



ASM Handbook: Volume 11: Failure Analysis and Prevention (ASM Handbook) (ASM Handbook)

By W. T. Becker, R. J. Shipley

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Volume 11 covers the general engineering aspects of failure prevention and fundamental root causes, materials selection, and the role of design reviews in failure prevention and analysis. Includes failures related to metals manufacturing operations, and the increasingly important role of life assessment methods in failure prevention. Failure analysis proves, principles, practices, tools, and techniques used to perform and evaluate failure analysis work and the causes, mechanisms, appearances, and prevention methodology for the four classic types of failure.

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Editorial Review

Review

Theme and Purpose of this Volume. The authors and editors assembled this Volume with several broad themes in mind. First, the most important goal of failure analysis is to decrease the occurrence of component failures through the understanding of the root cause for failure. Experienced failure analysts are often frustrated when, despite extensive engineering research, investigations, and failure analysis reports, the same types of failures occur again and again. When the root cause has been identified as defective global design rather than abuse or misuse, product quality and reliability is improved.

The failure analyst should strive to uncover the underlying or root (technical) cause of the failure. The fact that a specific component appears to have failed in some way does not automatically mean that the component itself is defective. The problem may lie in the way the component was used, inspected, or maintained. If it is truly defective, then the analysis should determine whether the defect originates in design, manufacture (fabrication and assembly), material selection/processing, or unexpected service environment. This Volume provides a framework for investigating the above issues. In addition to sections devoted to design and manufacture, there are also sections on failures that occur through fracture, corrosion, and wear, as well as an article on failure through deformation. This Volume is also an attempt to address the principles, tools, techniques, and procedures necessary to plan, organize, and conduct a thorough investigation. Not every failure investigation is the same, and a failure root-cause analysis is more than a microstructural examination, a stress analysis, or a chemical corrosion analysis. All of these disciplines, as well as others, may be required to reach a root cause conclusion.

No single volume, no matter how comprehensive, can present all the information that may potentially be needed. The emphasis of this Volume is on general principles with the widest applicability to situations that the reader is likely to encounter. References and sources of further information are provided throughout. While some common types of components or equipment may be included in some detail, not every type of machine can be treated. The reader is encouraged, and in fact urged, to pursue additional sources of information so as to understand the function and history of the component, machine, or system that is under investigation. --ASM International

From the Publisher

Published: 2002

About the Author

Differences of Opinion. Controversy is, perhaps, inherent in the very nature of failure analysis. If anything, that is even truer today when real or perceived failures are the subject of litigation. The authors have integrated thoughts on legal considerations into many of the articles. However, nothing here should be taken as legal advice. Those who are concerned regarding legal implications should consult competent counsel. Furthermore, as every circumstance is somewhat unique, the Handbook should be used with care and should not be the sole source of information when critical decisions are to be made. Most articles include extensive references, which should be reviewed if further information is required.

The authors present analyses and interpretations based on scientific principles and experience. All of the articles have been reviewed and edited. However, there can be and still are differences of opinion among failure analysts regarding some issues. It is up to the reader to determine whether the information presented is applicable and helpful in a particular situation. Experienced analysts should be consulted if there is any doubt. Despite the best efforts of the authors, reviewers, and editors, the reader might find an area that could be improved. If so, please bring this to the attention of the ASM Editors so that your concern can be

reviewed and, depending on the consensus of opinion, can be addressed in subsequent printings. Collaborative Effort. This Volume reflects the efforts of many people. Except for ASM staff, all are volunteers. Many of the volunteers are fully employed and contributed their personal time to the project. Neither they nor their employers receive any compensation for their efforts, except for the satisfaction that accrues from being able to share what they have learned, prevent failures, and contribute to safer, more reliable products. The names of the authors, editors, reviewers, and ASM staff are acknowledged individually elsewhere in this Volume and are too numerous to list here. However, ASM Editor Steven Lampman does deserve special mention for his commitment, dedication, and patience, without which this Volume would not have become a reality.

It has been most enjoyable and professionally rewarding to work with all who were involved in this effort. On behalf of ASM and the readers of this Handbook, we express our appreciation to all for the time and effort expended and for their willingness to share their knowledge and lessons derived from experience. Many of the contributors have established national and international reputations in their respective fields. More than any words of appreciation in a Preface such as this, however, it is our hope that the Handbook itself will be a most fitting tribute to all participants, both now and into the future.

Users Review

From reader reviews:

George Thomas:

Now a day folks who Living in the era exactly where everything reachable by match the internet and the resources inside can be true or not demand people to be aware of each facts they get. How people have to be smart in obtaining any information nowadays? Of course the answer then is reading a book. Reading through a book can help people out of this uncertainty Information mainly this ASM Handbook: Volume 11: Failure Analysis and Prevention (ASM Handbook) (ASM Handbook) book because book offers you rich information and knowledge. Of course the information in this book hundred pct guarantees there is no doubt in it you may already know.

Scott Lowe:

The reason? Because this ASM Handbook: Volume 11: Failure Analysis and Prevention (ASM Handbook) (ASM Handbook) is an unordinary book that the inside of the book waiting for you to snap that but latter it will zap you with the secret this inside. Reading this book adjacent to it was fantastic author who also write the book in such awesome way makes the content inside of easier to understand, entertaining approach but still convey the meaning entirely. So , it is good for you because of not hesitating having this any longer or you going to regret it. This phenomenal book will give you a lot of rewards than the other book possess such as help improving your proficiency and your critical thinking approach. So , still want to delay having that book? If I have been you I will go to the publication store hurriedly.

Miranda Durkee:

Reading can called imagination hangout, why? Because if you find yourself reading a book particularly book entitled ASM Handbook: Volume 11: Failure Analysis and Prevention (ASM Handbook) (ASM Handbook) your head will drift away trough every dimension, wandering in each and every aspect that maybe unfamiliar for but surely might be your mind friends. Imaging each word written in a book then become one application

form conclusion and explanation in which maybe you never get prior to. The ASM Handbook: Volume 11: Failure Analysis and Prevention (ASM Handbook) (ASM Handbook) giving you an additional experience more than blown away the mind but also giving you useful info for your better life in this particular era. So now let us demonstrate the relaxing pattern here is your body and mind is going to be pleased when you are finished reading through it, like winning a casino game. Do you want to try this extraordinary spending spare time activity?

Corey Mason:

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