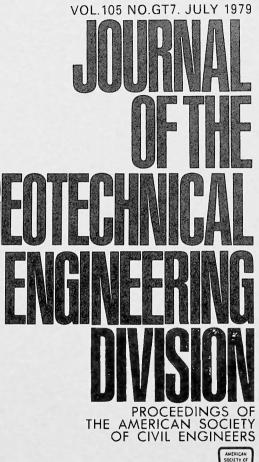
# PIERO SEMBENELLI MILANO





### AMERICAN SOCIETY OF CIVIL ENGINEERS

BOARD OF DIRECTION

President Walter E. Blessey

Past President William R. Gibbs

President Elect Joseph S. Ward

Vice Presidents Virgil Meedel Irvan F. Mendenhall

Cranston R. Rogers John H. Wiedeman

Directors

Donald S. Austin George D. Barnes Floyd A. Bishop John A. Boneil Edward A. Bryant William J. Carroll Francis J. Connell Ronald J. Drnevich D. Allan Firmage James W. Gillespie

ustin James N. Glenn arnes James E. Humphrey, Jr. Nop Richard W. Karn eil Eugene R. McMaster ryant Franklin D. Meyers rroll David A. Novick nnell S. Russell Stearns nevich William H. Taylor lage Staflord E. Thornton Robert E. Whiteside

**EXECUTIVE OFFICERS** 

Eugene Zwoyer, Executive Director Louis L. Meier, Washington Counsel/Assistant Secretary William N. Carey, Secretary Emeritus William H. Wisely, Executive Director Emeritus Michael N. Salgo, Treasurer Elmer B. Isaak, Assistant Treasurer

#### STAFF DIRECTORS

Gail Bays, Managing Director for Administrative Services Donald A. Buzzell, Managing Director for Education and Professional Alfairs Robert A. Crist, Jr., Managing Director for Publications and Technical Affairs Richard A. Jeffers, Controller Carl E. Nelson, Director, Field Services Paul A. Parisi, Director, Publication Services Don P. Reynolds, Director, Policy, Planning and Public Aflairs James M. Shea, Director, Public Communications Albert W. Turchick, Director, Technical Services George K. Wadlin, Director, Education Services and Continuing Education R. Lawrence Whipple, Director, Engineering Management Services COMMITTEE ON PUBLICATIONS

James W. Gillespie, Chairman Ronald J. Drnevich Richard W. Karn James N. Glenn David A. Novick Stafford E. Thornton

#### GEOTECHNICAL ENGINEERING DIVISION

Executive Committee William F. Swiger, Chairman John A. Focht, Jr., Vice Chairman Robert L. Schuster John Lysmer Ernest T. Selig, Secretary Woodland G. Shockley, Management Group E Contact Member Publications Committee William F. Marcuson III, Chairman O. B. Andersland L. J. Langfelder Roberto Lastrico Warren J. Baker Don C. Banks James M. Bell Felipe A. Len-Rios Francis G. McLean Gholamreza Mesri Joseph E. Bowles Chandra S. Braharna Donald J. Murphy S. V. Nathan Ralph Brown Thorn L. Neff J. T. Christian G. W. Clough Ed Nowatzki Michael W. O'Neill C. S. Desai Tuncer B. Edil Ted Park Jean H. Prevost Herbert H. Einstein D. H. Gray Adrian F. Richards Adel Saada Bobby O. Hardin Cornelius J. Higgins Walter C. Sherman, Jr. Marshall L. Silver Glen S. Tarbox G. R. Thiers Robert D. Holtz Izzat M. Idriss L. H. Irwin David E. Thompson Reuben H. Karol Donald Treadwell H. Y. Ko Kuei Wu Tsai William D. Kovacs

Leland M. Kraft Charles R. Ullrich Raymond J. Krizek C. V. G. Vallabhan Fred H. Kulhawy V. N. Vijayvergiya C. C. Ladd J. Lawrence Von Thun Poul V. Lade R. N. Yong E. T. Selig, *Exec. Comn. Contact Member* 

PUBLICATION SERVICES DEPARTMENT

Paul A. Parisi, Director

**Technical Publications** 

Richard R. Torrens, Editor James T. Halston, Assistant Editor Timothy O. Bakke, Editorial Assistant Joseph P. Cerami, Editorial Assistant Antoinette Cimino, Editorial Assistant Mark H. Roaman, Editorial Assistent Shiela Menaker, Production Editor Richard C. Scheblein, Draftsman

Information Services

Irving Amron, Editor

# CONTENTS

Model Study of Circular Sheetpile Cells	
by J. K. Maitland and W. L. Schroeder	805
Cellular Bulkheads and Cofferdams	
by W. L. Schroeder and J. K. Maitland	823
Pore Distribution and Permeability of Silty Clays	
by Ignacio Garcia-Bengochea, Charles William Lovell,	
and Adolph G. Altschaeffl	839
Landslide in Claystone Derived Soil	
by Archie M. Richardson	857
Anisotropic Shear Modulus due to Stress Anisotropy	
by Stephan K. Roesler	871
Zero Extension Line Theory of Earth Pressure	
by Karim Habibagahi and Arsalan Ghahramani	881

#### **TECHNICAL NOTES**

Proc. Paper 14665

### Uncertainty Analysis of Relative Density

This Journal is published monthly by the American Society of Civil Engineers. Publications office is at 345 East 47th Street, New York, N.Y. 10017. Address all ASCE correspondence to the Editorial and General Offices at 345 East 47th Street, New York, N.Y. 10017. Allow six weeks for change of address to become effective. Subscription price to members is \$12.00. Nonmember subscriptions available; prices obtainable on request. Second-class postage paid at New York, N.Y. and at additional mailing offices. GT, HY.

The Society is not responsible for any statement made or opinion expressed in its publications.

## DISCUSSION

#### Proc. Paper 14661

Parameter Effects on Dynamic Properties of Frozen Soils," by Ted	
S. Vinson (Oct., 1978).	
by Yong S Chae	907

## INFORMATION RETRIEVAL

The key words, abstract, and reference "cards" for each article in this Journal represent part of the ASCE participation in the EJC information retrieval plan. The retrieval data are placed herein so that each can be cut out, placed on a  $3 \times 5$  card and given an accession number for the user's file. The accession number is then entered on key word cards so that the user can subsequently match key words to choose the articles he wishes. Details of this program were given in an August, 1962 article in CIVIL ENGINEERING, reprints of which are available on request to ASCE headquarters.

\*Discussion period closed for this paper. Any other discussion received during this discussion period will be published in subsequent Journals.