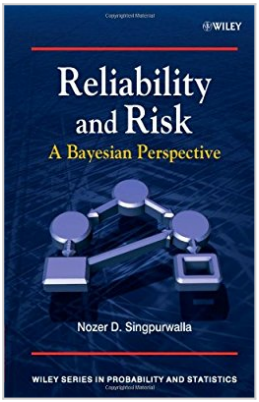

Reliability and Risk: A Bayesian Perspective

By Nozer D. Singpurwalla

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We all like to know how reliable and how risky certain situations are, and our increasing reliance on technology has led to the need for more precise assessments than ever before. Such precision has resulted in efforts both to sharpen the notions of risk and reliability, and to quantify them. Quantification is required for normative decision-making, especially decisions pertaining to our safety and wellbeing. Increasingly in recent years Bayesian methods have become key to such quantifications.

Reliability and Risk provides a comprehensive overview of the mathematical and statistical aspects of risk and reliability analysis, from a Bayesian perspective. This book sets out to change the way in which we think about reliability and survival analysis by casting them in the broader context of decision-making. This is achieved by:

- Providing a broad coverage of the diverse aspects of reliability, including: multivariate failure models, dynamic reliability, event history analysis, non-parametric Bayes, competing risks, co-operative and competing systems, and signature analysis.
- Covering the essentials of Bayesian statistics and exchangeability, enabling readers who are unfamiliar with Bayesian inference to benefit from the book.
- Introducing the notion of “composite reliability”, or the collective reliability of a population of items.
- Discussing the relationship between notions of reliability and survival analysis and econometrics and financial risk.

Reliability and Risk can most profitably be used by practitioners and research workers in reliability and survivability as a source of information, reference, and open problems. It can also form the basis of a graduate level course in reliability and risk analysis for students in statistics, biostatistics, engineering (industrial, nuclear, systems), operations research, and other mathematically oriented scientists, wherein the instructor could supplement the material with examples and problems.

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Editorial Review

Review
"The book is written by an expert in reliability analysis and it is a very valuable source of information for mathematical models for reliability problems ... An extensive bibliography concludes the book." (Stat Papers, 2011)

"As the author mentions in his preface, the book can be read in several different ways, as a text for a graduate level course on reliability or as a source book for “information and open problems." This book has been a joy to read for this reviewer." (*International Statistical Review*, August 2008)

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"The material of this book will be most profitable for practitioners and researchers in reliability and survivability, who will greatly appreciate it as a source of information and open problems." (*Mathematical Reviews*, 2008h)

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From the Back Cover
"Reliability studies lead to problems of how to act and action is best carried out by Bayesian principles. The author uses these to provide a clear account of the subject that will be of value to both theoreticians and practitioners."
—**Dennis V. Lindley**

"This is a wonderful book—well written, exceptionally wide-ranging in its coverage of reliability and risk concepts and applications, and coherently focused throughout by its Bayesian perspective."
—**Adrian F. M. Smith**, Queen Mary, University of London, UK

“This groundbreaking book should be invaluable to those who wish to understand reliability and survival analysis from the modern Bayesian perspective."

—**Joseph B. Kadane**, Carnegie Mellon University, Pittsburgh, USA

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