

BOOK REVIEWS

each of two topics (hot-spot stress and fatigue of chain links) but neither item is listed in the index.

Mechanical Testing

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REFERENCE: *Mechanical Testing*, I. Curbishley, Ed., Institute of Metals, London, and Institute of Metals, North American Publication Center, Brookfield, VT, 357 pp., 1988.

This work is the third in a series of seven monographs on the Characterization of High Temperature Materials under the general editorship of M. McLean. Prior volumes related to microstructural and chemical characterization. The present volume represents the proceedings of a December 1988 seminar, sponsored and organized by the Institute of Metals through its committees on Materials Science, Materials Engineering and Continuing Education. The targeted audience is the nonspecialist who needs to know what types of tests are available, how to select the test most appropriate for his purposes, and who needs to have an appreciation of the methods of determination and analysis of the data he uses and knowledge of the status of national and international standards. As the editor points out, while the emphasis is on high temperature materials, the techniques and principles are applicable to many different material classes, and not all tests relevant to high temperature materials are conducted at high temperatures.

Six particular subject areas are addressed: tensile testing by T. G. F. Gray, Creep Testing by M. S. Loveday, Fatigue Crack Growth by R. P. Skelton, High Strain (Low Cycle) Fatigue by G. Sumner, High Cycle Fatigue by R. W. Suhr, and Fracture Toughness by E. Morland. Though all the authors are from British university, government, or industrial laboratories, the work is not at all parochial. Extensive reference and discussion are made to other national and international testing standards as well as to various ASTM publications. The articles are all well-written and extensively referenced and illustrated. In general, the aim is to include representative, not exhaustive, review and citation of the literature. It is notable that nearly all the authors indicate appreciation for the historical development of the field by citing some pioneering contributions from the Renaissance to near-modern times.

In accordance with the major objective of the series, more than half of the text is devoted to descriptive and prescriptive discussion of mechanical testing methods. Standards and data receive relatively less attention and are completely ignored by Suhr in an otherwise excellent essay. Only enough theory of mechanical behavior and physical metallurgy is included to en-

able understanding of the design and application of test methods. The skilled hand of the editor, I. Curbishley of UKAEA, is evident in the cross-referencing between chapters, in the quality of the author-prepared typescripts, and in his own contribution on crack growth during creep. Regretably, Curbishley did not see fit to add an index.

The discussions on standards for mechanical testing cover: comparisons between British, European, American, and International Standards; observations of standards missing or only now under development; notation of parameters needed but not specified in current standards or methods for their control when not defined; the accuracy to be expected from test data if all provisions of current standards are met; the criteria for choice of a particular test standard in a given application area; and the tie between test standards (and the resulting data) and design codes.

Although most chapters contain some treatment of test data, particularly their accuracy and areas of application, much more might have been said about pertinent methods of data analysis, modelling, and extrapolation techniques. The most egregious omission (which will frustrate both the mechanical designer and the test developer who seeks some reliable data for comparison) is the failure to list key data compilations, either printed or computerized, in each topical area. Tabular compilations and graphical compendia (so-called atlases) exist on both sides of the Atlantic, put out by such reputable organizations as ESDU, British Steel, DoD, SAE, and MPC, as well as ASTM in its Data Series publications.

The book succeeds well in its effort to provide a readily comprehensible overview of mechanical testing for the nonspecialist. It is unfortunate that, despite the "Materials" of the series title, the present work is devoted almost exclusively to metals; yet ceramics, polymers and composites are well known to pose special testing problems of their own. While the particular test methods chosen for discussion are clearly the most important, a more comprehensive coverage would have included treatment of hot hardness, formability/workability, and stress relaxation.

Adequate reference is provided in each of the chapters to specialized monographs, conference proceedings, and encyclopedic treatises in that topical area. However, a reader wishing a broad, contemporary, but more in-depth coverage of the same scope and quality as the present volume should be directed to Loveday, Day, and Dyson, "Measurement of High Temperature Mechanical Properties of Materials," (HMSO, 1982) or to "Mechanical Testing" (1985), Vol. 8 of ASM's *Metals Handbook*; the latter is not even mentioned.

In sum, we have here a valuable, up-to-date, concise, but incomplete treatment of the subject field which will be useful to those developing and using standards and those doing mechanical testing.