

Cementation

SKANSKA

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Auto-Load Test[®]

Automatic Static Load Testing

Trademarks

- AUTO LOAD TEST[®]
- AUTO SLT[®]
- ASLT[®]
- CEMSET[®]
- CEMSOLVE[®]
- TIMESET[®]

Patents

- UK Patent 2323174
- Europe Patent 1007793
- USA Patent 6311567
- Canada Patent 2283807
- South Africa Patent 98/2114
- India Patent 630/DEL/98



A normal Maintained Loading Test is one in which some loads are held for quite long periods while other loads are held for short periods. During the longer periods creep and pore water pressure have opportunity to approach final conditions while in the shorter periods deformations can develop to only a limited extent. This leads to erratically determined load/ settlement relationships.

Only if the creep and deformation can be logged accurately and the resulting deformation projected to the final state, can a true interpretation of pile behaviour be made.

By the use of a computer program called TIMESET[®] it is possible to project the final state of deformation under any load provided the load has been held truly constant for a reasonable duration - normally a few hours.

Cementation Skanska have developed an automated testing method AUTO LOAD TEST[®] computer based equipment which maintains loads constant to a high degree of precision and electronically logs all settlements at prescribed short time intervals. This means that for any given load the final settlement can be projected with high accuracy. This is believed to be the most advanced commercially available equipment in the world.

Having projected the true long term settlements for a series of loads, it is found that the shape and characteristics of the load/deformation relationship can be interpreted according to the properties of the soil in which the pile is embedded. This is of course subject to the settlement of the pile having been pursued to a point where a significant proportion of the base load has been mobilised.

Analysis using a computer program called CEMSOLVE[®] allows the individual shaft and base loads to be determined, together with the soil stiffness characteristics which prevail beneath the pile base. These data may then be used to determine the behaviour of other piles of the same length in the same ground conditions using a further computer program in the suite.

Application of this system in well over 1000 cases demonstrates the reliability and genuine usefulness of the method. The method has become known by the name CEMSET[®] and is based on and developed from the paper "A new method for single pile settlement prediction and analysis" by W.G.K. Fleming, published in Geotechnique 42, No 3, 411-425, 1992.

The programs have far reaching value in the analysis and prediction of pile performance. They

also provide a useful diagnostic tool for those cases where piles do not perform according to expectation, for example arising from a particular construction technique.

The system demonstrates clearly the limitations of many testing methods and the problems associated with some currently fashionable rapid tests. It offers a method of determining appropriate soil parameters more reliably than most small scale site investigation methods.

The method may equally be applied to the behaviour of spread footings, barrettes and other foundation types. The CEMSET[®] program uses the original definition of failure proposed by Terzaghi which defined ultimate load as that corresponding to asymptotic behaviour, with soil resistance fully mobilised. It contains a theoretically satisfactory Partial Factoring system, unlike most other proposals.

Cementation Skanska use the patented method consistently when designing all types of pile and the programs are offered for sale to those in the industry interested in achieving a useful and thorough understanding of foundation-ground interaction.

Advantages of Automation

- Using computers, all actions of load application and recording can be carried out according to any normal specification.
- Progress of the AUTO LOAD TEST[®] can be supervised remotely and with minimal site attendance. Additionally, the computer equipment is programmed to take appropriate action in the event of a range of potential sudden anomalies.
- These improvements represent an important advance in site safety.
- The costs for AUTO LOAD TEST[®] are generally in line with those of more conventional tests. Reports can be produced rapidly and reliably, including all graphs and recordings.
- The technical quality of the test results are significantly enhanced.

