

PIERO SEMBENELLI  
MILANO

VOL.102 NO.GT7. JULY 1976

**JOURNAL  
OF THE  
GEOTECHNICAL  
ENGINEERING  
DIVISION**

PROCEEDINGS OF  
THE AMERICAN SOCIETY  
OF CIVIL ENGINEERS



## AMERICAN SOCIETY OF CIVIL ENGINEERS

### BOARD OF DIRECTION

#### President

Arthur J. Fox, Jr.

#### Past President

William M. Sangster

#### President-elect

Leland J. Walker

#### Vice Presidents

Daniel B. Barge, Jr.

John T. Merrifield

Ralph H. Wallace

Joseph S. Ward

#### Directors

Philip Abrams

Richard O. Albright

Amos J. Alter

Robert D. Bay

Lynn S. Beedle

Frederick R. Brown

Jose L. Capacete

Archie N. Carter

John J. Cusack

Clarence W. E. Davies

Anthony M. DiGioia, Jr.

R. Gene Ellis

George F. Play, Jr.

Lyman R. Gillis

Albert A. Grant

Robert T. Lawson

Virgil G. Meedel

Irvan F. Mendenhall

Edward H. Sokolowski

Eben Vey

John H. Wiedeman

### EXECUTIVE OFFICERS

Eugene Zwoyer, *Executive Director*

Don P. Reynolds, *Assistant Executive Director*

Joseph McCabe, *Director—Education Services*

Edmund H. Lang, *Director—Professional Services*

Paul A. Parisi, *Director—Publication Services*

Albert W. Turchick, *Director—Technical Services*

William D. French, *Director—Support Services*

William N. Carey, *Secretary Emeritus*

William H. Wisely, *Executive Director Emeritus*

Robert H. Dodds, *Treasurer*

Michael N. Salgo, *Assistant Treasurer*

### COMMITTEE ON PUBLICATIONS

Clarence W. E. Davies, *Chairman*

Philip Abrams, *Vice Chairman*

Archie N. Carter

Virgil G. Meedel

Eben Vey

John H. Wiedeman

### GEOTECHNICAL ENGINEERING DIVISION

#### Executive Committee

Kenneth L. Lee, *Chairman*

Richard E. Gray, *Vice Chairman*

John A. Focht, Jr.

George F. Sowers

John Lysmer, *Secretary*

Jack W. Hilf, *Management Group E Contact Member*

#### Publications Committee

E. T. Selig, *Chairman*

O. B. Andersland

Warren J. Baker

Don Banks

Joseph Bowles

Ralph Brown

J. T. Christian

G. W. Clough

C. S. Desai

J. M. Duncan

Herb Einstein

L. R. Gebhart

D. H. Gray

Bobby Hardin

I. M. Idriss

H. Y. Ko

L. M. Kraft

R. J. Krizek

C. C. Ladd

Poul Lade

L. J. Langfelder

Roberto Lastrico

Ulrich Luscher

Gholamreza Mesri

Victor Milligan

N. Morgenstern

Donald J. Murphy

Iraj Noorany

Ed Nowatzki

Adrian Richards

Wally Sherman

W. G. Shockley

M. L. Silver

Glen S. Tarbox

G. R. Thiers

Dave Thompson

C. V. G. Vallabhan

J. Lawrence Von Thun

R. J. Woodward, III

S. G. Wright

T. H. Wu

R. N. Yong

John Lysmer, *Exec. Comm. Contact Member*

### PUBLICATION SERVICES DEPARTMENT

Paul A. Parisi, *Director*

#### Technical Publications

Richard R. Torrens, *Editor*

Robert D. Walker, *Associate Editor*

Geraldine Fahey, *Assistant Editor*

Howard Brenker, *Editorial Assistant*

Patricia A. Goldenberg, *Editorial Assistant*

Vicki L. Iguchi, *Editorial Assistant*

Paul Andrew Kunkel, *Editorial Assistant*

Richard C. Scheblein, *Draftsman*

#### Information Services

Irving Amron, *Editor*

# CONTENTS

<b>Seismic SSI of Nuclear Power Plant Structures</b> <i>by Izzat M. Idriss and Khosrow Sadigh . . . . .</i>	663
<b>Generalized Cap Model for Geological Materials</b> <i>by Ivan S. Sandler, Frank L. DiMaggio, and George Y. Baladi, . . . . .</i>	683
<b>Finite Element Analysis of Piles in Expansive Media</b> <i>by Joram M. Amir and M. Sokolov . . . . .</i>	701
<b>At-Rest Lateral Earth Pressure of Consolidating Clay</b> <i>by M. Salah Abdelhamid and Raymond J. Krizek . . . . .</i>	721
<b>Analysis of Backpacked Liners</b> <i>by Sidiq M. Dar and Robert C. Bates . . . . .</i>	739
<b>Acoustic Emission Behavior of Granular Soils</b> <i>by Robert M. Koerner, Arthur E. Lord, Jr., W. Martin McCabe, and John W. Curran . . . . .</i>	761
<b>Dynamic Behavior of Partially Embedded Pile</b> <i>by Muhammed A. Satter . . . . .</i>	775
<b>Method of Calculating Long-Term Creep Settlements</b> <i>by Harry G. Poulos, Laurence P. de Ambrosis, and Edward H. Davis . . . . .</i>	787

→

---

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 \$10.00. Nonmember subscriptions available; prices obtainable on request. Second-class postage paid at New York, N.Y. and at additional mailing offices. HY, GT.

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

---

## TECHNICAL NOTES

Proc. Paper 12227

---

- Stress Distribution for Heavy Embedded Structures**  
*by Kul Bhushan and Steven C. Haley* . . . . . 807

---

## DISCUSSION

Proc. Paper 12224

---

- Test Loading of Piles and New Proof Testing Procedure,<sup>a</sup>** by Bengt H. Fellenius (Sept., 1975).  
*by Luciano Picarelli* . . . . . 813

- Statistical Quality Control at Kastraki Earth Dam,<sup>a</sup>** by Panagiotis C. Kotzias and Aris C. Stamatopoulos (Sept., 1975).  
*by John D. Coumoulos* . . . . . 815  
*by James L. Sherard* . . . . . 816

- A Case History of Expansive Claystone Damage,<sup>a</sup>** by Richard L. Meehan, Michael T. Dukes, and Patrick O. Shires (Sept., 1975. Prior Discussions: June, 1976).  
*by Dinesh Mohan* . . . . . 818

- Elastoplastic Stress-Strain Theory for Cohesionless Soil,<sup>a</sup>** by Poul V. Lade and James M. Duncan (Oct., 1975. Prior Discussion: June, 1976).  
*by Adel S. Saada* . . . . . 819

- End Effects on Stability of Cohesive Slopes,<sup>a</sup>** by Mohsen M. Baligh and Amr S. Azzouz (Nov., 1975).  
*by H. John Hovland* . . . . . 820

- Quasi-Static Deep Penetration in Clays,<sup>a</sup>** by Mohsen M. Baligh and Ronald F. Scott (Nov., 1975).  
*by Branko Ladanyi* . . . . . 821

- Anisotropy in Heavily Overconsolidated Kaolin,<sup>a</sup>** by Srinath F. Amerasinghe and Richard H. G. Parry (Dec., 1975).  
*by Adel S. Saada* . . . . . 823

---

<sup>a</sup>Discussion period closed for this paper. Any other discussion received during this discussion period will be published in subsequent Journals.