BOOK REVIEW

Non-Destructive Testing, Second Edition

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REFERENCE: Halmshaw, R., Non-Destructive Testing, Second Edition, Edward Arnold, London, 1991, ISBN: 0-340-54521-6, 323 pp., \$39.95.

Considering the importance of nondestructive testing (NDT) to modern industry, and specifically to quality control in manufacturing and to maintenance and safety in service, it is disturbing that there are so few good monographs on the subject. This is one of the better ones. In the author's words, this book was planned to cover concisely the major fields of NDT and to indicate how they overlap. Following an introduction, separate chapters address, in order, visual methods, radiological methods, ultrasonic testing of materials, magnetic methods, electrical methods, penetrant flaw detection, acoustic emission methods, and other (i.e., miscellaneous) methods. These are followed by three short but interesting chapters on acceptance standards, reliability and probability, and computers in NDT.

The chapters on radiography and ultrasonics are excellent and, despite the author's declaration, can hardly be called concise, covering some 85 and 100 pages, respectively. The radiography chapter takes the reader through the X ray basics step by step. then goes into a detailed description of equipment and an extensive discussion of techniques. Neutron radiography and inmotion real-time radiography are given short shrift, but aside from this the chapter would be useful to both the learner and to the radiographer seeking a solution to a new problem. Similarly, the chapter on ultrasonics begins with an exposition of the principles (including a particularly lucid treatment of waves at boundaries), and then proceeds into elaborations of equipment, techniques, and many, many applications. The experienced practitioner of ultrasonic NDT, as well as the beginner, will surely find here some indication of how others have addressed all kinds of difficult inspection problems.

The rest of the book does not measure up in quality to the chapters on radiography and ultrasonics. The remaining chapters vary from good to poor, although overall the book is certainly above average. Considerably expanded from the first edition, the chapters on electrical methods and on acoustic emission methods are good, as is the chapter on magnetic methods, but the chapter on other methods is not. Its coverage of leak testing is grossly inadequate, all the more so because it uses three different sets of units for sensitivity (one of them incorrect) in the space of two pages. Microwave methods receive only half a page better to have omitted this subject altogether.

In the preface, the author states that the book is written for engineers at undergraduate and graduate levels. This should not be taken to mean that both undergraduate and graduate engineers will benefit from it, but rather that some parts of the book are written at the undergraduate level and others at a considerably more advanced level. The chapter on electrical methods, for example, which deals primarily with eddy current methods, elaborates the elementary principles in a clear and thorough manner. By contrast, the treatment of optical holographic methods (in the chapter on visual methods) would be incomprehensible to one not already educated in optical physics.

Although paper-bound, the book is beautifully made. The type is large and clear, easy to read, and the figures are clear and sharp. It is obvious that no attempt was made to economize on the figures—they are both_large and numerous. Unfortunately, one cannot be as complimentary about the editing. Directly contradictory statements are made about the safety of exposure to ultraviolet light, and two different editions of an ISO document are quoted within a single chapter. More significantly, where new textual material was added to what had previously appeared in the first edition, it was not properly integrated. Under the heading of thermographic methods, for example, new material on thermal wave testing precedes the more elementary description of conventional infrared thermography. Elsewhere, a revision of the chapter on magnetic methods resulted in the unfortunate deletion of the definition of μ_{i}^{*} the permeability of the material.

American readers may be somewhat less pleased with the book than British readers. The author makes many references to British and European standards, relatively few to ASTM standards or to calibration services available in this country. This is entirely understandable since the author, being British, is clearly more familiar with European practices. What is puzzling, however, is his failure to acknowledge or to cite references for many of the major American developments in NDT that he nevertheless discusses in detail, especially in the chapter on acoustic emission methods. (Actually, the entire volume suffers from inadequate references. The reader who would like to further pursue a particular technique or application is rarely given any indication of where to turn.) Many Americans may assume that the English are superior in their usage of English grammar. This book tends to show otherwise. It is replete with misspellings as well as other grammatical errors (such as improper punctuation) to the point where the phrasing in a few places is confusing.

The first edition of this book was published in 1987. There was a second printing only two years later, and this, the second edition, appeared only two years after that. With this kind of demand it is safe to say that there will probably be a third edition within a few years that will provide the opportunity to rectify these minor errors. The concerned student or practitioner of NDT should not wait, however. The present edition will serve him or her well.