Book Review

Title: DESIGN PARADIGMS; Case Histories of Error and Judgment in Engineering

Henry Petroski
Cambridge University Press
1994

This is a delightful book in which the author describes some of the famous (and not so famous) engineering mistakes that have enlivened the progress of technology throughout history.

The main thesis of the book is that the design engineer can profit from mistakes (in contemporary language, we call them failures), as well as the successful designs.

The thesis is repeated several times in the form of vivid and interesting descriptions of the failures.

Here are a few of the more colorful cases:

The story of John Roebling, the builder of the bridges across the Niagara Falls, the George Washington Bridge in New York, and the famous Brooklyn Bridge between Manhattan Island and Long Island (the latter was actually completed by Roebling's son, Washington Roebling) shows that Roebling apparently took careful notice of where previous suspension bridges had failed and, realizing where the failures had occurred, proceeded to design additional suspension bridges that utilized (1) the suspension concept, (2) successful parameters from previous bridges, and (3) knowledge of the failures that had occurred in other suspension-type bridges.

The story of Vitruvius and his auger (drill) from the fourth century before the Christian Era is an interesting example of how a design may appear to work on a small scale but not work at all when an attempt is made to implement it on a full scale. It would not be fair to reveal the solution to this engineering failure in this review. Instead, it would be worthwhile for the reader to examine the story of how a certain Diognetus achieved a superb triumph in engineering for the city of Rhodes after another person named Callius had developed and tested (on a small scale) a flawed design.

The story is delightful and delightfully told.

The book also contains some stories of how that erstwhile genius, Galileo actually made some errors...errors we dare not divulge.

The book is easy reading and is the type of book a technical person may want to read at an airport while waiting for a flight.

One criticism that might be mentioned is that the message of failure analysis is repeated too frequently.

This shortcoming can be overlooked...the interesting stories and the historical perspectives are well worth reading.

Title: NANOCERAMICS
Publisher: The Institute of Materials
British Ceramic Society
Proceedings No. 51
Editor: Robert Freer
1993
ISBN: 0-901716-41-3
PRICE: $135
205 pages

The papers contained in this book were presented at a meeting of the Basic Science Section of the Institute of Ceramics held at Churchill College, Cambridge, 8-10 April 1992.

The book is an excellent compilation of papers on nano-size materials; their preparation, their characterization, and their properties.

A partial list of the contents gives a good idea of the book:

- An Analysis of the Sintering and Growth of Voids in Nanocrystalline Materials
- Sol Processed Nanoceramic Zirconia Fibre Coatings
- HIP Densification of Nanophase SiC
- Sol Gel Processing of Monolithic and Composite Mullite Ceramics
- Preparation, Microstructural Control and Superplasticity of Nanostructured Yttria/Ceria Stabilized Tetragonal Zirconia Ceramics
- Fabrication and Use of "Green" Sol-Derived Nanophase Alumina Feedstock Rods for Producing Laser Melt Grown Single Crystal Alumina Fibres

The list could go on.

The text has been prepared well. The book is attractive. The book fits well with the lengthy series of monographs from the Institute.

The reference lists associated with the papers are extensive.

One word of caution: in some papers, it is found that undefined terms abound. The editors have made a valiant effort to prevent such a happening, but it occurs.

Even with this minor negative observation, the book is highly recommended for workers in the nanocrystalline area.