

Automation OF Mechanical Testing

DAVID T. HEBERLING EDITOR ()) STP 1208 **STP 1208**

Automation of Mechanical Testing

David T. Heberling, Editor

ASTM Publication Code Number (PCN) 04-012080-23



Library of Congress Cataloging-in-Publication Data

Automation of mechanical testing / David T. Heberling, editor. (STP 1208) Contains papers presented at the symposium held in Pittsburgh on 21 May 1992. "ASTM publication code number (PCN) 04-012080-23." Includes bibliographical references and index. ISBN 0-8031-1868-6 1. Testing-machines--Automation--Congresses. I. Heberling, David T. II. Series: ASTM special technical publication ; 1208. TA413.A88 1993 620'.0044--dc20 93-16119 CIP

Copyright ©1993 AMERICAN SOCIETY FOR TESTING AND MATERIALS, Philadelphia, PA. All rights reserved. This material may not be reproduced or copied, in whole or in part, in any printed, mechanical, electronic, film, or other distribution and storage media, without the written consent of the publisher.

Photocopy Rights

Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by the AMERICAN SOCIETY FOR TESTING AND MATERIALS for users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$2.50 per copy, plus \$0.50 per page is paid directly to CCC, 27 Congress St., Salem, MA 01970; (508) 744-3350. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Service is 0-8031-1868-6/93 \$2.50 + .50.

Peer Review Policy

Each paper published in this volume was evaluated by three peer reviewers. The authors addressed all of the reviewers' comments to the satisfaction of both the technical editor(s) and the ASTM Committee on Publications.

The quality of the papers in this publication reflects not only the obvious efforts of the authors and the technical editor(s), but also the work of these peer reviewers. The ASTM Committee on Publications acknowledges with appreciation their dedication and contribution to time and effort on behalf of ASTM.

Printed in Philadelphia, PA March 1993

Foreword

This publication, Automation of Mechanical Testing, contains papers presented at the symposium of the same name, held in Pittsburgh, PA on 21 May 1992. The symposium was sponsored by ASTM Committee E-28 on Mechanical Testing. David T. Heberling, Armco Steel Co., L.P., Middletown Works Metallurgical Laboratory, Middletown, OH, presided as symposium chairman and is editor of the resulting publication.

Contents

Overview

Elements of Automated Mechanical Testing—E. A. RUTH	5
Experiences in the Automation of Mechanical Testing-P. GEBHARDT	10
Measurement, Control, and Data Processing Techniques in the Automation of Mechanical Testing—P. M. MUMFORD	19
Automated Data Acquisition and Analysis in a Mechanical Test Lab— D. H. CARTER AND W. SCOTT GIBBS	28
A Case Study: Linking an Automated Tension Testing Machine to a Laboratory Information Management System—D. T. HEBERLING	40
Data Interpretation Issues in Automated Mechanical Testing—R. N. KHAN	51
A Comparison of Automated Versus Manual Measurement of Total Elongation- Tension Testing—D. K. SCHERRER	65
A Technique for Determining Yield Point Elongation—J. J. YOUNG	75
Event Criteria to Determine Bandwidth and Data Rate in Tensile Testing— A. M. NICOLSON	91

1

ISBN 0-8031-1868-6