

Some experiences on geotechnical instrumentation for monitoring field performance

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The practice of geotechnical instrumentation involves a marriage between the capabilities of measuring instruments and the capabilities of people. There are two general categories of measuring instruments. The first category is used for *in situ* determination of soil and rock properties such as strength, compressibility and permeability, normally during the design phase of a project. The second category is used for monitoring performance, normally during the construction of a project and may involve measurement of groundwater pressure, total stress, deformation, load, or strain.

The use of geotechnical instrumentation is not merely the selection of instruments but a comprehensive step-by-step engineering process beginning with a definition of the objective and ending with implementation of the data. Every instrument on a project should be selected and placed to assist with answering a specific question: if there is no question, there should be no instrumentation.

Construction industries do have some limitation or uncertainties in terms of behaviours of soils or structures during and after construction. Therefore, geotechnical instrumentation is a useful tool to determine the following:

- To confirm compliance of real behaviour with design assumptions.
- To ensure the observed behaviour remains within pre-determined permissible limits.
- To demonstrate progressive deformations which require immediate action for ground support strengthening.
- To measure the development of ground movements, *in situ* stresses and variations in ground water conditions.
- To provide early warnings of failures and monitor long term safety.
- To demonstrate safety measures to the public.

This paper indicated the reasons for instrumentation, case study and past experiences in instrumentation and monitoring works.
