PIERO SEMBENELLI MILANO

VOL.103 NO.GT3. MARCH 1977

PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS



# AMERICAN SOCIETY OF CIVIL ENGINEERS

### BOARD OF DIRECTION

President Leland J. Walker Past President

Arthur J. Fox. Jr.

President Flect William R. Gibbs

Vice Presidents Russel C. Jones William W. Moore

Directors Richard O. Albright Donald S. Austin Lynn S. Beedle Frederick R. Brown Jose L. Capacete William J. Carroll Francis J. Connell John J. Cusack Anthony M. DiGioia, Jr.

George F. Flay, Jr. James W. Gillespie Robert T. Lawson Eugene R. McMaster Virgil G. Meedel Irvan F. Mendenhall Franklin D. Mevers Edward H. Sokolowski D. Russell Tatman Eben Vev

Ralph H. Wallace

Joseph S. Ward

John H. Wiedeman

#### **EXECUTIVE OFFICERS**

R. Gene Ellis

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

Don P. Reynolds, Director—Policy, Research, and Standards Services Joseph McCabe, Director—Education

Services

Edmund H. Lang, Director-Professional Services

Paul A. Parisi, Director-Publication Services Albert W. Turchick, Director-Technical Services

Gail Bays, Assistant to the Executive Director

### COMMITTEE ON PUBLICATIONS

Eben Vey, Chairman John H. Wiedeman, Vice Chairman James W. Gillespie Irvan F. Mendenhall Virgil G. Meedel D. Russell Tatman

#### GEOTECHNICAL ENGINEERING DIVISION

Executive Committee Richard E. Gray, Chairman John Lysmer, Vice Chairman William F. Swiger Kenneth L. Lee John A. Focht, Jr., Secretary Woodland G. Shockley, Management Group E Contact Member

Publications Committee Raymond J. Krizek, Chairman

O. B. Andersland C. C. Ladd Poul Lade Warren J. Baker L. J. Langfelder Don Banks Roberto Lastrico James M. Bell Joseph Bowles William F. Marcuson Raiph Brown Gholamreza Mesri Donald J. Murphy T. Christian G. W. Clough Irai Noorany C. S. Desai Ed Nowatzki J. M. Duncan Ted Park Tuncer B. Edil Adrian Richards Herb Einstein Wally Sherman M. L. Silver Glen S. Tarbox L. R. Gebhart D. H. Grav G. R. Thiers Bobby Hardin Dave Thompson Robert D. Holtz Kuei-Wu Tsai I, M. Idriss L. H. Irwin Charles R. Ullrich C. V. G. Vallabhan V. N. Vijayvergiya H. Y. Ko William D. Kovacs J. Lawrence Von Thun S. G. Wright I M. Kraft Fred H. Kulhawy

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 Timothy J. Bennett, Editorial Assistant Paul Andrew Kunkel, Editorial Assistant Patricia G. Silverberg, Editorial Assistant Victoria White, Editorial Assistant Richard C. Scheblein, Draftsman

# Information Services

Irving Amron, Editor

# CONTENTS

Performance of a Cellular Wharf by W. L. Schroeder, Dennis K. Marker,	
and Thanasarn Khuayjarernpanishk	53
Time-Dependent Development of Strength in Dredgings by Raymond J. Krizek and Abdelsalam M. Salem	59
Heave of Silty Sands	
by Mehmet A. Sherif, Isao Ishibashi, and Wing-Wai Ding 18	85
Estimating Foundation Settlements in Residual Soils	
by Ray E. Martin	97
Performance of Jetted Anchor Piles with Widening	
by Gregory P. Tsinker	.13
Foundation Performance of Tower of Pisa	
by James K. Mitchell, Vitoon Vivatrat, and T. William Lambe 2	:27
DISCUSSION	
Proc. Paper 12764	

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.

253

Bearing Capacity and Settlement of Pile Foundations," by George

Geoffrey Meyerhof (Mar., 1976).

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

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

Liquefaction during 1906 San Francisco Earthquake, by T. Leslie	
Youd and Seena N. Hoose (May, 1976).  errata	255
Dynamic Strength of Hydraulic Fill, by Richard L. Meehan (June, 1976).	
by Pedro A. De Alba	255

# 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.

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