

Overview

Although the triaxial compression test is presently the most widely used procedure for determining strength and stress-deformation properties of soils, there have been no books published on triaxial testing since the 1962 second edition of the landmark work *The Measurement of Soil Properties in the Triaxial Test* by Bishop and Henkel. It is apparent there is a need to document advances made in triaxial testing since publication of Bishop and Henkel's book and to examine the current state of the art in a forum devoted solely to triaxial testing. Because of increasing versatility brought about by recent developments in testing techniques and equipment, it is also important that the geotechnical profession be provided with an up-to-date awareness of potential uses for the triaxial test.

Along with a better understanding of the current state of the art of triaxial testing is the need to evaluate whether recent developments should be incorporated in standard triaxial test methods. Although modern equipment allows testing to be customized to fit many types of design problems, most triaxial testing is still routine and follows standardized procedures. Procedures for standard triaxial tests have been developed by authors of texts, university laboratory instructors, federal and state agencies, and many engineering consulting firms. A major objective of ASTM is to eliminate possible design problems resulting from misleading interpretation of results obtained through the use of different testing procedures by developing widely used standard test methods. To achieve this objective, it is important to keep ASTM standard test methods current and to develop new standard test methods when research and use indicate a need.

With the preceding in mind, Subcommittee D18.05 on Structural Properties and Subcommittee D18.09 on Dynamic Properties suggested to the Executive Committee of Committee D-18 on Soil and Rock that ASTM sponsor a symposium on triaxial testing. As a result, the symposium on Advanced Triaxial Testing on Soil and Rock was held in Louisville, Kentucky on 19–20 June 1986.

The symposium was held in four sessions (two sessions per day) with an evening poster session held at the end of the first day. Topics for the poster session papers were taken from those for the daily sessions. The daily session program format and participants were as follows.

Session 1—Equipment

Chairman	Willard L. DeGroot, McClelland Engineers, Inc., Houston.
State-of-the-art speakers	Marshall L. Silver, University of Illinois, Chicago
	F. Tatsuoka, University of Tokyo, Tokyo, Japan
Invited speakers	D. Negussey, University of British Columbia, Vancouver, B.C.
	H. W. Olsen, U.S. Geological Survey, Denver
	C. K. Chan, University of California, Berkeley

Session 2—Test Methods

Chairman	Richard S. Ladd, Woodward-Clyde Consultants, Clifton, New Jersey
State-of-the-art speakers	S. LaCasse (for Toralv Barre), Norwegian Geotechnical Institute, Oslo, Norway
	G. Baldi, ISMES, Bergamo, Italy
Invited speakers	R. S. Ladd, Woodward-Clyde Consultants, Clifton, New Jersey
	P. C. Lambe, North Carolina State University, Raleigh
	J. C. Evans, Bucknell University, Lewisburg, Pennsylvania
	J. L. Colliat, Institut de Mecanique de Grenoble, France

Session 3—Test Interpretation and Errors

Chairman	H. F. Hanson, Los Angeles City Department of Water and Power, Los Angeles
State-of-the-art speakers	J. F. Peters, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi
	J. T. Germaine, Massachusetts Institute of Technology, Cambridge, Massachusetts
Invited speakers	R. Kitamura, Kagoshima University, Kagoshima, Japan
	N. D. Dennis, U.S. Military Academy, West Point, New York
	H. Dendani, Institut de Mecanique de Grenoble, Grenoble, France
	W. Z. Savage, U.S. Geological Survey, Denver

Session 4—New Varieties of Tests

Chairman	Ronald C. Chaney, Humboldt State University, Arcata, California
State-of-the-art speakers	A. S. Saada, Case Western Reserve University, Cleveland
	J. R. F. Arthur, University College London, London, England
Invited speakers	G. F. Bianchini, Case Western Reserve University, Cleveland
	V. Janoo, University of Colorado, Boulder
	V. Silvestri, Ecole Polytechnique, Montreal, Canada

Papers are presented in this STP under the topics of the four sessions. State-of-the-art papers are given first, followed by invited and poster papers. Papers include examples of equipment designed to meet unusual applications, as well as the most recent examples of the use of computers and special equipment to automate standard tests. In the area of test methods, there are papers detailing methods for testing hard to handle soils such as marine clays and contaminated soils. Also under this topic are papers relating the latest information on routine test methods developed by some of the best laboratories in the world. Under test interpretation and errors are papers on the influence of test conditions and specimen preparation techniques on results. In addition, there are papers on the meaning of results relative to design conditions. In this context, an important finding pointed out in several papers is that results from standard unconsolidated undrained triaxial tests on saturated soils may be meaningless relative to the design problems for which they are normally used. Finally, there are papers describing new varieties of tests including true triaxial, directional shear, and hollow cylinder tests.

It is the hope and belief of the organizers of this symposium, that this STP will serve as a valuable tool for engineers and researchers who seek knowledge concerning triaxial testing

and its application, and that it will serve as a basis for improving existing and developing new ASTM triaxial testing standards.

The editors wish to thank all those who participated in the symposium and who contributed to this STP. Special thanks go to the reviewers of the papers, to ASTM Committee D-18 on Soil and Rock for sponsoring the symposium, and to members of Subcommittees D18.05 on Structural Properties and D18.09 on Dynamic Properties. Finally, the editors would like to thank the ASTM staff for their assistance in preparing for the symposium and in the preparation of this STP. The high quality of ASTM publications would not be possible without their efforts.

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