

Evaluating the application of geophysical methods for geotechnical site investigations

ABDUL RAHIM SAMSUDIN

Geology Programme

School of Environment and Natural Resource Sciences

Faculty of Science & Technology

Universiti Kebangsaan Malaysia

Bangi, 43600, Selangor D.E.

Email: abrahim@pkrisc.cc.ukm.my

Engineering geophysical techniques measure specific physical parameters and are routinely applied to geotechnical-related problems. The engineer responsible for site investigation should ensure that geophysical technique(s) employed provide cost effective information about physical properties of interest at the required levels of spatial resolution and target definition.

To successfully apply any geophysical technology a clear understanding of the techniques' limitations and manipulations of recorded data is essential. Experience has shown that dependence on any one particular technique results in data limitations often unacceptable to clients. It is for this reason that a broad spectrum of inspection techniques is essential to ensure supply of expected deliverables. This allows for the generation of multiple data streams enabling cross correlation resulting in increased levels of confidence in the final assessments.

To ensure success of the geophysical surveys, the engineer designing or responsible for the geophysical investigation should raise several pertinent questions, and select methodologies based on the responses. Questions could include:

- i. What are the physical properties of interest?
- ii. Which geophysical methods measure the physical properties of interest?
- iii. Which techniques will likely provide the required spatial resolution and target definition ?
- iv. Which geophysical tools will perform well in the study area?
- v. Which techniques are most cost-effective?
- vi. Which techniques will provide complementary data?
- vii. What non-geophysical data are required to constrain the interpretation of the acquired geophysical control?
- viii. Is the overall program cost-effective?

Some information about commonly employed geophysical methods and a generalized approach for evaluating their application for a specific geoengineering related problem are discussed. This paper has tried to raise and summarize pertinent related issues, in an effort to assist the engineer involved in designing geophysical surveys, and inform the engineer charged with decision responsibilities.