

# LOADTEST

## Dynamic Load Testing (DLT)

### INTRODUCTION

Dynamic load testing can be an attractive cost effective alternative to traditional full scale static load testing. Instead of costly, time consuming proof loading using kentledge or anchor piles, the technique uses a heavy falling weight such as a piling hammer to impart a short duration impact to the pile head, whilst monitoring the pile response using attached transducers. The test generates data required by the foundation designer to provide assurance on the relative capacity of the foundation and can usually provide additional information that can be difficult to obtain via static load testing.

### DESCRIPTION

The test is performed by striking the pile head with a piling hammer or other suitable drop weight whilst monitoring pile soil response in terms of pile head force and velocity using specially developed bolt-on reusable transducers. The test may be performed on many pile types. The equipment used to energise the transducers and record their output is rugged and portable and easily accommodated in the back of a small vehicle.

### ADVANTAGES

- Can provide information difficult to obtain with static load tests, for example data on skin friction distribution and end bearing components of soil resistance.
- Can be used to assess pile integrity.
- Provides check of operating efficiency of driving hammer.
- Can be used to investigate anomalous driving behaviour.
- Cost effective and rapid to perform.
- Up to ten piles may be tested on a day.
- Causes minimum disruption to piling operations.
- No kentledge or anchor piles needed.
- Can be performed on piles installed over water.
- Piles do not need to be preselected for testing prior to installation.



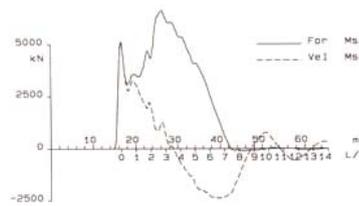
Testing a marine steel tubular pile

### RESULTS

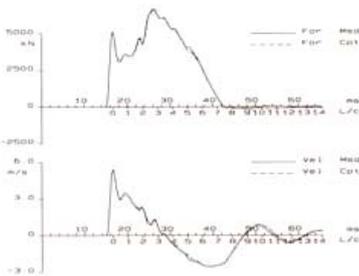
The measured pile head signals are analysed in real time to provide:

- an estimate of the soil resistance mobilised during the test.
- determination of maximum stresses in the pile and shaft integrity.
- measurement of the overall operating efficiency of the hammer and its coupling to the pile head.

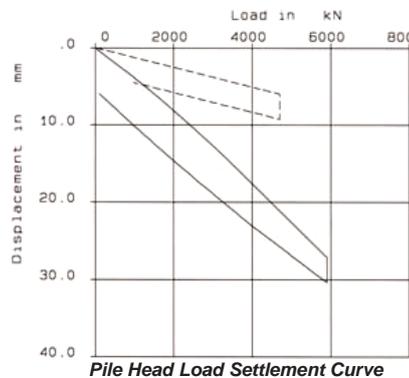
Additional analysis of each set of dynamic test data can be performed using the CAPWAP or DLTWAVE pile driving simulation computer programs. These programs use an iterative solution technique to optimise the parameters defining the soil resistance supporting the pile. This is done by matching forces at the pile head computed using stress wave theory with those actually measured during the test. The programs output many parameters valuable to the experienced piling engineer.



Typical Measured Signals



CAPWAP Output



Pile Head Load Settlement Curve

The parameters of most value are generally the distribution of soil resistance down the pile shaft and beneath the pile toe, and the computed pile head load settlement curve. This analysis is generally conducted in the office subsequent to the field testing but can easily be performed on site if rapid answers to anomalous behaviour are required, or to optimise driven pile lengths.