

EDITORIAL STAFF

R. T. HORSTMAN, *Assistant Editor*
K. C. LIEB, *Managing Editor*

R. L. MELTZER, *Director of Publications*
I. C. MOORE, *Manager, Production
and Purchasing*

OFFICERS

W. A. McADAMS, *President*

Vice-Presidents

J. G. O'GRADY W. P. ELLIS

F. C. WILSON, *Treasurer*

Directors

Term ending 1978

S. D. ANDREWS
A. J. CEFALO
V. H. FRANKEL

C. F. THEIS
R. P. TROWBRIDGE
R. R. WRIGHT

Term ending 1979

R. J. AMOROSI
JACKSON BAUER
W. A. GOODWIN

M. W. KIRKPATRICK
J. A. MARCHESE
C. S. MULLEN, JR.

Term ending 1980

J. C. GROSSKREUTZ H. R. PIEHLER
G. S. HARTMAN J. C. WEAVER
R. B. MINOGUE J. R. WRIGHT

Past-Presidents

BRYANT MATHER J. S. WHEELER
W. T. CAVANAUGH, *Managing Director*

COMMITTEE ON PUBLICATIONS

PAUL STRIGNER, *Chairman*

E. P. BARTKUS
D. D. BLY
B. F. BROWN
R. C. DEEN

J. A. GILLIGAN
C. E. HAMILTON
J. G. KAUFMAN

ROBERT PHILLEO
ALLEN SIEGEL
A. J. SINISCALLI
HARVEY YAKOWITZ

The Society is not responsible, as a body, for the statements and opinions advanced in this publication.

Journal of Testing and Evaluation is published bimonthly by the American Society for Testing and Materials as part of the Testing and Evaluation Series, which includes the *Geotechnical Testing Journal* (published quarterly) and *Cement, Concrete, and Aggregates* (published semiannually). Publication office at 200 N. Bentalou St., Baltimore, Md. 21223. Editorial office at the Headquarters of the Society, 1916 Race St., Philadelphia, Pa. 19103. Subscriptions: For 6 consecutive issues \$18.00 (\$14.40 to ASTM members). Single copies, \$5.00. *Journal of Testing and Evaluation* is indexed regularly by Engineering Index, Inc., and is available on microfilm from University Microfilms, a Xerox Co., Ann Arbor, Mich. Second-class postage paid at Philadelphia, Pa. and additional mailing offices. Copyright 1978 by the American Society for Testing and Materials (ISSN 0090-3973).

Permission to Copy: The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per-copy fee through the Copyright Clearance Center, Inc., Operations Office, P.O. Box 765, Schenectady, N.Y., 12301, for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. (The per-copy fee appears as the last four digits of the code at the bottom of the first page of each article.) This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Further information may be obtained from the Copyright Clearance Center's Administrative office, 310 Madison Ave., New York, N.Y. 10017 (212/697-2525).

POSTMASTER: Send Form 3579 to Subscription Dept., ASTM Headquarters, 1916 Race St., Philadelphia, Pa. 19103.

CHANGE OF ADDRESS: Please return entire addressing label on wrapper to *Journal of Testing and Evaluation*, 1916 Race St., Philadelphia, Pa. 19103, along with new address.

EDITORIAL OBJECTIVES

The objective of ASTM's *Journal of Testing and Evaluation* is to provide a forum for presenting data derived from the testing and evaluation of materials, products, systems, and services of interest to the practicing engineer. Papers will be accepted on the grounds that they present new techniques or provide new information on existing methods of testing and evaluation, or that they contain new data resulting from testing and evaluation.

The importance of engineering standards to industry, national and international trade, and the protection of the public is now universally recognized. The technical validity of engineering standards—the international vocabulary of practical engineering communication—will be enhanced by continuing advances in methods of testing and evaluation.

Papers are reviewed on the basis of the inclusion of experimental data or mathematical derivations, or both, either as original work or as needed to confirm the theoretical conclusions or proposals, and their contribution to the permanent literature. The substance of the paper must not have been published in the open literature. Discussions of published papers may be submitted at any time and are also subject to review.

Many of the articles appearing in the *Journal of Testing and Evaluation* are specifically presented to provide the basis for new or improved standard methods and to stimulate new ideas. If you have suggestions for possible areas of standardizations, please contact R. L. Meltzer, Director of Publications, ASTM, 1916 Race St., Philadelphia, Pa. 19103.

INFORMATION FOR AUTHORS

Authors preparing papers for submittal to the journal should observe the conventions of style explained in the *ASTM Style Manual*. Since the journal does not request page charges, the author is expected to observe these standard conventions for style. The original manuscript and three copies, including original charts and illustrations, should be submitted to K. C. Lieb, Managing Editor, Periodicals, ASTM, 1916 Race St., Philadelphia, Pa. 19103.

GENERAL

This publication is one of many issued by the American Society for Testing and Materials in connection with its work in promoting knowledge of the properties and performance of materials, products, systems, and services, as well as in developing standard specifications and test measurement techniques to establish their value. Much of the information results from the voluntary contributions of many of the country's leading technical authorities from industry, scientific agencies, and government. A list of ASTM publications and information on the work of the Society will be furnished on request.