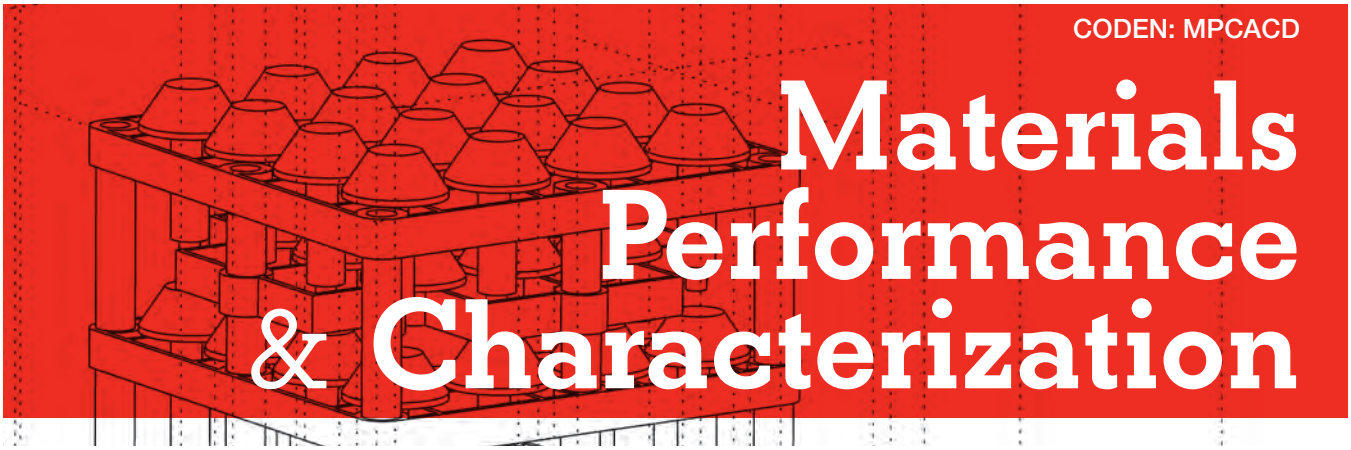
CODEN: MPCACD



Materials Performance & Characterization

Contents:

Special Issue on Residual Stresses

Guest Editors: Jeremy Robinson and Berthold Scholtes

(Contents continued on back cover)

ASTM INTERNATIONAL

Published by ASTM International | 100 Barr Harbor Drive | PO Box C700 | W. Conshohocken, PA 19428-2959

Editorial Objectives

Materials Performance and Characterization is published online by ASTM International, a nonprofit technical organization that develops and publishes voluntary consensus standards and related information for materials, products, systems, and services.

Contributions are peer reviewed prior to publication.

Purpose and Scope

The journal publishes high-quality, original articles, including full papers, review papers, and technical notes, on both theoretical and practical aspects of the processing, structure, properties, and performance of materials used in mechanical, transportation, aerospace, energy systems, and medical devices. These materials include metals and alloys, glass and ceramics, polymers, composite materials, textiles, and nanomaterials. The journal covers topics related to the integrity of materials which encompasses mechanical testing, fatigue and fracture, corrosion, wear, and erosion, as well as the integrity of components and systems such as rolling element bearings, piping and pressure vessels, fasteners, space technology, and nanotechnology. The journal publishes articles on both qualitative and quantitative methods used to characterize materials including all forms of microscopy, chemical analysis, and nondestructive evaluation.

Co-Editors

Editorial Services

Editorial Board

Materials Performance and Characterization (E-ISSN 2165-3992, print ISSN 2379-1365) is published online by ASTM International. The views expressed in this journal are not those of ASTM International. The data and opinions appearing in the published material were prepared by and are the responsibility of the contributors, not of ASTM International.

Subscriptions include online access. Individual subscriptions: $252.00 for 1 year online access. Institutional subscriptions (one geographic site via IP access): $422.00 for 1 year online access. Multisite access also available; please contact sales@astm.org or call 1-877-909-ASTM. To subscribe, please send prepaid order to ASTM International, Customer Service, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959 or visit www.astm.org.

Periodicals postage paid at W. Conshohocken, Pa., and at additional mailing offices.

POSTMASTER: Send address change to ASTM International—MPC, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.

Printed in the USA

Visit our website: www.astm.org.

Table of Contents (continued)

Overview

Special Issue on Residual Stresses

In the field of industrial engineering, a well known fundamental principle is that manufacturing-induced residual stress states have a considerable influence on reliability, strength, and lifetime of components. There is a great and still increasing demand to include existing residual stress distributions into design rules. Consequently, for the full exploitation of the potential of highly and complexly loaded components, e.g. for light weight constructions, the exact and reliable determination of existing residual stress distributions is crucial. The availability of fast, reliable, and economic methods for residual stress analysis, therefore, is a key factor for the successful manufacturing of advanced materials and structures and for the reduction of production costs. The correct consideration of residual stress states already in the design phase of components based on modeling and simulation techniques is an important step towards short production cycles, to increase the degree of safety and reliability of relevant parts as well as for the economical use of materials.

A variety of destructive or nondestructive types of methods for the analysis of residual stress states have been developed in the past, based on the physical consequences of residual stresses in materials and components. The situation is characterized by a partially complex scientific basis as well as by manifold and different requirements of the industrial users. The intensive cooperation between researchers in the field of residual stress analysis and industrial users of the methods—as well as manufacturers of devices for residual stress measurement—over the years has led to significant progress in this interdisciplinary field. Typical methods that are today well accepted and widely used for industrial applications are diffraction techniques (X-ray diffraction, neutron diffraction), mechanical methods (sectioning techniques, hole drilling, contour method, etc.), but also ultrasonic techniques as well as magnetic methods that have been developed and applied with increasing success. For diffraction techniques as well as for the hole drilling method, standards of good measurement practice have been determined. They describe the proper application of measurement techniques and possible errors, however, only for relatively simple standard cases. Experimental procedures are more and more complemented by theoretical methods, which allow for the simulation of the residual stress generating processes. Combinations of experimental and theoretical methods are increasingly gaining importance, especially during the design phase of components.

This special issue of *Materials Performance and Characterization* presents 33 papers on origins, determination, and assessment of residual stresses in technical components. The articles describe the latest advances in measurement techniques and applications for technical components. Metallic as well as polymeric and composite materials are considered. Welding and surface treatment processes and the associated formation of residual stress fields are important areas of application. Other aspects that are addressed are heat treatment and stress relief, additive manufacturing and forging.

Producing this special issue was only possible by the joint effort of authors, reviewers, editors, and the publication team. The guest editors are especially grateful for the support of Dr. Rick Neu and Dr. George Totten from ASTM and also for the effective and close cooperation with Ms. Alyssa Conaway as a responsible member of the publishing team.

Prof. Dr. Berthold Scholtes
University of Kassel, Germany

Prof. Dr. Jeremy Robinson
University of Limerick, Ireland

Information for Authors

For details regarding paper submission go to http://mc04.manuscriptcentral.com.

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.

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 International and the authors as well, we acknowledge with appreciation their important contribution to the success of this journal.

ASTM INTERNATIONAL

ASTM INTERNATIONAL
Helping our world work better

ISSN: 2379-1365
Stock #: MPC1804

(Contents continued on page iii)

www.astm.org