

## Technical Editor

Prof. Presley A. Wedding  
5813 Jarvis Lane  
Bethesda, MD 20814

## Editorial Board

### Committee C-1 on Cement

P. K. Mehta  
University of California  
537 Davis Hall  
Berkeley, CA 94720

L. U. Spellman  
Atlantic Cement Co., Inc.  
P.O. Box 30  
Stamford, CT 06904

### Committee C-9 on Concrete and Concrete Aggregates

H. T. Arni  
3303 Graham Rd.  
Falls Church, VA 22042  
Paul Klieger  
Portland Cement Association  
5420 Old Orchard R.  
Skokie, IL 60077

## Purpose and Scope

The purpose of *Cement, Concrete, and Aggregates* is to provide information on new development in testing, evaluation, and standardization of cement, concrete, concrete aggregates, and admixtures and to create a forum for the exchange of information, particularly research leading to standardization and experience in using standards.

The editorial scope of this journal includes technical papers, technical notes, letters to the editor, discussions of previously published papers, and book reviews that deal with testing, evaluation, and standardization of cement, concrete, concrete aggregates, and admixtures.

The American Society for Testing and Materials is not responsible, as a body, for the statement and opinions advanced in this publication.

Cement, Concrete, and Aggregates (ISSN 0149-6123) is published semiannually by ASTM as part of the Testing and Evaluation Series, which also includes the *Journal of Testing and Evaluation* (published bimonthly) and the *Geotechnical Testing Journal* (published quarterly). Publication office is at 428 E. Preston St., Baltimore, MD 21202. Editorial office is at the Headquarters of the Society, 1916 Race St., Philadelphia, PA 19103.

**Subscriptions** \$30.00 (\$15.00 to ASTM members). Single copies, \$16.00. To subscribe please send prepaid order to: P.O. Box 64106, Baltimore, MD 21264, AH: Journal Subscription. *Cement, Concrete, and Aggregates* is indexed regularly by Engineering Index, Inc., and is available on microfilm from University Microfilms, a Xerox company, Ann Arbor, MI. Copyright 1984 by the American Society for Testing and Materials.

**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, NY 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, NY 10017 (212/697-2525).

**Change of address:** Please return entire label on wrapper to *Cement, Concrete, and Aggregates*, P.O. Box 64106, Baltimore MD 21264.

# ASTM

## Editorial Staff

Rosemary Horstman, *Managing Editor*  
Susan L. Gebremedhin, *Assistant Editor*  
Robert L. Meltzer, *Vice-President of Publications*  
and *Marketing*  
M. Bruce Vieth, *Manager of Production*

## Officers

Richard E. Redelfs, *Chairman*  
Lendell E. Steele, *Vice-Chairman*  
Gladys B. Berchtold, *Vice-Chairman*  
Robert Baboian, *Treasurer*  
William T. Cavanaugh, *President*

### Directors

Albert J. Bartosic	Donald R. Johnson
John A. Blair	J. Gilbert Kaufman
Stephen E. Chehi	Benjamin Levadie
F. Greg Clarke	John F. McLaughlin
William P. Dugan	Thomas D. Moreland
Robert E. Elliott	Roman F. Serra
W. DeWayne France, Jr.	Richard O. Simpson
John A. Gilligan	Nancy M. Trahey
Emanuel Horowitz	Alan H. Yorkdale

### Past Chairmen

Richard H. Goodemote	William A. Goodwin
----------------------	--------------------

## Committee on Publications

R. C. Deen, <i>Chairman</i>	Richard Kimerle
K. L. Reifsnider, <i>Vice-Chairman</i>	E. L. Lewis
J. M. Barsom	Leonard Mordfin
E. P. Bartkus, <i>Ex-officio</i>	J. S. Perrin
S. W. Dean	C. G. Scott
W. G. Dukek	P. G. Sullivan
J. H. Kanzelmeyer	E. T. Wessel
	R. E. White

## Information for Authors

Contributions to *Cement, Concrete, and Aggregates* are subject to peer review in accordance with the policy established by the ASTM Committee on Publications. The paper must either contribute to the permanent literature or be of immediate interest to ASTM membership. The subject matter must not be of a speculative nature and the contents must not include materials of an advertising nature. The paper must not be seriously defective as to literary form and structure, continuity of thought, and clarity of expression. The substance of the paper should not have been published previously in the open literature.

Authors preparing papers for submittal 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 conform to these standard conventions for style. SI units are to be used throughout; if data were not measured in SI units, a note should appear to that effect and the original units should be included in parentheses after the SI units.

The original manuscript and four clear copies, including original illustrations, should be submitted to Kathy Greene, Manager, Acquisitions and Review, ASTM, 1916 Race St., Philadelphia, PA 19103. Papers are eligible for the following ASTM awards: the Charles B. Dudley Medal (for outstanding papers published by ASTM), the Richard L. Templin Award (for outstanding papers on new and useful testing procedures and apparatus), the Sanford E. Thompson Award (for papers on concrete and concrete aggregates), and the P. H. Bates Memorial Award (for papers on hydraulic cement).

## General

This publication is one of many issued by ASTM 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 publications and information on the work of ASTM will be furnished on request.

## In Appreciation

The high quality of the papers that appear in this publication is a tribute not only to the obvious efforts of the authors represented but to the unheralded, though essential, efforts of their reviewers. It is to the reviewers' dedication to upholding the high standards of their profession that this note pays tribute. On behalf of ASTM and the authors as well, we acknowledge with appreciation their important contribution to the success of this journal.