



# Reliability of Safety-Critical Systems: Theory and Applications

*Marvin Rausand*

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**Reliability of Safety-Critical Systems: Theory and Applications** Marvin Rausand

*Presents the theory and methodology for reliability assessments of safety-critical functions through examples from a wide range of applications*

*Reliability of Safety-Critical Systems: Theory and Applications* provides a comprehensive introduction to reliability assessments of safety-related systems based on electrical, electronic, and programmable electronic (E/E/PE) technology. With a focus on the design and development phases of safety-critical systems, the book presents theory and methods required to document compliance with IEC 61508 and the associated sector-specific standards.

Combining theory and practical applications, *Reliability of Safety-Critical Systems: Theory and Applications* implements key safety-related strategies and methods to meet quantitative safety integrity requirements. In addition, the book details a variety of reliability analysis methods that are needed during all stages of a safety-critical system, beginning with specification and design and advancing to operations, maintenance, and modification control. The key categories of safety life-cycle phases are featured, including strategies for the allocation of reliability performance requirements; assessment methods in relation to design; and reliability quantification in relation to operation and maintenance. Issues and benefits that arise from complex modern technology developments are featured, as well as:

- Real-world examples from large industry facilities with major accident potential and products owned by the general public such as cars and tools
- Plentiful worked examples throughout that provide readers with a deeper understanding of the core concepts and aid in the analysis and solution of common issues when assessing all facets of safety-critical systems
- Approaches that work on a wide scope of applications and can be applied to the analysis of any safety-critical system
- A brief appendix of probability theory for reference

With an emphasis on how safety-critical functions are introduced into systems and facilities to prevent or mitigate the impact of an accident, this book is an excellent guide for professionals, consultants, and operators of safety-critical systems who carry out practical, risk, and reliability assessments of safety-critical systems. *Reliability of Safety-Critical Systems: Theory and Applications* is also a useful textbook for courses in reliability assessment of safety-critical systems and reliability engineering at the graduate-level, as well as for consulting companies offering short courses in reliability assessment of safety-critical systems.

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