Application of Automation in Geotechnical Testing

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Abstract

This presentation discusses the application of the latest technologies in electronics, software, automated controls to geotechnical testing. Geotechnical testing current state-of-the-art equipment, principle, and capabilities are also reviewed. The advantages and disadvantages of the use of fully automated soil testing are discussed based on experiences of a modern soil-rock-geosynthetics testing services laboratory.

A particular emphasis is given to the time saving achieved by using fully automated computer-controlled testing system for performing triaxial and consolidation laboratory soil tests. An innovative feature that makes use of the Internet to remotely monitor and control a test is presented alongside some powerful software features to run advanced tests, and the latest technologies in load, displacement and pressure measurements. Current fully automated computer-controlled geotechnical testing systems use Proportional-Integral-Derivative (PID) adaptive controller technology to improve the quality of the test in terms of reliability, repeatability, accuracy, and confidence in test results, while reducing human error as well as end-user subjectivity. The internet remote control allows users the ability to adjust and edit test parameters, in real-time, while the test is running, in each phase of the test through the use of a Virtual Network Computing (VNC) software program. Operating these automated geotechnical systems in a VNC environment can substantially improve time management, efficiency, and cost-effectiveness of this equipment operation. Further benefits may be realized in the areas of training, remote-evaluation and diagnostics, and collaborative research.

***** Everyone is invited*****