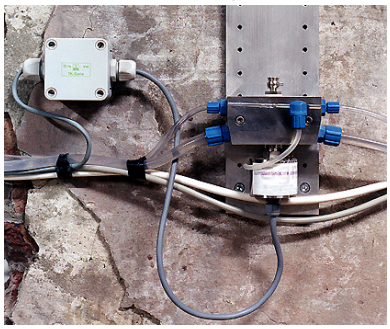
Instrumentation of load tests

Instrumentation of load test for the automated registration of load-settlement-curves

Load test for a bored pile



Hydrostatic electronic pressure sensor

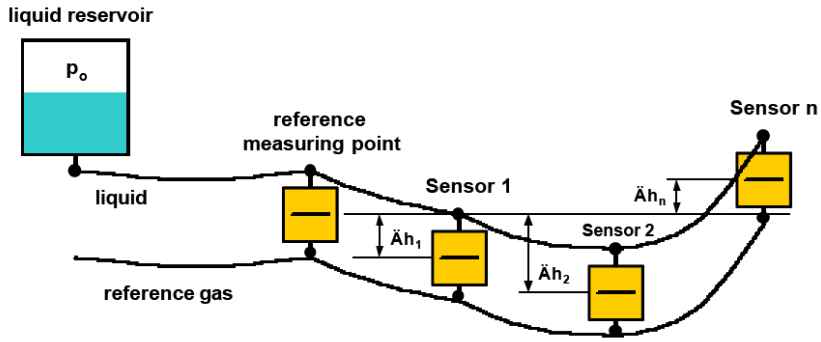
Reference point

Despite of sophisticated calculation models for geotechnical problems load tests still remain an essential element of practical design and execution of works.

In a load test usually the **absolute deformation** of a footing or foundation element e.g. a pile **under a certain load regime** is measured. The usual method for this is to have very long beams resting outside of what is believed to be the sphere of influence of the load as a reference for the absolute deformation which is measured with dial gauges. This method is related to some serious problems:

1. The length of the beams usually is limited due to transportation restrictions. Thus in many cases not absolute but only relative deformations are measured.
2. The positioning of the beams on site is time-consuming and costly as hoisting devices and cushions are necessary.
3. Due to a one-sided exposition of the beams to the sun significant thermal deformations falsify the results.

To overcome this problems GeTec Ingenieurgesellschaft has developed a measurement system for the instrumentation of load tests **based on its well known hydrostatic levelling system**.



Principle of a hydrostatic levelling system

On the load platform there can be installed a user-defined number of sensors which are connected with a data recording unit. As a reference point another sensor of the same kind fixed outside the sphere of influence is used. As the sensors are connected only with cables and flexible tubes the distance among each other and to the reference point is arbitrary and can be much greater than with beams.

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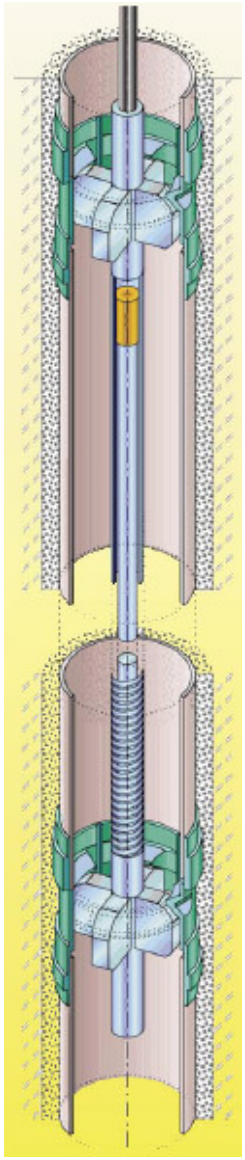
Instrumentation of load tests



measuring gauge

Load platform equipped with electronic hydrostatic pressure seonsors

Another sensor is attached to the hydraulic press for the load application which allows the automatic registration of the load parallel to the deformation.

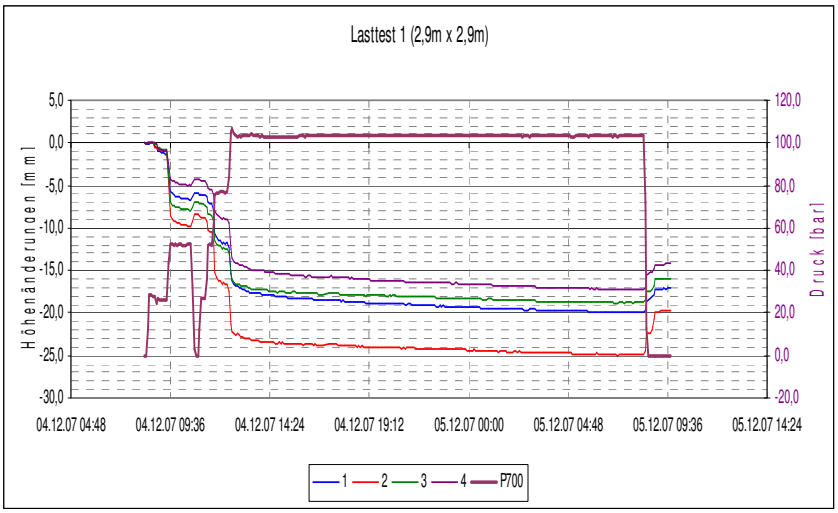
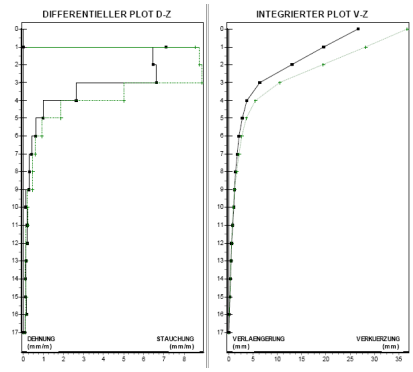


Diagram of loads and settlements over time.



Evaluated data from sliding deformeter (System SOLEXPERTS AG)

If further information is required about the distribution of the settlements over depth a measuring gauge for a sliding deformeter (system SOLEXPERTS AG) can be installed. With this system the differential settlement between two levels (pipe couplings) can be measured and by integration of this values one can get a deformation analysis over depth.