

studies include the use of logistics at BMWAG, modelling international and national distribution and production at PE, the important increase in third-party distribution services at Tibett & Britten Group PLC, etc. Concepts of logistics in the brewing industry and steel industry are also presented. The two main goals, namely reduction of logistics costs (costs of order-processing, storage and transport) and improvement of the customer service (delivery time, delivery reliability, delivery conditions and flexibility, service standard), which are frequently in conflict are well emphasized here.

The future for logistics is discussed in the last part of the book. Key areas of system application include forecasting, stock management, production/customer profitability and retailing. The impact of digital communication and growth in direct marketing on logistics management and on the structure of logistics systems is highlighted. It has also been shown that the integration of design and support engineering will result in improved corporate profitability.

This is a good book to read. A lot of graphs, figures and tables are included to help the reader understand the different systems. In some articles sufficient references are given to guide those interested to look further into the literature.

Contributors are from market-leader firms, mainly from the UK, USA and West Germany, but Italy, the Netherlands, France and Switzerland are also represented. There is, however, no contribution from Japan, which is quite surprising.

This is not a technical book but it provides the reader with a wide methodology in looking at logistics in manufacturing. Although not a standard OR text, I would certainly recommend this book for university libraries. International logistics managers, OR practitioners and students of logistics management, marketing and industrial engineering will find it very helpful.

S. SALHI

### **A Primer of Reliability Theory**

DORIS LLOYD GROSH

*Wiley, New York, 1989. 373 pp. US\$57.50*

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The author declares that her intention in writing this book is to give the necessary background (of theoretical statistics?) to enable engineering students to 'appreciate' the reliability literature during their future careers. The material is, of course, the author's personal choice, though based on many years of teaching and research. After a brief introductory chapter indicating a relationship between quality control and reliability theory, the statistical properties of a list of the more popular lifetime distributions, from the exponential to the Weibull and Lognormal, are given. A core chapter on multi-component systems introduces definitions of the reliability of components/systems, structure functions, minimal path and cut sets for determining bounds on the reliability of a system, and the evaluation of mean times to failure. A short feature on star and delta configurations for easing the effort of reliability calculations is an interesting contribution, followed by a piece on the allocation of subsystems with differing failure rates. The next topic discussed is stand-by redundancy, with primary and stand-by components having different failure rates.

A second core subject, life testing, is covered in some detail, with treatment of types of censored data, with and without replacement, hypothesis testing, and taking care of cost aspects. This is by far the best chapter in the book. Use of the sequential probability ratio test in testing reliability hypotheses follows orthodox lines and is succeeded by the case of repairable items, where again a customary stochastic process treatment is given. An added piece on preventive maintenance is interesting. Even admitting the fact that this book is a primer, the statistical and operational research student may find its pace rather pedestrian, with too much emphasis on basic results. However, there are some nice approaches to familiar scenes, and although it would not be my recommended text, it could be one to browse through with advantage.

The book closes with a listing of military standards literature, which appears vast, as well as a long list of common acronyms used. Both of these are intimidating! It is salutary to note that TEMP is not an abbreviation for 'temperature' but for 'test and evaluation master plan'!

DEREK RAY