feur senell's

VOL.92 NO.SM6. NOV.1966

PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS



BITCOLD R ASCE 1966

AMERICAN SOCIETY OF CIVIL ENGINEERS BOARD OF DIRECTION

President

Earle T. Andrews

President-Elect Richard H. Totlow III

Vice Presidents

Jewell M. Garrelts Leland J. Walker Clifford D. Williams Charles W. Yoder

Directors

rectors
Daniel B. Barge, Jr.
Lloyd T. Cheney
Robert H. Dodds
Clyde D. Gessel
Richard Hazen
Corl B. Jansen
James L. Konski
Jack E. McKee

H. T. Person Gardner M. Reynolds A. L. R. Sonders William M. Songster Robert E. Shaver James R. Sims Horace J. Whitacre James D. Wilson

William W. Moore Longina A. Woodman

J. Harold Zoller

Past President William J. Hedley

Executive Officers

William H. Wisely, Executive Secretary Don P. Reynolds, Assistant Secretary Donald D. King, Assistant Secretary William P. Kimboll, Assistant Secretary William N. Carey, Secretary Emerilus William S. Lobande, Jr., Treasurer

COMMITTEE ON PUBLICATIONS

Robert H. Dodds, Chairman H. T. Person, Vice Chairman Carl B. Jansen James L. Konski

A. L. R. Sanders
J. Harold Zoller

SOIL MECHANICS AND FOUNDATIONS DIVISION

Executive Committee

T. William Lambe, Chairman Frank E. Richart, Jr., Vice Chairman Woodland G. Shackley Richard J. Woodward, Jr. James K. Mitchell, Secretary James D. Wilson, Board Contact Member

Publications Committee

Richard J. Woodward, Jr., Chairman
Richard G. Ahlvin E. D'Appolonia
W. D. Liam Finn John A. Focht, Jr.
Bernard B. Gardon Jomes P. Gould
Milton E. Harr John S. Schmertmann

L. C. Reese

Jomes K. Mitchell, Exec. Comm. Confact Member

TECHNICAL PUBLICATIONS

Paul A. Parisi, Manager
Albert W. Turchick, Associate Editor
William D. French, Assistant Editor
William H. Griffin, Assistant Editor
Ann R. Pyk, Assistant Editor
Barbora Greene, Editorial Assistant
Bayra Schegloft, Editorial Assistant
Susan E. Salomane, Editorial Assistant
Fronk J. Loeffler, Pardisman

CONTENTS

Papers	Page
FOUNDATION CLAY SHRINKAGE CAUSED BY LARGE TREES by Mark J. Hammer and Orville B. Thompson	1
STRENGTH CHARACTERISTICS OF DESSICATED CLAYS by Geoffrey E. Blight	18
BIBLIOGRAPHY ON CHEMICAL GROUTING Report of the Third Progress Committee on Grouting	39
PLANE STRAIN TESTS ON A SATURATED REMOLDED CLAY by David J. Henkel and Neil H. Wade	67
STRENGTH VARIATION ALONG FAILURE SURFACES IN CLAY by J. M. Duncan and H. Bolton Seed	81
LIQUEFACTION OF SATURATED SANDS DURING CYCLIC LOADING by H. Bolton Seed and Kenneth L. Lee	105
ROCKFILL STRUCTURES SUBJECT TO WATER FLOW by Alan K. Parkin, David H. Trollope, and John D. Lawson	135
TRANSIENT LOADING TESTS ON A CIRCULAR FOOTING by Vincent P. Drnevich and John R. Hall, Jr	153
REPLICA MODELING IN SOIL DYNAMICS by Peter S. Westine	169
CURVED BEAM ANALOG FOR TUNNEL DESIGN IN MASSIVE ROCK	
by Lawrence Adler(over)	189

This Journal is published bi-monthly by the American Society of Civil Engineers. Publications office is at 2500 South State Street, Ann Arbor, Michigan, 48104. Editorial and General Offices are at 345 East 47th Street, New York, N. Y. 10017. Subscription price is \$8.00 per year with discounts to members and libraries. Second-class postage paid at Ann Arbor, Michigan. EM, HY, SA, SM, ST.

BUCKLING OF SOIL-SURROUNDED TUBES by Ulrich Luscher	211
ANALYSIS OF CONSOLIDATION BY RATE PROCESS THEORY by T. H. Wu, D. Resendiz, and R. J. Neukirchner	229
DISCUSSION	
Proc. Paper 4958	
A METHOD FOR EARTHQUAKE RESISTANT DESIGN OF EARTH DAMS ^a , by H. Bolton Seed (Jan., 1966. Prior Discussion: Sept.,	
1966). by Dalim K. Majumdar and Gary G. LaFrance	251
ROCK PROPERTIES INTERPRETED FROM SONIC VELOCITY LOGS ² , by Roderick D. Carroll (Mar., 1966).	
by Bryant Mather	254
SURFACE SETTLEMENT ADJACENT TO BRACED OPEN CUTS, by Marc S. Caspe (July, 1966. Discussion closes Dec. 1, 1966).	

Page

255

INFORMATION RETRIEVAL

by Harrison Kane . . .

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 placedherein so that each can be cut out, placed on a 3 x 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.

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