



book reviews

METAL FATIGUE, by N. E. Frost, K. J. Marsh and L. P. Pook, Oxford University Press, New York, 1975, pp. xii + 499, \$42.00.

REVIEWED BY IAIN LE MAY¹

This volume is a substantial contribution to the literature on fatigue, providing a wealth of information on the fatigue properties of many engineering alloys, and a comprehensive review of the existing literature in most areas of fatigue damage and crack propagation; nonetheless, this reviewer found it to be a disappointing book as there is very scant coverage of several areas of current interest and importance to engineers and metallurgists involved in fatigue studies or in design methods to obviate fatigue failure. In particular, the authors do not provide a satisfactory coverage of the important matter of elevated temperature fatigue and lifetime prediction where creep deformation also becomes important, thermal ratchetting phenomena are not discussed, nor is an adequate review of low-cycle fatigue presented. These topics are of considerable importance at the present time, particularly as they relate to nuclear power plants, and this fact is illustrated by the number of recent conferences devoted to them and by the number of such papers appearing in the current literature on fatigue. These criticisms apart, the authors have provided a most useful compendium of information relating to more conventional fatigue properties and test methods which will serve as a good reference source for many workers.

The authors have chosen to present their book in an essentially classical format, dealing in turn with crack initiation, fatigue strength of plain specimens, effect of notches on fatigue strength, and fatigue crack growth, followed by an extensive chapter entitled "Notes on Various Other Aspects of Fatigue," and a number of Appendixes dealing with elementary concepts. While this order does indeed help the reader to trace the historical development of the understanding of metal fatigue, as the writers indicate to be their intention in their Introduction, it may be that it has also contributed to the relative neglect of the topics of more recent interest and activity as mentioned above.

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It is to be hoped that, when preparing a revised edition of this work in due course, the authors will expand its already extensive coverage to make it a truly up-to-date reference book for the whole subject of metal fatigue.

COMPOSITE MATERIALS AND THEIR USE IN STRUCTURES, J. R. Vinson and T. W. Chou, John Wiley & Sons, New York—Toronto, 1975, 438 pp.

REVIEWED BY K. K. CHAWLA²

The authors' assertion that "there is no adequate teaching text for composite materials today" is true without a shadow of doubt. This book is an attempt of theirs to correct this deficiency. It would be an uphill task, almost an impossible one, to do justice in trying to cover such a broad, and at the moment explosive, field in one volume. Selection from the voluminous material available is inevitable. This is bound to cause every reader to feel that some of his pet topics have been left out. But then there is no way around that. The authors present a mix of materials science aspects and structural mechanics aspects of composites. A brief introduction is followed by short descriptions of various fiber reinforced systems, their preparation and properties. I found missing any reference to an important system though, viz., fiber reinforced cement. A rather sketchy treatment is then given to dispersion hardened and directionally solidified eutectics. This is followed by chapters on plate and shell theory, anisotropic elasticity, analysis of plates made of composites, and anisotropic shells. Finally a chapter on strength and fracture of composite materials concludes the book. The authors have done well to use SI units along with the British system. A few problems are given at the end of all chapters but one on plate and shell theory which is excerpted from another book and so the reader is referred to the original book for problems. There are plenty of references to literature; sadly though the authors have not cared to give references in a uniform style—at places they are incomplete. I also found wanting an author index.

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