

## BOOK REVIEWS

### Innovation: A Challenge to the Engineer

Reviewed by Woodland G. Shockley, Vicksburg, MS 39180.

**REFERENCE:** Holt, K., *Innovation: A Challenge to the Engineer*, Elsevier Science Publishers, Amsterdam, 1987, xii + 452 pp., Dfl. 180.000.

Some may call it *invention*, some *research and development*, but, according to the author, these and similar concepts are all part of a much larger process called *innovation*. This book is directed towards engineers who participate in the product innovation process and towards others such as marketing, financial, and personnel people who have associated roles. It examines in depth each aspect of the process from the planning stage through production, exploring various strategies that may be used in each stage in order to produce a useful innovation that will succeed in the marketplace.

Many examples are given of approaches used by actual firms in successful and unsuccessful situations. Alternative strategies are proposed and potential outcomes are discussed. The book is up to date in that it discusses the impact of environmental concerns, safety, and ergonomics on the production of the innovation and on its acceptance in the marketplace. Although the book is aimed at the industrial engineer, the ideas and concepts presented have application to many innovations in other engineering fields. It is a reference work from which both the experienced engineer and the novice can benefit.

In addition to many illustrative examples, the book contains a large number of figures to explain and clarify the ideas presented. There is a voluminous list of references from which the author has drawn his material. The book has a subject index and an index of the companies mentioned in the text.

The book has been printed from "camera-ready" text prepared on a typewriter or word processor. The resultant copy is not pleasing to the reader's eye. Since so many subjects are covered, it would have helped the reader to have headings on each page indicating at least the chapter name. Also, a list of figures with page numbers would be of benefit, since the author often refers to a prior figure and the reader has to thumb through many pages before he finds the right one. Unfortunately, neither the author nor the publisher saw fit to edit the text. There are many misspelled words; in the first chapter the names of at least six well known innovators, two of them Nobel Prize winners, are misspelled. Also there are awkward grammatical constructions. The author evidently is not familiar with American idiomatic usage and some sentences are difficult to understand. The reader has to approach this book with a good sense of humor in order to overcome these deficiencies.

### Materials and the Designer

Reviewed by J. H. Westbrook, Sci-Tech Knowledge Systems, Scotia, NY 12302.

**REFERENCE:** Cornish, E. H., *Materials and the Designer*, Cambridge University Press, 1987, cloth, \$59.50.

This book reviews the concerns of the designer in manufacturing industry: in the selection of materials, in the consideration of alternative processing routes, and in the identification and assessment of the property values necessary to carry out the design of the part or component. Although the materials coverage is very broad, an arbitrary decision was made to omit all aspects of the building and construction industry as well as materials for certain specialized functions such as magnetics and semiconductor electronics.

Following a discussion of the impact of design on manufacturing and of the expertise required for design, individual chapters review each of the principal materials classes: metals and alloys, ceramics, polymers, composites, finishes, and coatings. The second half of the book covers such topics as materials performance in service, materials reliability and service life, materials substitution, and the interaction between materials forming processes and design. The concluding chapters present sources of information and standards.

The book is not textbook, reference work, or narrative but rather an overview of the subject for the student or practicing designer or manufacturing engineer. It generally satisfies this objective of an overview of materials *vis-à-vis* design through a clear and well organized scheme of presentation with ample reference to further sources of information. On the other hand, the work would have definitely benefited from a thorough review by someone more deeply versed in materials engineering and pedagogy than the author before commitment to print. Some of the more egregious defects are: redundant treatment of the same topic in several chapters; omission of worked examples of real-world case histories; non-uniform and confusing treatment of units (e.g., no less than nine different units for strength); numerous typos not caught in proof; and technical inaccuracies ranging from infelicitous phrasing to outright technical error. Examples of the last include:

- p. 235—Diffusion bonding of aluminum to stainless steel is *not* effected by atomic movements resulting in the formation of interstitial inclusions.
- p. 87—The first translucent ceramic was *not* a Japanese development with  $\text{Al}_3\text{N}_4$  but rather the famous Lucalox lamp envelope of doped  $\text{Al}_2\text{O}_3$  by General Electric.
- p. 187—Sprayed ceramic coatings for jet engine blades do *not* perform the primary technical function, the blades themselves do.
- p. 43—Anisotropic properties of composites result from well oriented *not* randomly oriented fibers.

And there are more! Such instances arise not from ignorance but from carelessness, sloppy writing, and inadequate editorial review. Some Criticisms of language and reference to commercial products

and technical jargon mar the work but do not seriously impede understanding for an American reader.

ASTM readers must also be warned that Cornish's treatment of the design process does not extend to the generation and use of materials standards and codes of practice, application of test methods, or analysis of test results.

In summary, we have here a book on an important subject, well planned, but imperfectly executed. As a tool for the classroom or

for independent learning it is inferior to competitive works by Dieter<sup>1</sup> and by Ashby and Jones.<sup>2</sup>

<sup>1</sup>Dieter, G. E., *Engineering Design: A Materials and Processing Approach*, McGraw-Hill, New York, 1983.

<sup>2</sup>Ashby, M. F. and Jones D. R., *Engineering Materials: An Introduction to Their Properties and Applications*, Pergamon, Oxford, 1980; *An Introduction to Microstructures, Processing, and Design*, Pergamon, Oxford, 1986.