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## **SURVEY OF AUTOMATION PRACTICES IN GEOTECHNICAL LABORATORIES**

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**REFERENCE:** Marr, W.A., “**Survey of Automation Practices in Geotechnical Laboratories,**” *Nondestructive and Automated Testing for Soil and Rock Properties, ASTM STP 1350*, W.A. Marr and C.E. Fairhurst, Eds., American Society for Testing and Materials, 1999.

**ABSTRACT:** There has been considerable interest in automation of geotechnical laboratory testing over the past 20 years, particularly since the introduction of the personal computer. Several papers have been written describing various systems for automating different tests. However, it is not clear how this interest and the research results are being implemented in practice. There is little but anecdotal information on the experiences of those who have automated their geotechnical testing.

Subcommittee D18.95 of ASTM conducted a survey of automation practice in geotechnical laboratories. This survey was performed in 1996-1997 by publishing a questionnaire in the *Geotechnical Testing Journal* and mailing a copy of the questionnaire to lab managers asking them to summarize and quantify their experience with automated testing equipment.

This paper summarizes the results of that survey. It describes what types of tests laboratories have automated. It examines the types of automation equipment people have used and their experiences with that equipment. It also considers people's experience with important considerations like hardware reliability, software maintenance and vendor support. The paper provides useful information for those considering the purchase or development of automated geotechnical testing equipment.

**KEYWORDS:** automation, laboratory tests, triaxial testing, compression testing, consolidation testing, shear testing, rock properties

Engineers have sought to automate their testing laboratories since the invention of the computer. Automation reduces the mundane activities of repetitive tasks and recording data. The appearance of the mini-computer expanded the possibilities for laboratory automation and put the reality of automation within financial reach. During the late 1960's and early 1970's several large facilities used mini-computers to automate various aspects of their geotechnical labs. The MIT Department of Civil Engineering used a Honeywell mini-

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