and cables
- Proven technique in full compliance with ASTM D4945-12
- Backed by 40 years of pile testing experience
- Efficient addition to Static Load Testing according to Eurocode 7



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## Specifications PDA/DLT-system

### PDA-USB conditioner

Dimensions	: 165 x 171 x 52 mm
Weight	: 0.9 kg
Housing	: Hard anodized aluminum case
Operating temperature	: -20 °C to + 60 °C
I/O	: 2x USB for power and data transmission 1x connector for cable to junction box
Compatibility	: Windows XP/Vista/WIN 7.0
Sensor status control	: 4x Multicolor LED, 1 per channel

### Strain transducer

Range	: > (-2000...+2000) $\mu\epsilon$
Shock	: 5000 g Natural frequency when attached to foundation, greater than 2000 Hz

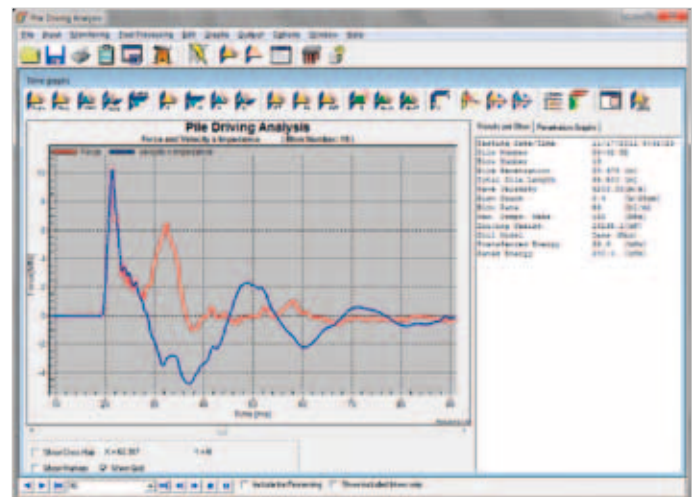
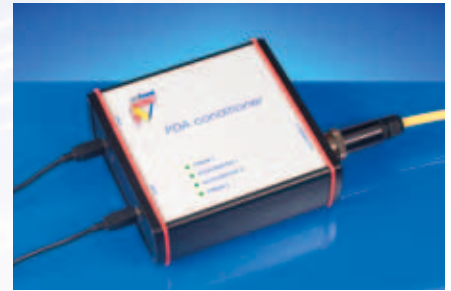
### Accelerometer

Type	: Piezoresistive accelerometer
Frequency range	: DC to 8000 Hz
Damping ratio	: 0.7
Range	: > (-5000...+5000) g

## Training and support

High strain dynamic tests require special knowledge and experience. Only qualified engineers should directly run the tests and do further interpretation. New users are strongly advised to follow a training course at the Profound Academy where operation of the system, the theory of PDA/DLT and interpretation of the measurement signals are discussed.

Profound, pioneer in the field of professional pile testing both in research and equipment, has over 50 years of worldwide experience and continuously strives to make the best technology available to clients. PDA/DLT is backed by over 40 years of pile testing experience for clients all over the world, onshore and offshore.



Screenshot from the PDA/DLT software.

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