



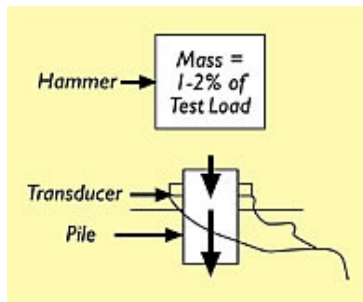
## DYNAMIC LOAD TESTING

Dynamic load testing (DLT) is a high strain test method for assessing pile performance. Over the last 15 years, it has been the predominant means of pile load testing worldwide. DLT involves impacting the head of a pile with a piling hammer or drop weight and measuring the resultant strains and accelerations. These measurements are used to quantify the pile and soil behaviour in response to the applied dynamic force. Some important capabilities of the DLT method are summarised as follows:

- \* Relatively quick and economical means of quality control for pile construction.
- \* On-site monitoring of piling hammer performance.
- \* Assessment of driving problems and/or pile damage.
- \* Provides immediate estimate of mobilised pile resistances during the blow.
- \* Can be applied to all types of pile foundation.

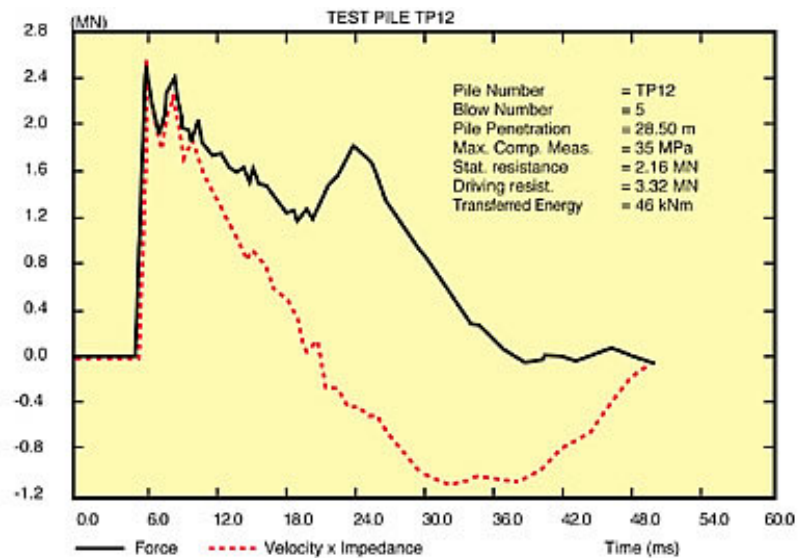
While originally developed for driven piles, the DLT method has been successfully transferred to the testing of cast-in-place piles. DLT, when applied to pre-formed driven piles, is a powerful diagnostic tool to control and identify problems in the pile driving process.

DLT is carried out using either the Foundation Pile Diagnostic System (FPDS), manufactured by the TNO Building and Construction Research Organisation in the Netherlands or the PAK System, manufactured by Pile Dynamics, Inc. of the USA. Both systems comprise a portable field computer with signal processing electronics, a signal conditioning system, two strain gauge/acceleration transducers, together with software for monitoring and reporting.



## HOW DOES IT WORK?

Dynamic load testing is carried out with two identical bolt-on strain and acceleration transducers attached to a section of pile. The pile is then struck with a driving hammer or a separate drop weight. A hammer mass of about 1 to 2% of the test load is generally sufficient. The generated compressive stress wave travels down the piles and reflects from the pile toe upward. The stress waves, which are picked up by the transducers, are processed and automatically stored in the computer for further analysis and reporting.



The analysis is carried out using the signal matching program CAPWAP. Pile and soil data are modelled and a response is calculated based on one dimensional wave equation theory. The signal matching process utilises an iterative method in which the results of each analysis are compared to the actual measured pile behaviour. Appropriate dynamic soil parameters are refined until a satisfactory match is achieved. The mobilised static shaft and toe resistance of the pile can hence be derived. The signal matching program also provides a prediction of the static load displacement performance of the pile on the basis of the refined pile and soil model.