Failure Analysis of Heat Treated Steel Components

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ASM International®
Materials Park, Ohio 44073-0002
www.asminternational.org

First printing, September 2008

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Prepared under the direction of the ASM International Technical Book Committee (2007–2008), Lichun L. Chen, Chair.

ASM International staff who worked on this project include Scott Henry, Senior Manager of Product and Service Development; Steven Lampman, Technical Editor; Ann Britton, Editorial Assistant; Bonnie Sanders, Manager of Production; Madrid Tramble, Senior Production Coordinator; Diane Grubbs, Production Coordinator; Patricia Conti, Production Coordinator; and Kathryn Muldoon, Production Assistant

Library of Congress Control Number: 2008925435
ISBN-13: 978-0-87170-868-7
ISBN-10: 0-87170-868-X
SAN: 204-7586

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Materials Park, OH 44073-0002
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Printed in the United States of America

This book is dedicated to our families, without whose continued support the completion of this work would not have been possible:

My husband, Antonio Carlos Canale,
and my children, Amanda, Sara, and Bruno
L.C.F.C.

To my lovely wife, Carla Mesquita, and my dear son, Rafael
R.A.M.

My wife, Alice
G.E.T.

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Preface

Material failures can lead to many potentially disasterous consequences, including poor product quality, necessary repair or component or equipment replacement, production downtime losses, environmental impact, and even loss of life. Furthermore, failures may arise from not one but various causes, including design, material composition, and, in the case of metals such as steel, improper thermal processing. Therefore, when failures do occur, it is critically necessary to not only identify these failures but also to determine and correct their root cause. This is a primary objective of this work.

There are many books, journals, and other references that focus on various aspects of failure analysis. However, there are relatively few that focus on steel failures arising during thermal processing, such as forging, casting, heat treatment, welding, and others. A second objective of this book is to provide a reasonably thorough reference detailing potential failures that may occur during thermal processing and the identification of their root cause, even if it is not specifically the thermal process being considered.

An important feature of ***Failure Analysis of Heat Treated Steel Components*** is that it not only discusses various causes of a failure and its identification but also integrates this discussion with the metallurgy of the process, thus providing one comprehensive resource. This book was developed as a reference source for use by designers, practicing metallurgists, mechanical and materials engineers, quality-control technicians, and heat treaters. This book also will serve as an important textbook for various advanced undergraduate and graduate courses on either failure analysis or thermal processing of steel.

The editors are indebted to the invaluable guidance of many persons in the development and production of this text, including Prof. George Krauss (Colorado School of Mines), George Vander Voort (Buehler Ltd., USA), N. Gopinath and V. Raghunathan (Fluidtherm Technology P. Ltd.), Ross Blackwood (deceased), Larry Jarvis (Tenaxol Inc.), and many others. In addition, the editors are most appreciative of Steve Lampman for his continued patience, guidance, and assistance during the various stages of the preparation of this text. The editors are especially grateful for the support of the chapter authors for the diligence, dedication, and patience involved in their vital contributions to this work. Most of all, the editors are especially appreciative of the support and sacrifices made by their spouses, Antonio Canale, Carla Mesquita, and Alice Totten, without which the preparation of this book would not have been possible. We also express our gratitude to Villares Metals S.A. for their continued and vital assistance and generosity throughout this project.

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ASM International is the society for materials engineers and scientists, a worldwide network dedicated to advancing industry, technology, and applications of metals and materials.

ASM International, Materials Park, Ohio, USA
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Publication title	Product code
Failure Analysis of Heat Treated Steel Components	**05113G**

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